DIPLOMADO DE PROFUNDIZACION CISCO CCNP
PRUEBA DE HABILIDADES PRÁCTICAS CCNP

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA - ECBTI
INGENIERÍA DE TELECOMUNICACIONES
BOGOTÁ
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Diplomado de opción de grado presentado para optar el
Título de INGENIERO DE TELECOMUNICACIONES.

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2021

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Firma del Jurado

Bogotá (29, noviembre, 2021)

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GLOSARIO

LACP: (Protocolo de control de agregación de enlaces) forma parte de una especificación IEEE (802.3ad) que permite agrupar varios puertos físicos para formar un único canal lógico. LACP permite que un switch negocie un grupo automático mediante el envío de paquetes LACP al peer. Realiza una función similar a PAgP con EtherChannel de Cisco. Debido a que LACP es un estándar IEEE, se puede usar para facilitar los EtherChannel en entornos de varios proveedores.

ETHERCHANNEL: Es una tecnología de Cisco que 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.

OSPF: Es un protocolo de red de enrutamiento que está basado en la tecnología de Estado de enlace (link state) que usa el algoritmo de Dijkstra para calcular la ruta más corta entre dos nodos. Su métrica es el *costo* y este valor es inversamente proporcional al ancho de banda de la interfaz.

SPANNING TREE: Es un protocolo que funciona en el nivel de la capa 2 del modelo OSI y su principal objetivo es controlar los enlaces redundantes, asegurando el rendimiento de una red, evitando los bucles, pero garantizando los enlaces de respaldo si falla un enlace activo.

VLAN: Virtual LAN (red de área local virtual) es un método para crear redes lógicas independientes dentro de una misma red física. Las VLAN pueden coexistir en un único switch, separando segmentos lógicos de una red de área local que no deberían intercambiar datos usando la red local.

BGP: protocolo de encaminamiento EGP muy utilizado en Internet. El cual, funciona sobre TCP por el puerto 179. Se ejecuta mediante el establecimiento de sesiones BGP inter-AS sobre conexiones TCP.

IP SLA: herramienta útil que permite la supervisión de la disponibilidad, la fiabilidad y el rendimiento de los enlaces WAN (conexiones lógicas entre dos hosts de red distantes geográficamente).

RESUMEN

Inicialmente, se interpreta que el presente proyecto evidencia el desarrollo de un escenario propuesto en el diplomado de profundización CISCO CCNP, con el propósito de demostrar las habilidades y destrezas que se adquirieron a lo largo del diplomado, los cuales permiten poner a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking. No obstante, este trabajo teórico práctico permite optar como opción de grado para las carreras de Ingeniería de Telecomunicaciones e Ingeniería Electrónica de la universidad Nacional Abierta y a Distancia. Por tanto, en su desarrollo se utiliza la herramienta GNS3 para simular la solución a la problemática en el escenario propuesto, consiguiendo la configuración de la red para que tenga una accesibilidad completa de un extremo a otro, y donde los hosts tengan un soporte confiable de la puerta de enlace predeterminada (default gateway) y que los protocolos configurados estén operativos dentro de la parte correspondiente a la "Red de la Compañía" según la topología propuesta. Es decir, que se requirió interconectar tres routers , dos switches multicapa , y un switch de capa 2 empleando distintos protocolos de enrutamiento como OSPF , EIGRP, BGP, Spanning-Tree (RSTP), entre otros requerimientos de conmutación, para dar solución a los requerimientos de este tipo de redes permitiéndoles redundancia del primer salto, configurando mecanismos de seguridad en los dispositivos, funciones de administración de red. Por tanto, se aplicaron las configuraciones iniciales a los equipos, así como la implementación de una interfaces loopback en el router que opera como ISP Proveedor de internet a la red, además se realizó la aplicación de redistribución de rutas entre los protocolos. Es decir que se configuraron dispositivos routers, switches de capa 2 y capa 3, empleando interfaces troncales EtherChannels, realizando asignación de VLANs, así como protocolos LACP, BGP, NTP, HSRPv2 y SNMPv2c. Una vez desarrolladas las configuraciones en el escenario propuesto se logró verificar a través de los distintos comandos, show ip route, pings, show vlan brief, show interfaces trunk, show spanning-tree, show EtherChannel summary, el funcionamiento correcto en las redes simuladas.

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

ABSTRACT

Initially, it is interpreted that this project shows the development of a proposed scenario in the CISCO CCNP in-depth diploma course, with the purpose of demonstrating the skills and abilities that were acquired throughout the course, which allow testing the levels of understanding and problem solving related to various aspects of Networking. However, this practical theoretical work allows choosing as a degree option for the careers of Telecommunications Engineering and Electronics Engineering of the National Open and Distance University. Therefore, in its development, the GNS3 tool is used to simulate the solution to the problem in the proposed scenario, achieving the configuration of the network so that it has complete accessibility from one end to the other, and where the hosts have a reliable support of the default gateway and that the configured protocols are operational within the part corresponding to the "Company Network" according to the proposed topology. In other words, it was required to interconnect three routers, two multilayer switches, and a layer 2 switch using different routing protocols such as OSPF, EIGRP, BGP, Spanning-Tree (RSTP), among other switching requirements, to solve the problem. The requirements of this type of networks, allowing them to have first-hop redundancy, configuring security mechanisms in the devices, and network management functions. Therefore, the initial configurations were applied to the equipment, as well as the implementation of a loopback interfaces in the router that operates as ISP Internet provider to the network, in addition to the application of redistribution of routes between the protocols. In other words, router devices, layer 2 and layer 3 switches were configured, using EtherChannels trunk interfaces, assigning VLANs, as well as LACP, BGP, NTP, HSRPv2 and SNMPv2c protocols. Once the configurations in the proposed scenario had been developed, it was possible to verify through the different commands, show ip route, pings, show vlan brief, show interfaces trunk, show spanning-tree and show EtherChannel summary, the correct operation in the simulated networks.

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

INTRODUCCIÓN

Inicialmente, se interpreta que en la actualidad de las telecomunicaciones, la red corporativa sea LAN o INALÁMBRICA está orientada a satisfacer las necesidades generales de las organizaciones, cumpliendo con los mejores estándares actuales de comunicación; apoyada con tecnología de avance en su consecución y operando al menor precio posible, reduciendo notablemente los costos de administración y mantenimiento, implementado redes de comunicaciones confiables y eficientes. Por tanto, mediante el desarrollo de esta actividad de Prueba de habilidades prácticas del diplomado de profundización CISCO CCNP se pretende, que los participantes demuestren el grado de desarrollo de competencias y habilidades que adquirieron a lo largo del diplomado. Por tanto, a partir del diseño y simulación empleando la herramienta GNS3 de un escenario propuesto; de red utilizado en pequeña y mediana empresa acorde con el modelo jerárquico y utilizando los protocolos de conmutación y enrutamiento, se tiene como objetivo principal garantizar su funcionalidad y optimizar su rendimiento.

En consecuencia, el documento final de esta actividad teórico práctica aborda el diseño y simulación del escenario practico propuesto elaborado en la herramienta de Simulación GNS3. En conclusión, por medio de esta práctica de laboratorio se configura la red para que tenga una accesibilidad completa de un extremo a otro, donde los hosts tienen un soporte confiable de la puerta de enlace predeterminada (default gateway) y los protocolos configurados se dejan operativos dentro de la parte correspondiente a la "Red de la Compañía" según la topología propuesta. Por lo cual, se interconectaron tres routers , dos switches multicapa , y un switch de capa 2 empleando protocolos de enrutamiento como OSPF , EIGRP, BGP, Spanning-Tree (RSTP), entre otros requerimientos de conmutación, permitiéndole a la pequeña red corporativa la redundancia del primer salto, contar con mecanismos de seguridad de acceso en los dispositivos, funciones de administración de red. Se implemento, una interfaz loopback en el router que opera como ISP Proveedor de internet para la red corporativa operando con BGP como protocolo de encaminamiento EGP para la conexión a Internet. También, se configuraron dispositivos routers, switches de capa 2 y capa 3, empleando interfaces troncales EtherChannels, realizando asignación de VLANs, empleando protocolos LACP, BGP, NTP, HSRPv2 y SNMPv2c.

DESARROLLO

Parte 1: Construir la red y configurar los parámetros básicos de los dispositivos y el direccionamiento de las interfaces.

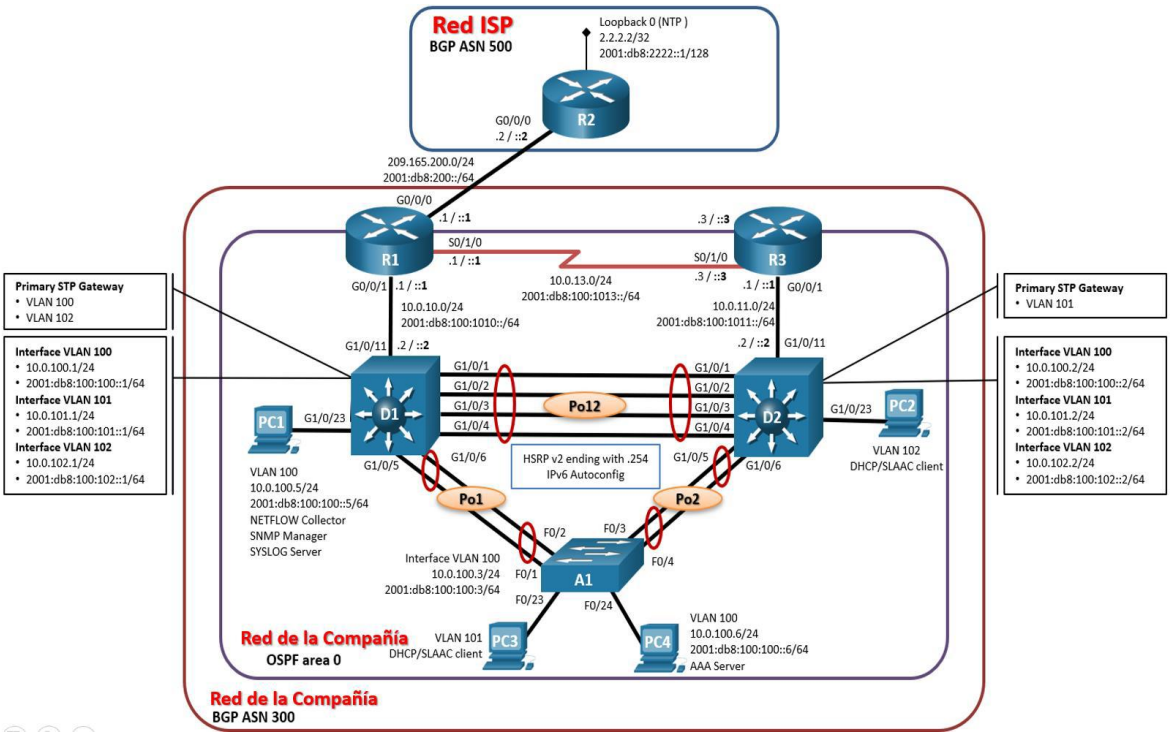

Figura 1 Topología de la Red del Escenario

Tabla de Direccionamiento

Dispositivo	Interfaz	Dirección IPv4	Dirección IPv6	IPv6 Link-Local
R1	G0/0	209.165.200.225/27	2001:db8:200::1/64	fe80::1:1
	G2/0	10.0.10.1/24	2001:db8:100:1010::1/64	fe80::1:2
	S1/0	10.0.13.1/24	2001:db8:100:1013::1/64	fe80::1:3
R2	G0/0	209.165.200.226/27	2001:db8:200::2/64	fe80::2:1
	Loopback0	2.2.2.2/32	2001:db8:2222::1/128	fe80::2:3
R3	G2/0	10.0.11.1/24	2001:db8:100:1011::1/64	fe80::3:2
	S1/0	10.0.13.3/24	2001:db8:100:1013::3/64	fe80::3:3
D1	G1/0	10.0.10.2/24	2001:db8:100:1010::2/64	fe80::d1:1

Dispositivo	Interfaz	Dirección IPv4	Dirección IPv6	IPv6 Link-Local
	VLAN 100	10.0.100.1/24	2001:db8:100:100::1/64	fe80::d1:2
	VLAN 101	10.0.101.1/24	2001:db8:100:101::1/64	fe80::d1:3
	VLAN 102	10.0.102.1/24	2001:db8:100:102::1/64	fe80::d1:4
D2	G1/0	10.0.11.2/24	2001:db8:100:1011::2/64	fe80::d2:1
	VLAN 100	10.0.100.2/24	2001:db8:100:100::2/64	fe80::d2:2
	VLAN 101	10.0.101.2/24	2001:db8:100:101::2/64	fe80::d2:3
	VLAN 102	10.0.102.2/24	2001:db8:100:102::2/64	fe80::d2:4
A1	VLAN 100	10.0.100.3/23	2001:db8:100:100::3/64	fe80::a1:1
PC1	NIC	10.0.100.5/24	2001:db8:100:100::5/64	EUI-64
PC2	NIC	DHCP	SLAAC	EUI-64
PC3	NIC	DHCP	SLAAC	EUI-64
PC4	NIC	10.0.100.6/24	2001:db8:100:100::6/64	EUI-64

Tabla 1 Direccionamiento

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

Se realizó el montaje y conexión de los dispositivos como se solicitó en el diagrama de topología, realizando las conexiones de los cables según el requerimiento.

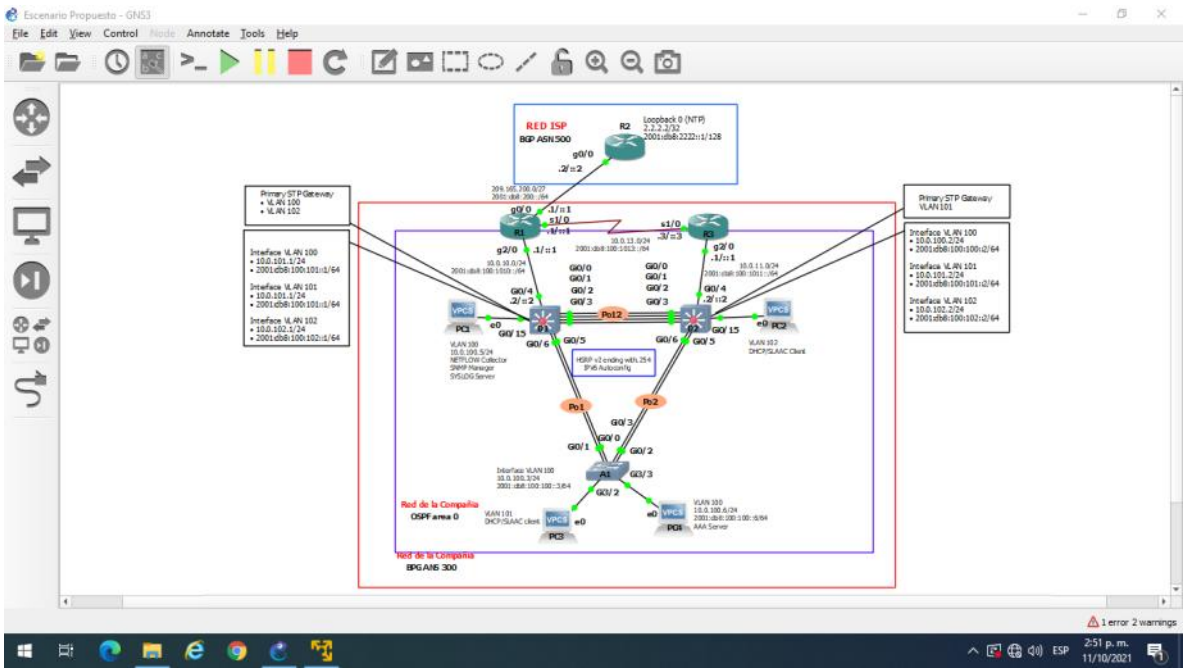

Figura 2 Escenario propuesto GNS3

El montaje de la red que se observa en la figura 2 del Escenario Propuesto se realizó en GNS3 con Máquina virtual de VMawere y empleando el Router C7200,

el iosvl2 de Switch multicapa para GNS3 de Cisco CCNP, a continuación se relaciona el Link de descarga del proyecto portable de GNS3:

Link:

https://drive.google.com/drive/folders/1S7PlKe5SKy4CypF8YaJwVzIX12ksC2T2?usp=sharing

Paso 2: Configurar los parámetros básicos para cada dispositivo.

Se estableció una conexión de consola y se ingresó en cada dispositivo, al modo de configuración global y se aplicaron los parámetros básicos. Por tanto, las configuraciones de inicio que se aplicaron para cada dispositivo se relacionan a continuación:

Router R1

```
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router (config)#hostname R1
R1(config)#ip routing
R1(config)#ipv6 unicast-routing
R1(config)#no ip domain lookup
R1(config)#banner motd " R1, ENCOR Skills Assessment, Scenario 1 "#
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#exec-timeout 0 0
R1(config-line)#login
R1(config-line)#logging synchronous
R1(config-line)#exit
R1(config)#enable secret class
R1(config)#line vty 0 4
R1(config-line)#password cisco123
R1(config-line)#service password-encryption
R1(config)#interface g0/0
R1(config-if)#shutdown
R1(config-if)#
*Oct 12 16:42:08.943: %LINK-5-CHANGED: Interface GigabitEthernet0/0,
changed state to administratively down
*Oct 12 16:42:09.943: %LINEPROTO-5-UPDOWN: Line protocol on Interface
```

```
GigabitEthernet0/0, changed state to down
R1(config-if)#interface g2/0
R1(config-if)#shutdown
R1(config-if)#
*Oct 12 16:42:46.527: %LINK-5-CHANGED: Interface GigabitEthernet2/0,
changed state to administratively down
*Oct 12 16:42:47.527: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet2/0, changed state to down
R1(config-if)#interface s1/0
R1(config-if)#shutdown
R1(config-if)#interface s1/1
R1(config-if)#shutdown
R1(config-if)#interface s1/2
R1(config-if)#shutdown
R1(config-if)#interface s1/3
R1(config-if)#shutdown
R1(config-if)#exit
R1(config)#interface g0/0
R1(config-if)#ip address 209.165.200.225 255.255.255.224
R1(config-if)#ipv6 address fe80::1:1 link-local
R1(config-if)#ipv6 address 2001:db8:200::1/64
R1(config-if)#no shutdown
R1(config-if)#
*Oct 12 16:45:11.995: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed
state to up
*Oct 12 16:45:12.995: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface g2/0
R1(config-if)#ip address 10.0.10.1 255.255.255.0
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)#
*Oct 12 16:46:22.607: %LINK-3-UPDOWN: Interface GigabitEthernet2/0, changed
state to up
*Oct 12 16:46:23.607: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet2/0, changed state to up
R1(config-if)#exit
R1(config)#interface s1/0
R1(config-if)#ip address 10.0.13.1 255.255.255.0
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)#
*Oct 12 16:47:29.847: %LINK-3-UPDOWN: Interface Serial1/0, changed state to
up
R1(config-if)#
*Oct 12 16:47:30.859: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial1/0, changed state to up
R1(config-if)#end
R1#
*Oct 12 16:47:43.387: %SYS-5-CONFIG_I: Configured from console by console
R1#copy running-config startup-config
Destination filename [startup-config]?
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R1#
```

Tabla 2 Configuración Router R1

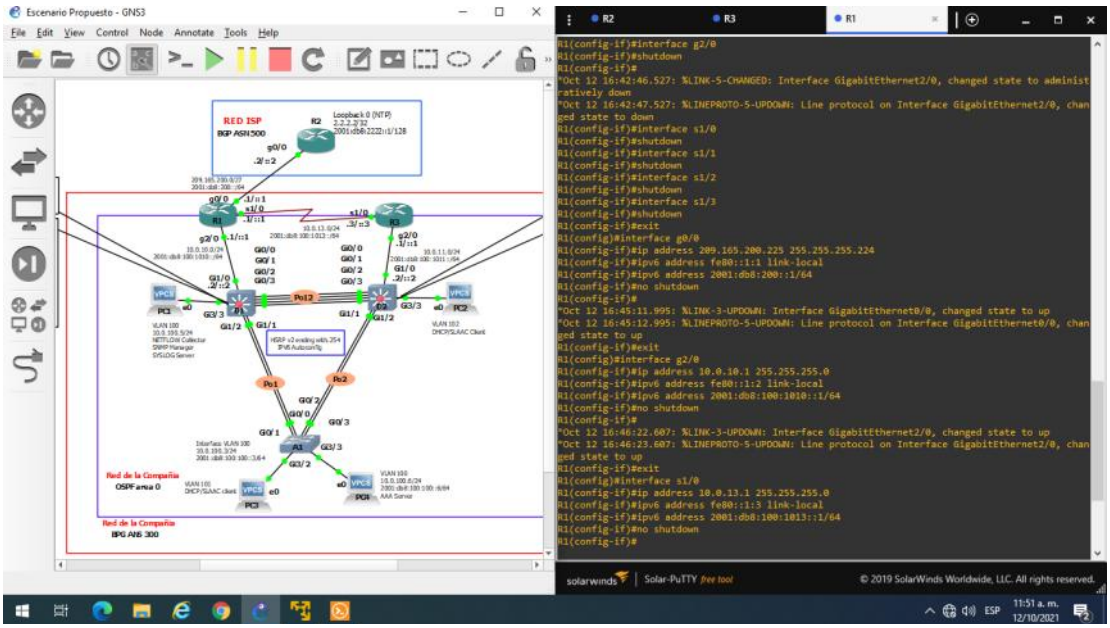

Figura 3 Configuración Router R1

Router R2

```
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R2
```

```
R2(config)#ip routing
R2(config)#ipv6 unicast-routing
R2(config)#no ip domain lookup
R2(config)#banner motd " R2, ENCOR Skills Assessment, Scenario 1 "#
R2(config)#line console 0
R2(config-line)#password cisco
R2(config-line)#exec-timeout 0 0
R2(config-line)#login
R2(config-line)#logging synchronous
R2(config-line)#exit
R2(config)#enable secret class
R2(config)#line vty 0 4
R2(config-line)#password cisco123
R2(config-line)#service password-encryption
R2(config)#interface g0/0
R2(config-if)#shutdown
R2(config-if)#interface g1/0
R2(config-if)#shutdown
R2(config-if)#interface g2/0
R2(config-if)#shutdown
R2(config-if)#interface g3/0
R2(config-if)#shutdown
R2(config-if)#exit
R2(config)#interface g0/0
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)#
*Oct 12 15:37:37.511: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 12 15:37:38.511: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
R2(config-if)#exit
R2(config)#interface Loopback 0
R2(config-if)#
*Oct 12 15:38:07.499: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
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)#end
R2#
```

```
*Oct 12 15:39:06.459: %SYS-5-CONFIG_I: Configured from console by console
R2#copy running-config startup-config
Destination filename [startup-config]?
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R2#
```

Tabla 3 Configuración Router R2

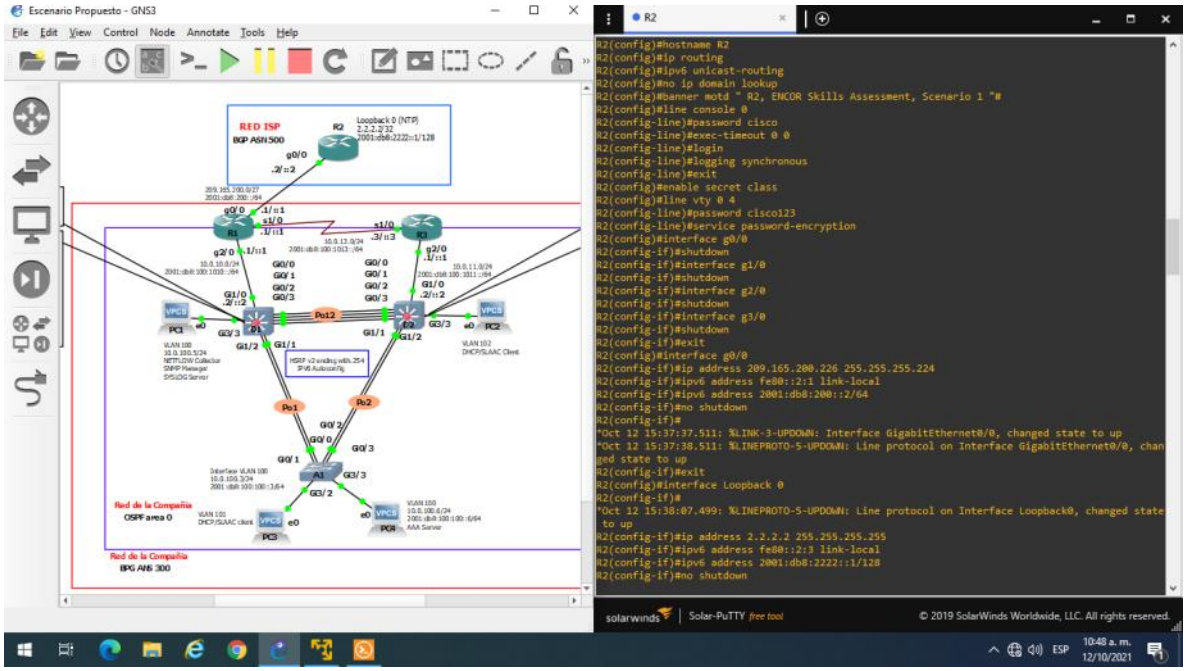

Figura 4 Configuración Router R2

Router R3

```
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router (config)#hostname R3
R3(config)#ip routing
R3(config)#ipv6 unicast-routing
R3(config)#no ip domain lookup
R3(config)#banner motd " R3, ENCOR Skills Assessment, Scenario 1 "#
```

```
R3(config)#line console 0
R3(config-line)#password cisco
R3(config-line)#exec-timeout 0 0
R3(config-line)#login
R3(config-line)#logging synchronous
R3(config-line)#exit
R3(config)#enable secret class
R3(config)#line vty 0 4
R3(config-line)#password cisco123
R3(config-line)#service password-encryption
R3(config)#interface g0/0
R3(config-if)#shutdown
R3(config-if)#interface g2/0
R3(config-if)#shutdown
R3(config-if)#interface s1/1
R3(config-if)#shutdown
R3(config-if)#interface s1/2
R3(config-if)#shutdown
R3(config-if)#interface s1/3
R3(config-if)#shutdown
R3(config-if)#exit
R3(config)#interface g2/0
R3(config-if)#ip address 10.0.11.1 255.255.255.0
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)#
*Oct 12 16:22:57.115: %LINK-3-UPDOWN: Interface GigabitEthernet2/0, changed
state to up
*Oct 12 16:22:58.115: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet2/0, changed state to up
R3(config-if)#exit
R3(config)#interface s1/0
R3(config-if)#ip address 10.0.13.3 255.255.255.0
R3(config-if)#ipv6 address fe80::3:3 link-local
R3(config-if)#ipv6 address 2001:db8:100:1013::3/64
R3(config-if)#no shutdown
R3(config-if)#
*Oct 12 16:24:11.395: %LINK-3-UPDOWN: Interface Serial1/0, changed state to
up
R3(config-if)#
*Oct 12 16:24:12.407: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial1/0, changed state to up
R3(config-if)#end
```

```
R3#
*Oct 12 16:24:29.231: %SYS-5-CONFIG_I: Configured from console by console
R3#copy running-config startup-config
Destination filename [startup-config]?
*Oct 12 16:24:42.139: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial1/0, changed state to down
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R3#
```

Tabla 4 Configuración Router R3

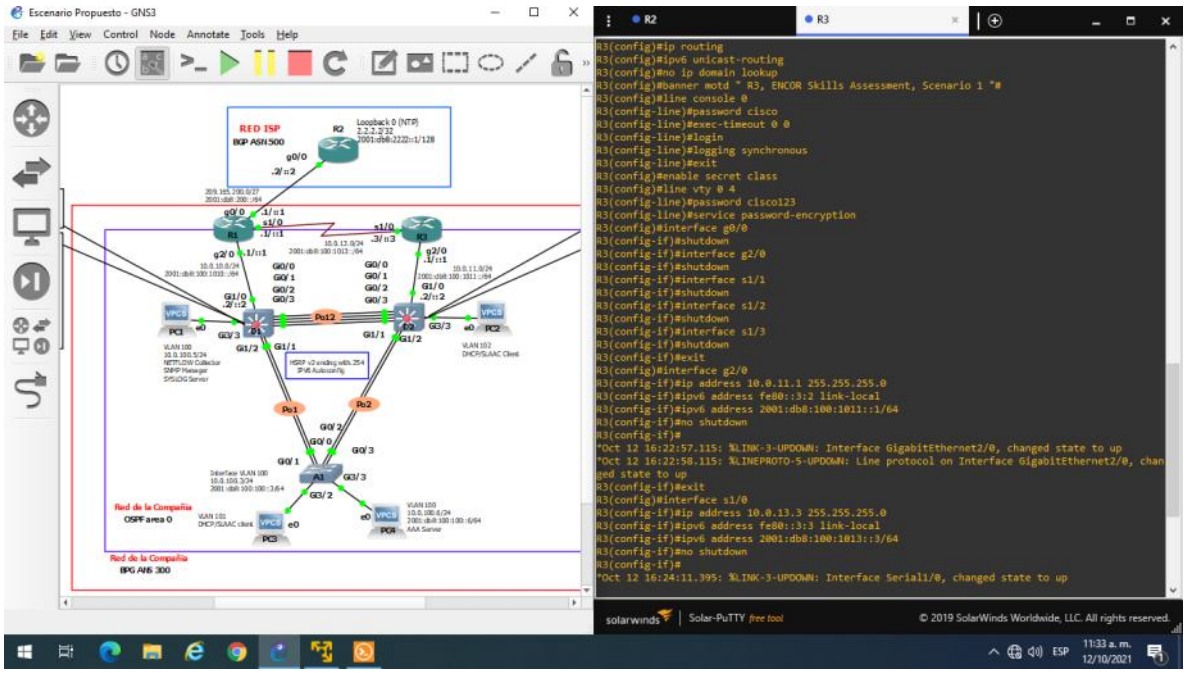

Figura 5 Configuración Router R3

Switch D1

```
Switch>enable
Switch#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname D1
```

```
D1(config)#ip routing
D1(config)#ipv6 unicast-routing
D1(config)#no ip domain lookup
D1(config)#banner motd " D1, ENCOR Skills Assessment, Scenario 1 "#
D1(config)#line console 0
D1(config-line)#password cisco
D1(config-line)#exec-timeout 0 0
D1(config-line)#
*Oct 12 17:59:39.658: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery
stopped (Config Wizard)login
D1(config-line)#login
D1(config-line)#logging synchronous
D1(config-line)#enable secret class
D1(config)#line vty 0 4
D1(config-line)#privilege level 15
D1(config-line)#password cisco123
D1(config-line)#service password-encryption
D1(config)#exit
D1#
*Oct 12 18:01:21.747: %SYS-5-CONFIG_I: Configured from console by console
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#vlan 100
D1(config-vlan)#name Management
D1(config-vlan)#exit
D1(config)#
*Oct 12 18:02:20.904: %PLATFORM-5-SIGNATURE_VERIFIED: Image
'flash0:/vios_l2-adventerprisek9-m' passed code signing verification
D1(config)#vlan 101
D1(config-vlan)#name UserGroupA
D1(config-vlan)#exit
D1(config)#vlan 102
D1(config-vlan)#name UserGroupB
D1(config-vlan)#exit
D1(config)#vlan 999
D1(config-vlan)#name NATIVE
D1(config-vlan)#exit
D1(config)#interface g1/0
D1(config-if)#no switchport
D1(config-if)#
*Oct 12 18:04:27.063: %LINK-3-UPDOWN: Interface GigabitEthernet1/0, changed
state to up
*Oct 12 18:04:28.109: %LINEPROTO-5-UPDOWN: Line protocol on Interface
```

```
GigabitEthernet1/0, changed state to up
D1(config-if)#ip address 10.0.10.2 255.255.255.0
D1(config-if)#ipv6 address fe80::d1:1 link-local
D1(config-if)#ipv6 address 2001:db8:100:1010::2/64
D1(config-if)#no shutdown
D1(config-if)#exit
D1(config)#interface vlan 100
D1(config-if)#
*Oct 12 18:05:38.998: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Vlan100, changed state to down
D1(config-if)#ip address 10.0.100.1 255.255.255.0
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)#
*Oct 12 18:06:43.123: %LINK-3-UPDOWN: Interface Vlan100, changed state to
down
D1(config-if)#exit
D1(config)#interface vlan 101
D1(config-if)#
*Oct 12 18:07:03.544: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Vlan101, changed state to down
D1(config-if)#ip address 10.0.101.1 255.255.255.0
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)#
*Oct 12 18:07:44.057: %LINK-3-UPDOWN: Interface Vlan101, changed state to
down
D1(config-if)#exit
D1(config)#interface vlan 102
D1(config-if)#
*Oct 12 18:08:04.359: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Vlan102, changed state to down
D1(config-if)#ip address 10.0.102.1 255.255.255.0
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)#
*Oct 12 18:09:00.005: %LINK-3-UPDOWN: Interface Vlan102, changed state to
down
D1(config-if)#exit
D1(config)#ip dhcp excluded-address 10.0.101.1 10.0.101.109
D1(config)#ip dhcp excluded-address 10.0.101.141 10.0.101.254
```

```
D1(config)#ip dhcp excluded-address 10.0.102.1 10.0.102.109
D1(config)#ip dhcp excluded-address 10.0.102.141 10.0.102.254
D1(config)#ip dhcp pool VLAN-101
D1(dhcp-config)#network 10.0.101.0 255.255.255.0
D1(dhcp-config)#default-router 10.0.101.254
D1(dhcp-config)#exit
D1(config)#ip dhcp pool VLAN-102
D1(dhcp-config)#network 10.0.102.0 255.255.255.0
D1(dhcp-config)#default-router 10.0.102.254
D1(dhcp-config)#exit
D1(config)#interface range g0/0-3,g1/1-2,g2/0-3,g3/0-2
D1(config-if-range)#shutdown
D1(config-if-range)#
*Oct 12 18:12:05.242: %LINK-5-CHANGED: Interface GigabitEthernet0/0,
changed state to administratively down
*Oct 12 18:12:05.365: %LINK-5-CHANGED: Interface GigabitEthernet0/1,
changed state to administratively down
*Oct 12 18:12:05.594: %LINK-5-CHANGED: Interface GigabitEthernet0/2,
changed state to administratively down
*Oct 12 18:12:05.693: %LINK-5-CHANGED: Interface GigabitEthernet0/3,
changed state to administratively down
*Oct 12 18:12:05.858: %LINK-5-CHANGED: Interface GigabitEthernet1/1,
changed state to administratively down
*Oct 12 18:12:05.971: %LINK-5-CHANGED: Interface GigabitEthernet1/2,
changed state to administratively down
*Oct 12 18:12:06.145: %LINK-5-CHANGED: Interface GigabitEthernet2/0,
changed state to administratively down
*Oct 12 18:12:06.239: %LINK-5-CHANGED: Interface GigabitEthernet2/1,
changed state to administratively down
*Oct 12 18:12:06.242: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0, changed state to down
*Oct 12 18:12:06.366: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to down
*Oct 12 18:12:06.392: %LINK-5-CHANGED: Interface GigabitEthernet2/2,
changed state to administratively down
*Oct 12 18:12:06.488: %LINK-5-CHANGED: Interface GigabitEthernet2/3,
changed state to administratively down
D1(config-if-range)#
*Oct 12 18:12:06.594: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/2, changed state to down
*Oct 12 18:12:07.227: %LINK-5-CHANGED: Interface GigabitEthernet3/0,
changed state to administratively down
*Oct 12 18:12:07.230: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/3, changed state to down
```

```
*Oct 12 18:12:07.232: %LINK-5-CHANGED: Interface GigabitEthernet3/1,
changed state to administratively down
D1(config-if-range)#end
D1#
*Oct 12 18:12:28.492: %SYS-5-CONFIG_I: Configured from console by console
D1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 4604 bytes to 2220 bytes[OK]
*Oct 12 18:13:06.618: %GRUB-5-CONFIG_WRITING: GRUB configuration is
being updated on disk. Please wait...
D1#
```

Tabla 5 Configuración Switch D1

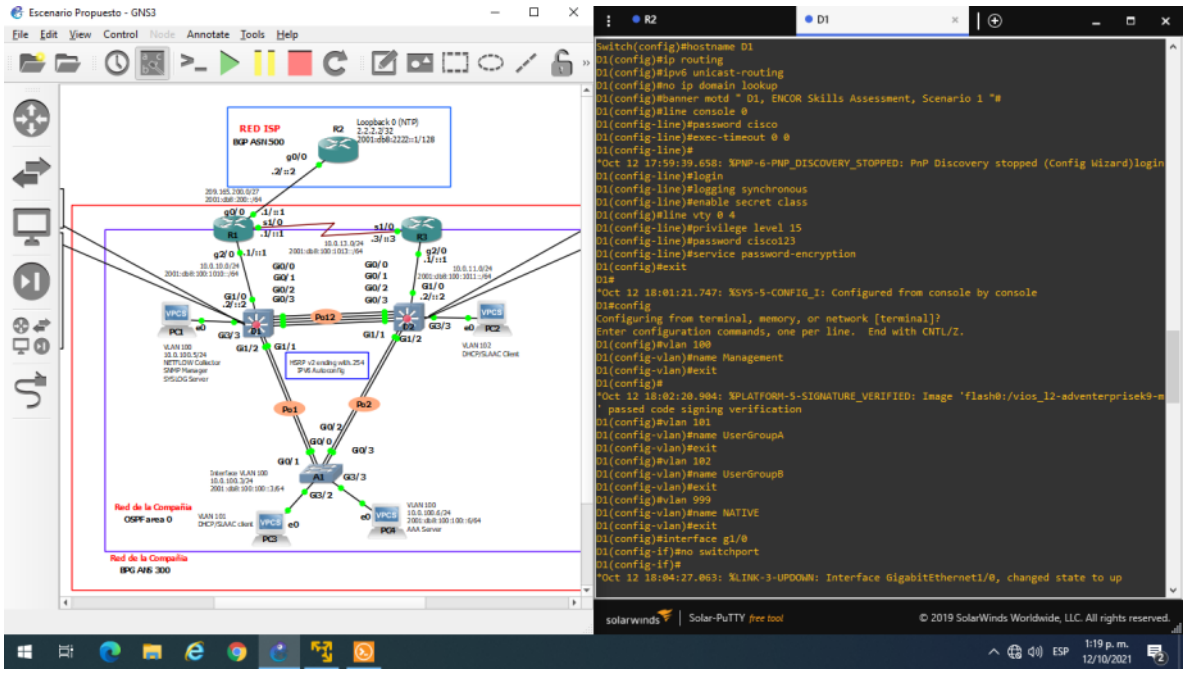

Figura 6 Configuración Switch D1

Switch D2

```
Switch>enable
Switch#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
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 console 0
D2(config-line)#password cisco
D2(config-line)#exec-timeout 0 0
D2(config-line)#login
D2(config-line)#logging synchronous
D2(config-line)#enable secret class
D2(config)#line vty 0 4
D2(config-line)#privilege level 15
D2(config-line)#password cisco123
D2(config-line)#service password-encryption
config)#exit
*Oct 12 20:13:52.627: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery stopped (Config Wizard)
D2(config)#exit
D2#
*Oct 12 20:13:56.953: %SYS-5-CONFIG_I: Configured from console by console exit
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
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 g1/0
D2(config-if)#no switchport
D2(config-if)#
*Oct 12 20:16:47.869: %LINK-3-UPDOWN: Interface GigabitEthernet1/0, changed state to up
D2(config-if)#
*Oct 12 20:16:48.868: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0, changed state to up
D2(config-if)#ip address 10.0.11.2 255.255.255.0
D2(config-if)#ipv6 address fe80::d2:1 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)#
*Oct 12 20:18:29.631: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan100, changed state to down
D2(config-if)#ip address 10.0.100.2 255.255.255.0
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)#
*Oct 12 20:19:50.606: %LINK-3-UPDOWN: Interface Vlan100, changed state to down
D2(config-if)#exit
D2(config)#interface vlan 101
D2(config-if)#
*Oct 12 20:20:19.687: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan101, changed state to down
D2(config-if)#ip address 10.0.101.2 255.255.255.0
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)#
*Oct 12 20:21:10.690: %LINK-3-UPDOWN: Interface Vlan101, changed state to down
D2(config-if)#exit
D2(config)#interface vlan 102
D2(config-if)#
*Oct 12 20:21:31.590: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan102, changed state to down
D2(config-if)#ip address 10.0.102.2 255.255.255.0
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)#
*Oct 12 20:22:17.625: %LINK-3-UPDOWN: Interface Vlan102, changed state to down
D2(config-if)#exit
D2(config)#ip dhcp excluded-address 10.0.101.1 10.0.101.209
D2(config)#ip dhcp excluded-address 10.0.101.241 10.0.101.254
D2(config)#ip dhcp excluded-address 10.0.102.1 10.0.102.209
D2(config)#ip dhcp excluded-address 10.0.102.241 10.0.102.254
D2(config)#ip dhcp pool VLAN-101
D2(dhcp-config)#network 10.0.101.0 255.255.255.0
D2(dhcp-config)#default-router 10.0.101.254
```

```
D2(dhcp-config)#exit
D2(config)#ip dhcp pool VLAN-102
D2(dhcp-config)#network 10.0.102.0 255.255.255.0
D2(dhcp-config)#default-router 10.0.102.254
D2(dhcp-config)#exit
D2(config)#interface range g0/0-3,g1/1-2,g2/0-3,g3/0-2
D2(config-if-range)#shutdown
D2(config-if-range)#
*Oct 12 20:26:12.751: %LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to administratively down
*Oct 12 20:26:12.859: %LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
*Oct 12 20:26:13.026: %LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
*Oct 12 20:26:13.137: %LINK-5-CHANGED: Interface GigabitEthernet0/3, changed state to administratively down
*Oct 12 20:26:13.375: %LINK-5-CHANGED: Interface GigabitEthernet1/1, changed state to administratively down
*Oct 12 20:26:13.485: %LINK-5-CHANGED: Interface GigabitEthernet1/2, changed state to administratively down
*Oct 12 20:26:13.634: %LINK-5-CHANGED: Interface GigabitEthernet2/0, changed state to administratively down
*Oct 12 20:26:13.727: %LINK-5-CHANGED: Interface GigabitEthernet2/1, changed state to administratively down
*Oct 12 20:26:13.751: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to down
*Oct 12 20:26:13.859: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
*Oct 12 20:26:13.890: %LINK-5-CHANGED: Interface GigabitEthernet2/2, changed state to administratively down
*Oct 12 20:26:13.993: %LINK-5-CHANGED: Interface GigabitEthernet2/3, changed state to administratively down
*Oct 12 20:26:14.027: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to down
*Oct 12 20:26:14.137: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3, changed state to down
D2(config-if-range)#
*Oct 12 20:26:14.338: %LINK-5-CHANGED: Interface GigabitEthernet3/2, changed state to administratively down
*Oct 12 20:26:14.375: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed state to down
*Oct 12 20:26:15.040: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/2, changed state to down
D2(config-if-range)#end
```

```
D2#
*Oct 12 20:26:28.995: %SYS-5-CONFIG_I: Configured from console by console
D2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 4604 bytes to 2218 bytes[OK]
D2#
```

Tabla 6 Configuración Switch D2

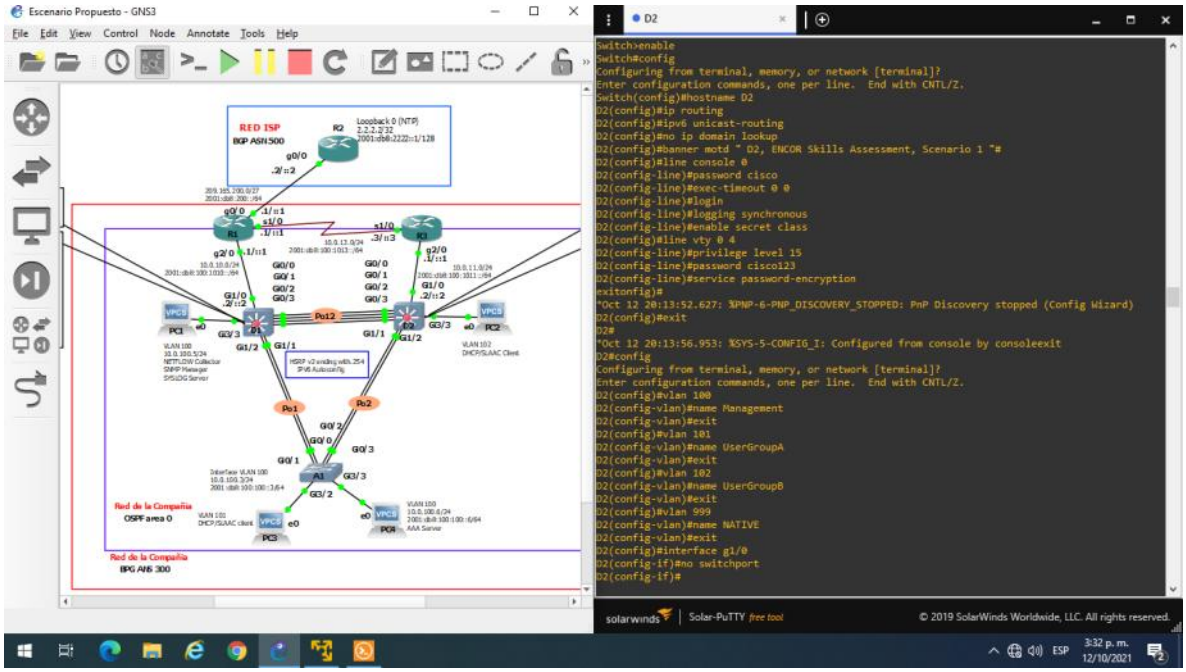

Figura 7 Configuración Switch D2

Switch A1

```
Switch>enable
Switch#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname A1
A1(config)#no ip domain lookup
A1(config)#banner motd " A1, ENCOR Skills Assessment, Scenario 1 "#
A1(config)#line console 0
A1(config-line)#password cisco
A1(config-line)#login
A1(config-line)#logging synchronous
A1(config-line)#exec-timeout 0 0
A1(config-line)#enable secret class
```

```
A1(config)#line vty 0 4
A1(config-line)#privilege level 15
A1(config-line)#password cisco123
A1(config-line)#service password-encryption
A1(config)#vlan 100
A1(config-vlan)#
*Oct 12 21:01:59.753: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery
stopped (Config Wizard)
A1(config-vlan)#name Managementname Management
Warning: Vlan 100 name length exceeded the recommended length of 20
characters.
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)#
*Oct 12 21:04:09.983: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Vlan100, changed state to down
A1(config-if)#ip address 10.0.100.3 255.255.255.0
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)#
*Oct 12 21:05:39.697: %LINK-3-UPDOWN: Interface Vlan100, changed state to
down
A1(config-if)#exit
A1(config)#interface range g1/0-3,g2/0-3,g3/0-1
A1(config-if-range)#shutdown
A1(config-if-range)#
*Oct 12 21:06:23.333: %LINK-5-CHANGED: Interface GigabitEthernet1/0,
changed state to administratively down
*Oct 12 21:06:23.434: %LINK-5-CHANGED: Interface GigabitEthernet1/1,
changed state to administratively down
*Oct 12 21:06:23.611: %LINK-5-CHANGED: Interface GigabitEthernet1/2,
changed state to administratively down
*Oct 12 21:06:23.707: %LINK-5-CHANGED: Interface GigabitEthernet1/3,
```

```
changed state to administratively down
*Oct 12 21:06:23.802: %LINK-5-CHANGED: Interface GigabitEthernet2/0,
changed state to administratively down
*Oct 12 21:06:23.945: %LINK-5-CHANGED: Interface GigabitEthernet2/1,
changed state to administratively down
A1(config-if-range)#
*Oct 12 21:06:24.032: %LINK-5-CHANGED: Interface GigabitEthernet2/2,
changed state to administratively down
*Oct 12 21:06:24.204: %LINK-5-CHANGED: Interface GigabitEthernet2/3,
changed state to administratively down
*Oct 12 21:06:24.301: %LINK-5-CHANGED: Interface GigabitEthernet3/0,
changed state to administratively down
*Oct 12 21:06:24.389: %LINK-5-CHANGED: Interface GigabitEthernet3/1,
changed state to administratively down
A1(config-if-range)#end
A1#
*Oct 12 21:06:34.640: %SYS-5-CONFIG_I: Configured from console by console
A1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 3795 bytes to 1862 bytes[OK]
A1#
```

Tabla 7 Configuración Switch A1

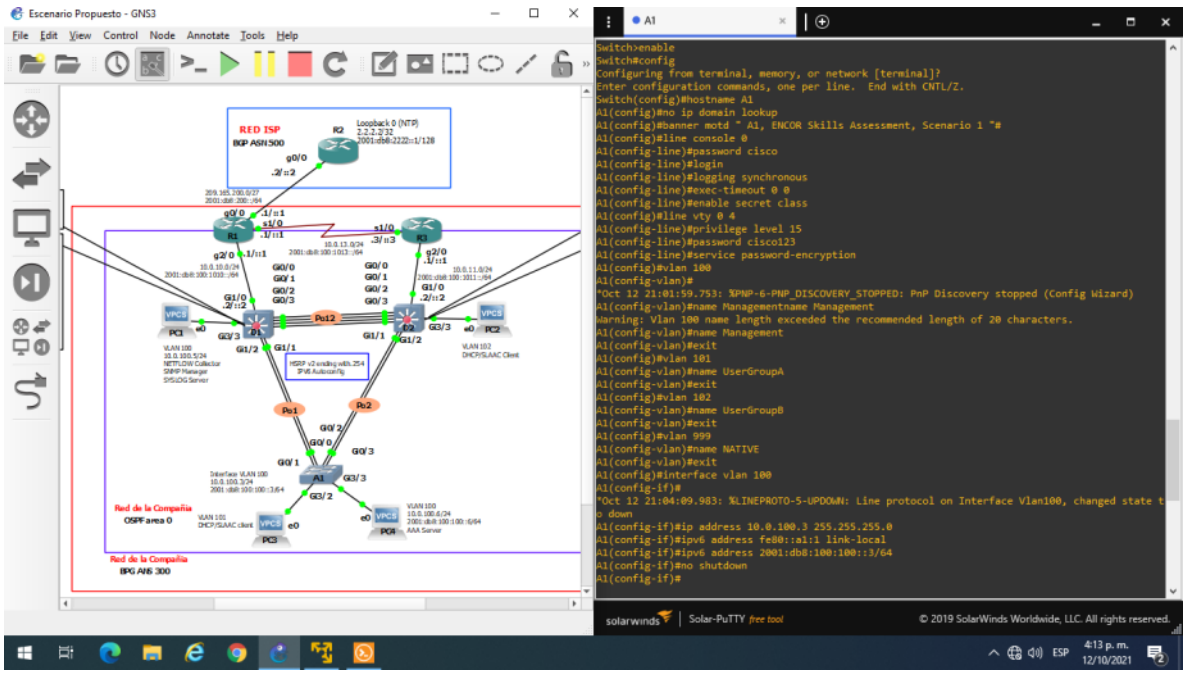

Figura 8 Configuración Switch A1

PC1

```
PC1> ip 10.0.100.5 255.255.255.0 gateway 10.0.100.254
Checking for duplicate address...
PC1: 10.0.100.5 255.255.255.0 gateway 10.0.100.254

PC1> ip 2001:db8:100:100::5/64
PC1: 2001:db8:100:100:: 5/64

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

PC1> show

NAME   IP/MASK              GATEWAY           MAC                  LPORT RHOST: PORT
PC1    10.0.100.5/24        10.0.100.254      00:50:79:66:68:00    20140 127.0.0.1:20141
       fe80:: 250:79ff:fe66:6800/64
       2001:db8:100:100::5/64
```

Tabla 8 Configuración IP PC1

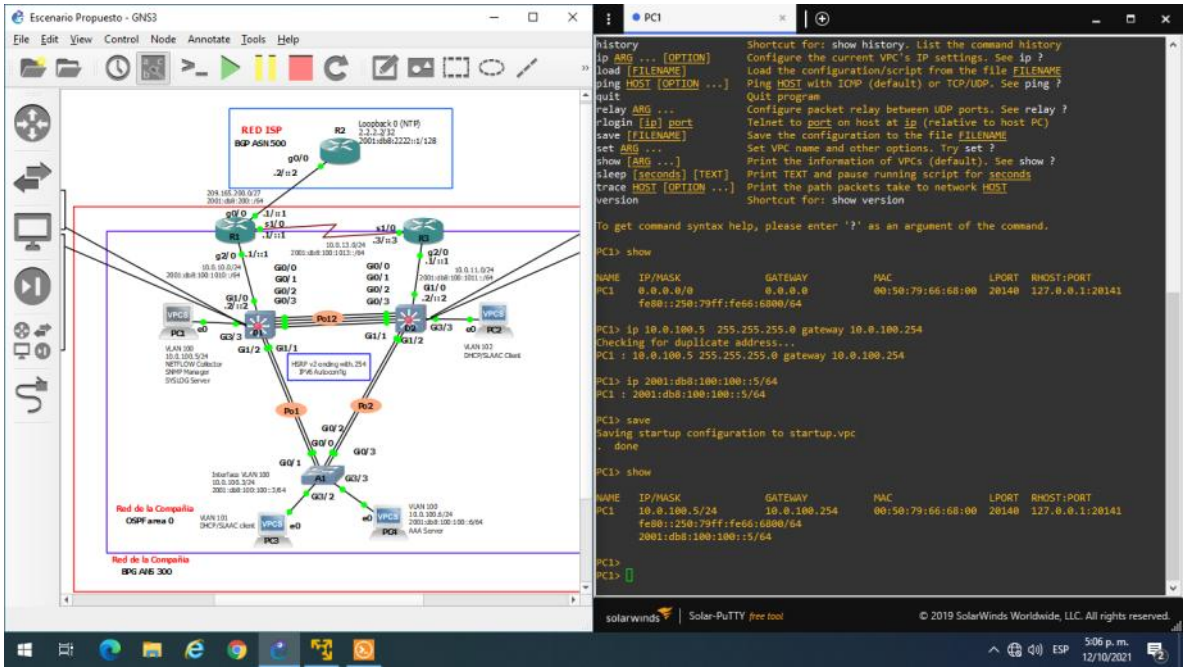

Figura 9 Configuración IP PC1

PC4

```
PC4> ip 10.0.100.6 255.255.255.0 gateway 10.0.100.254
Checking for duplicate address...
PC1 : 10.0.100.6 255.255.255.0 gateway 10.0.100.254

PC4> ip 2001:db8:100:100::6/64
PC1 : 2001:db8:100:100::6/64

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

PC4> show

NAME   IP/MASK              GATEWAY          MAC                LPORT RHOST: PORT
PC4    10.0.100.6/24        10.0.100.254     00:50:79:66:68:03  20146 127.0.0.1:20147
       fe80:: 250:79ff:fe66:6803/64
       2001:db8:100:100::6/64
```

Tabla 9 Configuración IP PC4

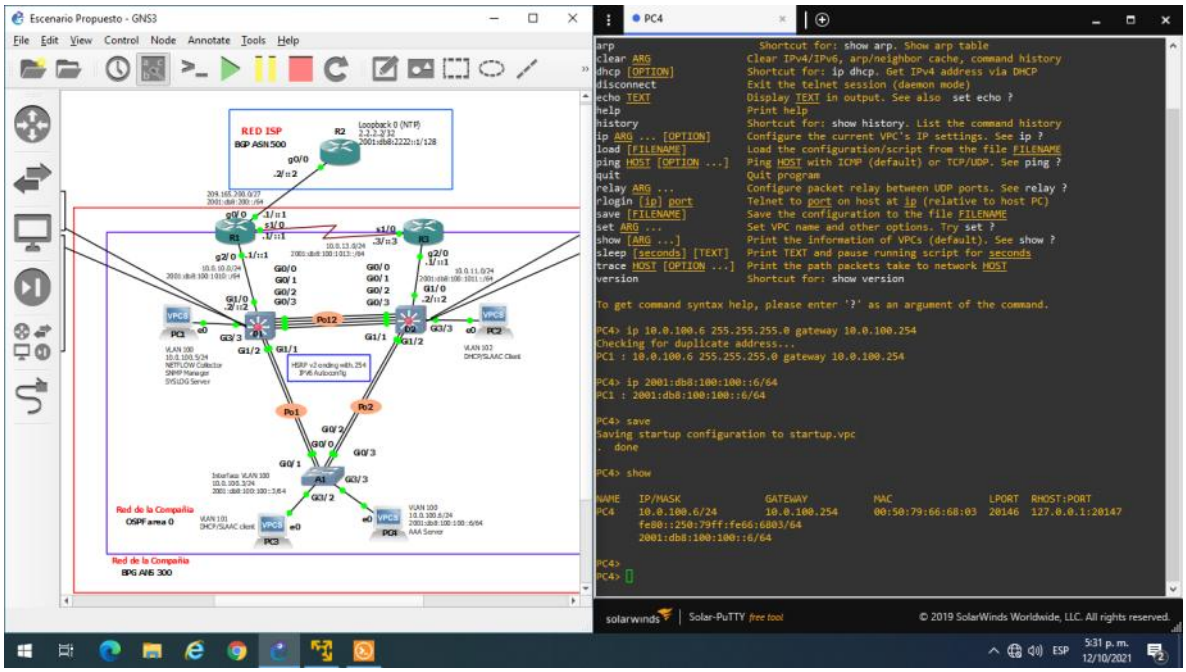

Figura 10 Configuración IP PC

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

2.1. Habilitación de enlaces trunk 802.1Q entre switches:

D1 y D2 :

Se procede a realizar la configuración en el Switch D1:

```
D1>enable
Password:
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#
*Oct 13 15:12:39.155: %PLATFORM-5-SIGNATURE_VERIFIED: Image 'flash0:/vios_l2-adventerprisek9-m' passed code signing verification
D1(config)#interface range g0/0-3
D1(config-if-range)#switch trunk encapsulation dot1q
D1(config-if-range)#switchport mode trunk
D1(config-if-range)#no shutdown
D1(config-if-range)#
*Oct 13 15:14:49.212: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 13 15:14:49.638: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to up
*Oct 13 15:14:50.123: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
*Oct 13 15:14:50.224: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
D1(config-if-range)#
*Oct 13 15:14:50.641: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
*Oct 13 15:14:50.909: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to up
D1(config-if-range)#
*Oct 13 15:14:51.156: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
*Oct 13 15:14:51.955: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3, changed state to up
D1(config-if-range)#exit
D1(config)#
```

Tabla 10 Configuración enlaces trunk 802.1Q D1

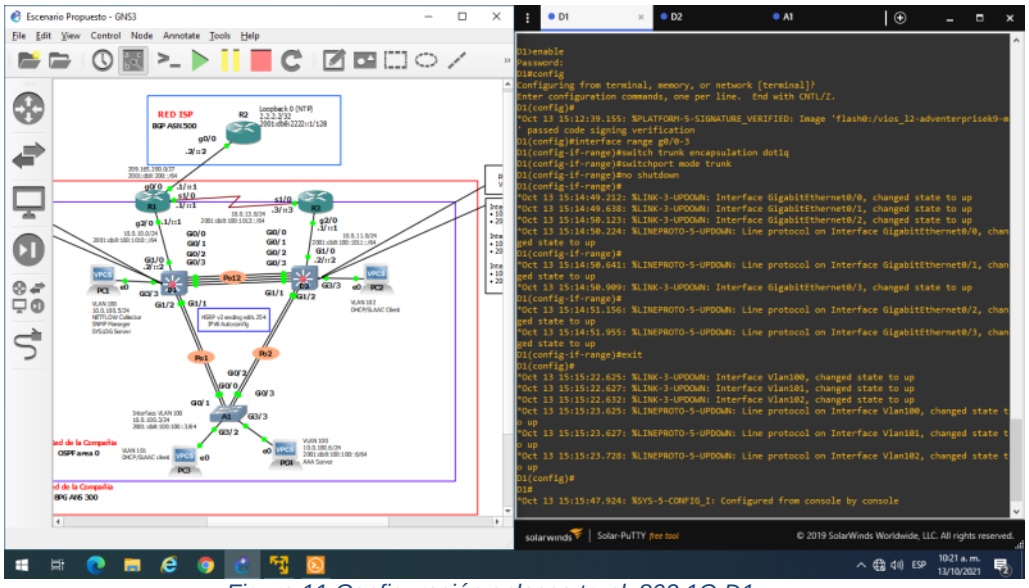

Figura 11 Configuración enlaces trunk 802.1Q D1

Posteriormente, se realizó la configuración en el Switch D2:

```
D2>enable
Password:
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#interface range g0/0-3
D2(config-if-range)#switch trunk encapsulation dot1q
D2(config-if-range)#switchport mode trunk
D2(config-if-range)#no shutdown
D2(config-if-range)#
*Oct 13 15:24:21.304: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 13 15:24:21.325: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to up
*Oct 13 15:24:21.825: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
*Oct 13 15:24:22.377: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
*Oct 13 15:24:22.380: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
*Oct 13 15:24:22.532: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to up
D2(config-if-range)#
*Oct 13 15:24:23.038: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
*Oct 13 15:24:23.831: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3, changed state to up
D2(config-if-range)#exit
D2(config)#
```

Tabla 11 Configuración enlaces trunk 802.1Q D2

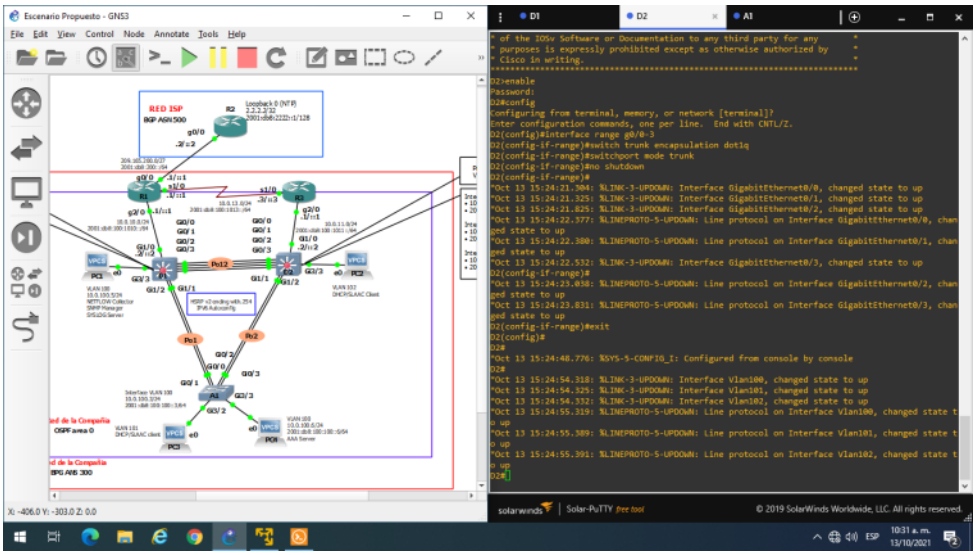

Figura 12 Configuración enlaces trunk 80 2.1Q D2

D1 y A1:

Se procede a realizar la configuración en el Switch D1:

```
D1#
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#interface range g1/1-2
D1(config-if-range)#switch trunk encapsulation dot1q
D1(config-if-range)#switchport mode trunk
D1(config-if-range)#no shutdown
D1(config-if-range)#exit
*Oct 13 15:34:23.952: %LINK-3-UPDOWN: Interface GigabitEthernet1/1, changed state to up
*Oct 13 15:34:24.570: %LINK-3-UPDOWN: Interface GigabitEthernet1/2, changed state to up
*Oct 13 15:34:24.968: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed state to upt
D1(confié)#
```

Tabla 12 Configuración enlaces trunk 802.1Q D1

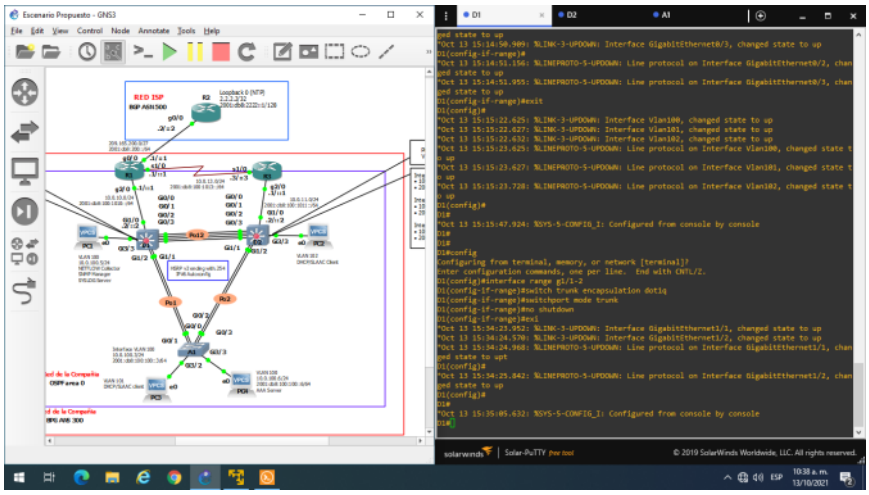

Figura 13 Configuración enlaces trunk 802.1Q D1

Posteriormente, se realizó la configuración en el Switch A1:

```
A1>enable
Password:
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#
*Oct 13 15:34:35.179: %LINK-3-UPDOWN: Interface Vlan100, changed state to up
A1(config)#
*Oct 13 15:34:36.181: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan100, changed state to up
A1(config)#interface range g0/0-1
A1(config-if-range)#switch trunk encapsulation dot1q
A1(config-if-range)#switchport mode trunk
A1(config-if-range)#no shutdown
A1(config-if-range)#exit
A1(config)#
```

Tabla 13 Configuración enlaces trunk 802.1Q A1

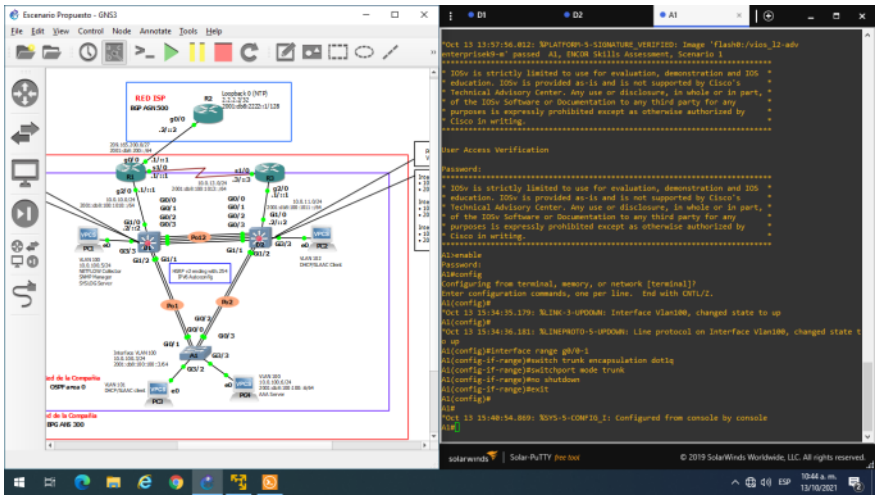

Figura 14 Configuración enlaces trunk 80 2.1Q A1

D2 y A1 :

Se procede a realizar la configuración en el Switch D2:

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#interface range g1/1-2
D2(config-if-range)#switch trunk encapsulation dot1q
D2(config-if-range)#switchport mode trunk
D2(config-if-range)#no shutdown
D2(config-if-range)#exit
*Oct 13 15:46:14.603: %LINK-3-UPDOWN: Interface GigabitEthernet1/1, changed state to up
*Oct 13 15:46:15.189: %LINK-3-UPDOWN: Interface GigabitEthernet1/2, changed state to upt
D2(config-if-range)#exit
*Oct 13 15:46:15.603: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed state to up
*Oct 13 15:46:16.270: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/2, changed state to up
D2(config-if-range)#exit
```

Tabla 14 Configuración enlaces trunk 802.1Q D2

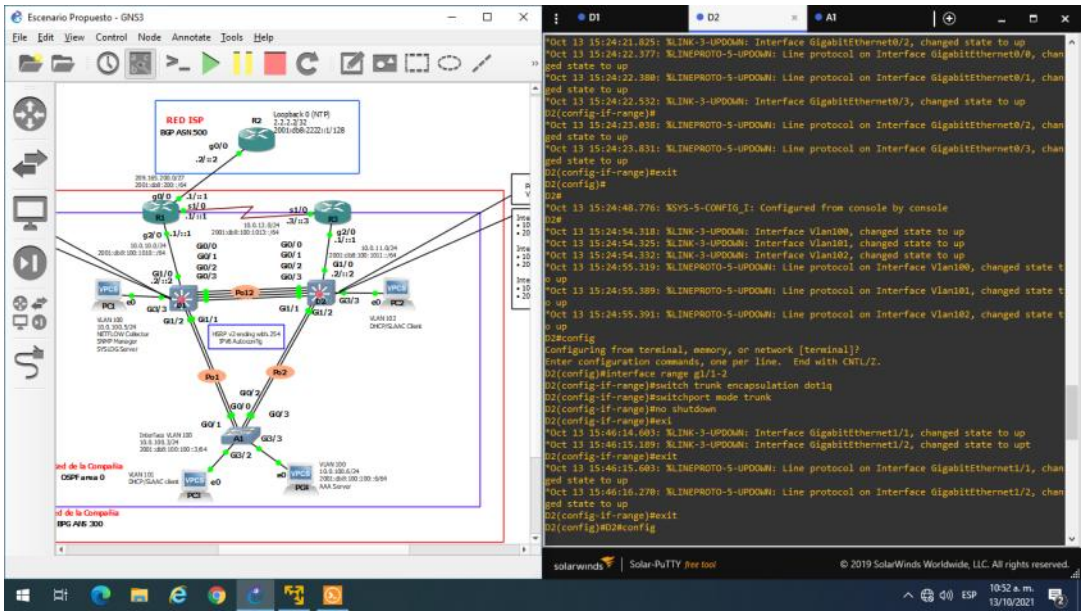

Figura 15 Configuración enlaces trunk 80 2.1Q D2

Posteriormente, se realizó la configuración en el Switch A1:

```
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#interface range g0/2-3
A1(config-if-range)#switch trunk encapsulation dot1q
A1(config-if-range)#switchport mode trunk
A1(config-if-range)#no shutdown
A1(config-if-range)#exit
A1(config)#
```

Tabla 15 Configuración enlaces trunk 802.1Q A1

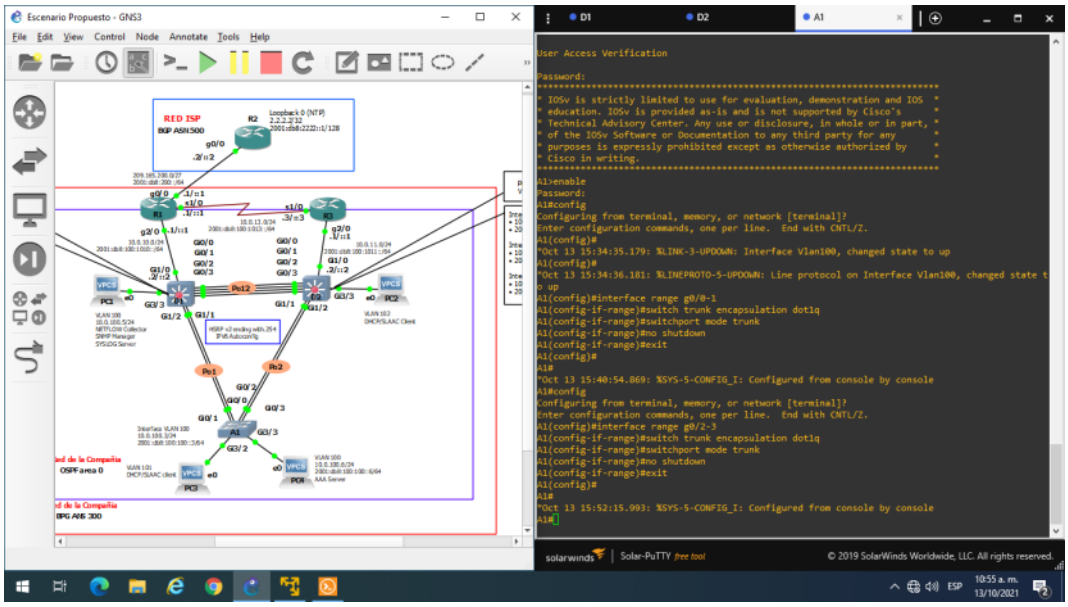

Figura 16 Configuración enlaces trunk 802.1Q A1

2.2. Cambio de la VLAN nativa en los switches en los enlaces troncales:

Se procede en los switches a cambiar la VLAN nativa en los enlaces troncales por la VLAN 999.

Switch D1:

```
D1(config)#interface range g0/0-3,g1/1-2,g3/0-3
D1(config-if-range)# switchport trunk native vlan 999
*Oct 13 16:19:03.458: %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch
discovered on GigabitEthernet0/2 (999), with D2 GigabitEthernet0/2 (1).
D1(config-if-range)#
*Oct 13 16:19:06.374: %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch
discovered on GigabitEthernet0/1 (999), with D2 GigabitEthernet0/1 (1).
D1(config-if-range)#exit
*Oct 13 16:19:13.456: %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch
discovered on GigabitEthernet0/3 (999), with D2 GigabitEthernet0/3 (1).
D1(config-if-range)#switchport trunk native vlan 999
D1(config)#
```

Tabla 16 Cambio VLAN nativa en los enlaces troncales por la VLAN 999 en D1.

Switch D2:

```
D2(config)#
*Oct 13 16:20:33.597: %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch
discovered on GigabitEthernet0/2 (1), with D1 GigabitEthernet0/2 (999).
D2(config)#interface range g0/0-3,g1/1-2,g3/0-3
D2(config-if-range)#switchport trunk native vlan 999
D2(config-if-range)#exit
*Oct 13 16:21:09.536: %SPANTREE-2-RECV_PVID_ERR: Received BPDU with
```

```
inconsistent peer vlan id 1 on GigabitEthernet1/1 VLAN999.
*Oct 13 16:21:09.538: %SPANTREE-2-BLOCK_PVID_PEER: Blocking GigabitEthernet1/1
on VLAN0001. Inconsistent peer vlan.
*Oct 13 16:21:09.542: %SPANTREE-2-BLOCK_PVID_LOCAL: Blocking GigabitEthernet1/1
on VLAN0999. Inconsistent local vlan.
*Oct 13 16:21:09.545: %SPANTREE-2-RECV_PVID_ERR: Received BPDU with
inconsistent peer vlan id 1 on GigabitEthernet1/2 VLAN999.
*Oct 13 16:21:09.547: %SPANTREE-2-BLOCK_PVID_PEER: Blocking GigabitEthernet1/2
on VLAN0001. Inconsistent peer vlan.
D2(config)#
```

Tabla 17 Cambio VLAN nativa en los enlaces troncales por la VLAN 999 en D2

Switch A2:

```
A1(config)#interface range g0/0-3,g3/0-3
A1(config-if-range)#
*Oct 13 16:23:42.855: %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch
discovered on GigabitEthernet0/1 (1), with D1 GigabitEthernet1/2 (999).
A1(config-if-range)#switchport trunk native vlan 999
A1(config-if-range)#exit
*Oct 13 16:24:04.195: %SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking
GigabitEthernet0/2 on VLAN0999. Port consistency restored.
*Oct 13 16:24:04.196: %SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking
A1(config)#
```

Tabla 18 Cambio VLAN nativa en los enlaces troncales por la VLAN 999 en A1

Finalmente, se verifico el estado del enlace troncal en todos los switches con el comando **show interfaces trunk LA VLAN 999 COMO NATIVA**

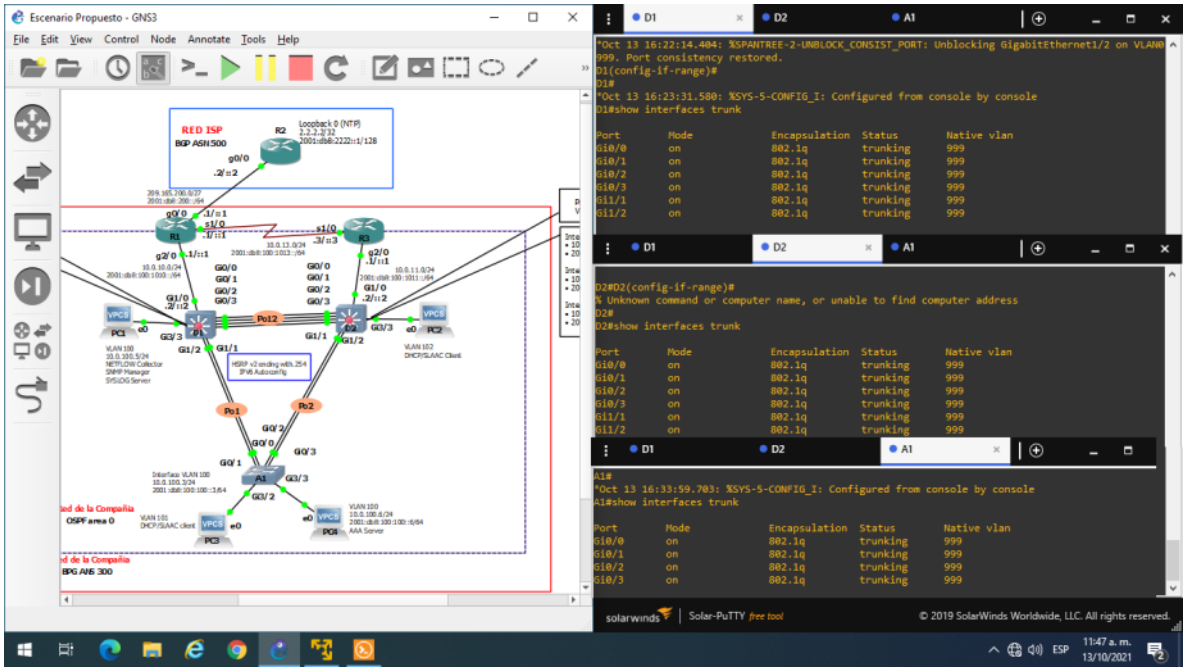

Figura 17 Verificación Cambio VLAN nativa a 999

2.3 Habilitación del protocolo Rapid Spanning-Tree (RSTP):

Se realiza en todos los switches la habilitación del protocolo Rapid Spanning-Tree (RSTP)

Switch D1:

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#spanning-tree mode rapid-pvst
D1(config)#
```

Tabla 19 Habilitación del protocolo Rapid Spanning-Tree (RSTP) en D1.

Se verifico el protocolo Rapid Spanning-Tree (RSTP) en el switch D1 con el comando **show spanning-tree**

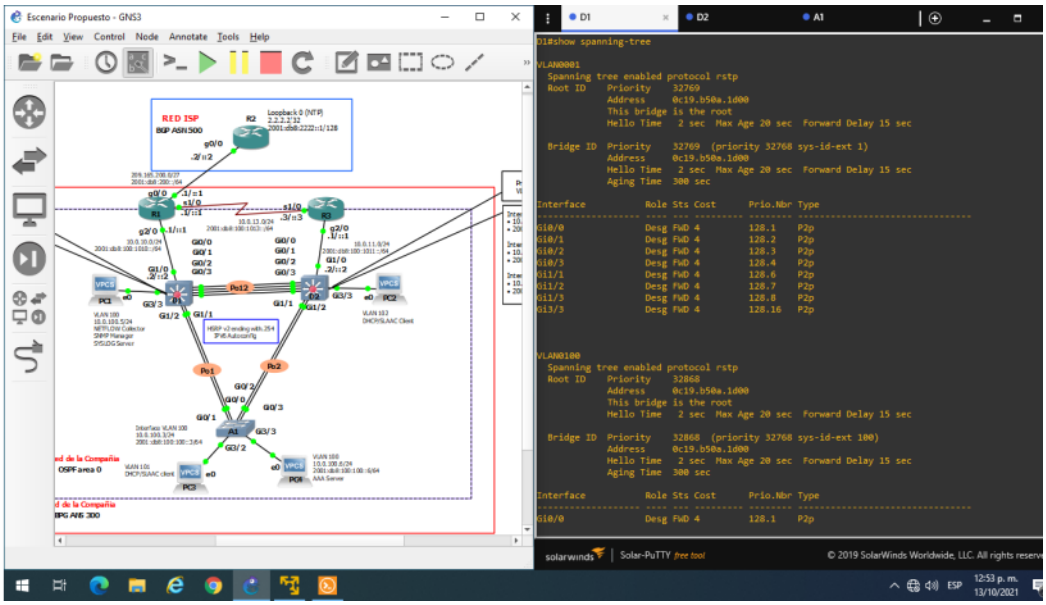

Figura 18 Protocolo Rapid Spanning-Tree (RSTP) D1

Switch D2:

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#spanning-tree mode rapid-pvst
D2(config)#
```

Tabla 20 Habilitación del protocolo Rapid Spanning-Tree (RSTP) en D2.

Se verifico el protocolo Rapid Spanning-Tree (RSTP) en el switch D2 con el comando **show spanning-tree**

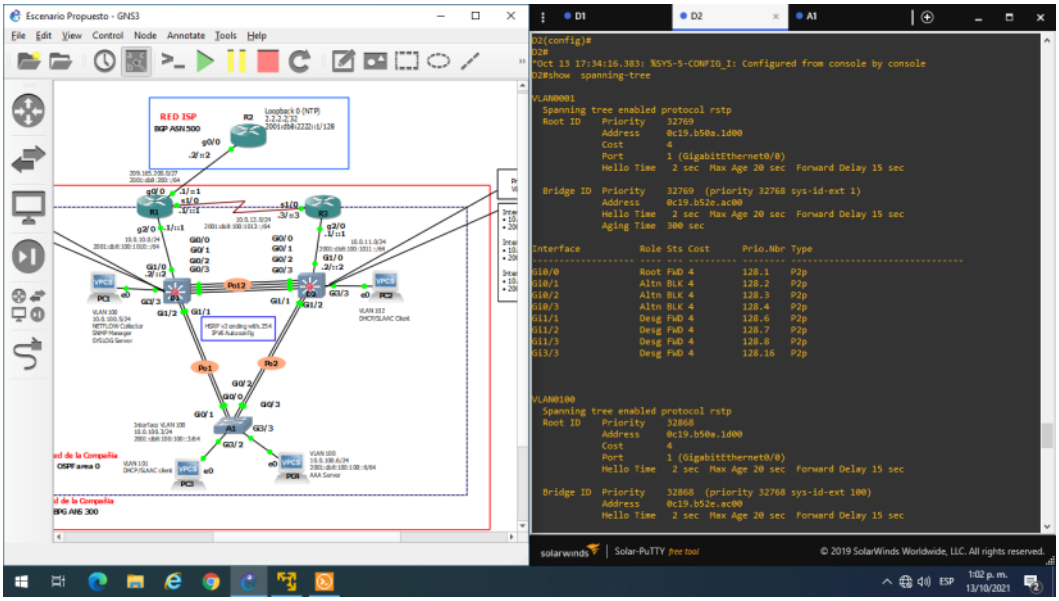

Figura 19 Protocolo Rapid Spanning-Tree (RSTP) D2

Switch A1:

```
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#spanning-tree mode rapid-pvst
A1(config)#
```

Tabla 21 Habilitación del protocolo Rapid Spanning-Tree (RSTP) en A1.

Se verifico el protocolo Rapid Spanning-Tree (RSTP) en el switch A1 con el comando **show spanning-tree**

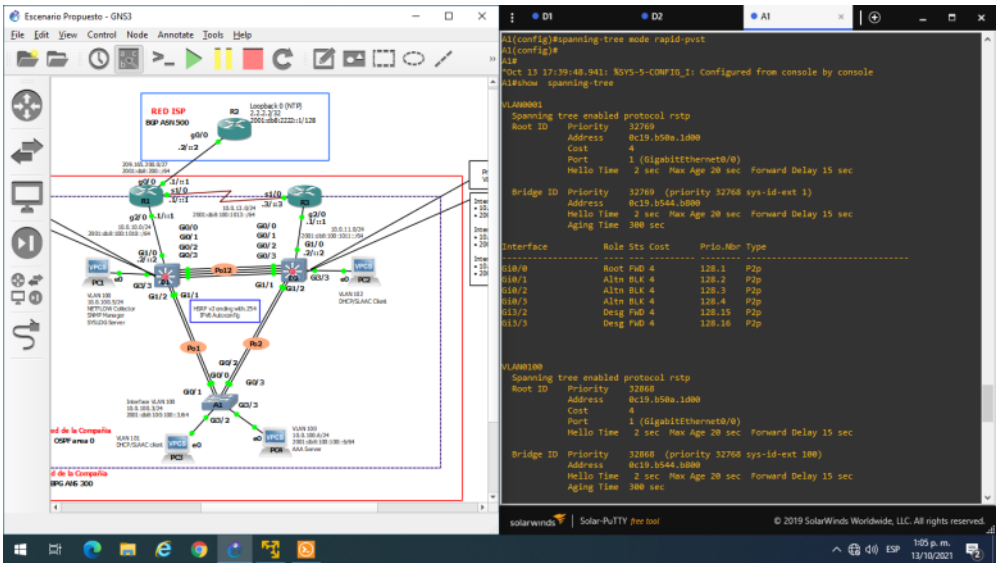

Figura 20 Protocolo Rapid Spanning-Tree (RSTP) A1

2.4 Configuración de los puentes raíz RSTP (root bridges):

Se Configura D1 y D2 como raíz (root) para las VLAN según el diagrama de topología , con las prioridades de apoyo mutuo en caso de falla de alguno de los switches.

Switch D1:

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#spanning-tree vlan 100,101 priority 4096
D1(config)#spanning-tree vlan 102 priority 8192
D1(config)#
```

Tabla 22 Configuración de los puentes raíz RSTP (root bridges) en D1.

Switch D2:

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#spanning-tree vlan 102 priority 4096
D2(config)#spanning-tree vlan 100,101 priority 8192
D2(config)#
```

Tabla 23 Configuración de los puentes raíz RSTP (root bridges) en D2.

Una vez configurados D1 y D2, en A1 se ingresó el comando show **spanning-tree root** y se observan los puentes raíz diferenciados. Por tanto, el Puerto raíz (Bridge root) para las VLANS 100 ,101 es Gi0/0 y el Puerto raíz (Bridge root) para la VLAN 2 es Gi0/2.

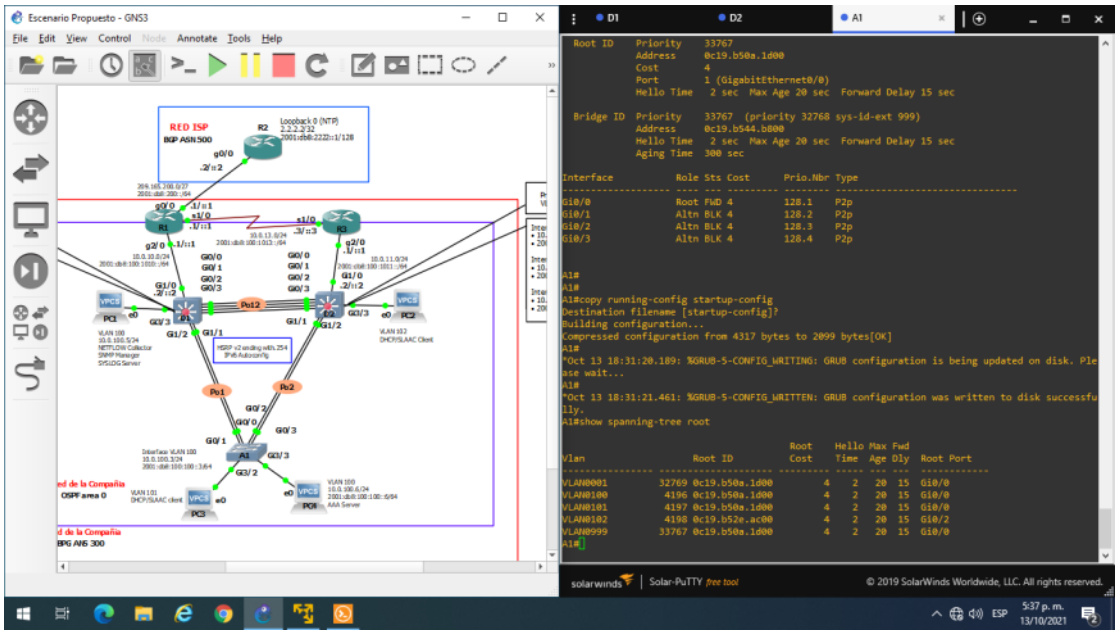

Figura 21 Verificación Configuración de los puentes raíz RSTP A1

2.5 Creación de EtherChannels LACP según el diagrama de topología:

Inicialmente se configura el criterio del switch maestro en D1 para que tenga el menor valor, y el sistema lo identifica como el maestro. En consecuencia, el Switch D1 con el valor de prioridad del sistema más bajo en 1 determinara los enlaces entre los switches D1 y D2 asociados de LACP que estarán en estado activo y en espera para cada canal de puerto LACP.

2.5.1 D1 a D2 – Port channel 12:

Switch D1:

```
D1#show lacp sys-id
32768, 0c19.b50a.8000
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#lacp system-priority 1
D1(config)#exit
D1#
*Oct 13 22:39:25.632: %SYS-5-CONFIG_I: Configured from console by console
D1#show lacp sys-id
1, 0c19.b50a.8000
D1#config
Configuring from terminal, memory, or network [terminal]?
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#interface range g0/0-3
D1(config-if-range)#shutdown
D1(config-if-range)#
*Oct 13 22:40:06.556: %LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to administratively down
*Oct 13 22:40:06.899: %LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
*Oct 13 22:40:07.000: %LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
*Oct 13 22:40:07.187: %LINK-5-CHANGED: Interface GigabitEthernet0/3, changed state to administratively down
*Oct 13 22:40:07.556: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to down
D1(config-if-range)#
*Oct 13 22:40:07.899: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
*Oct 13 22:40:08.000: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to down
*Oct 13 22:40:08.201: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3, changed state to down
D1(config-if-range)#channel-group 12 mode active
Creating a port-channel interface Port-channel 12

D1(config-if-range)#no shutdown
D1(config-if-range)#
*Oct 13 22:41:36.563: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 13 22:41:36.566: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to up
*Oct 13 22:41:36.930: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
D1(config-if-range)#
*Oct 13 22:41:38.121: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to up
D1(config-if-range)#
*Oct 13 22:41:45.428: %EC-5-L3DONTBNDL2: Gi0/0 suspended: LACP currently not enabled on the remote port.
D1(config-if-range)#
*Oct 13 22:41:46.732: %EC-5-L3DONTBNDL2: Gi0/1 suspended: LACP currently not enabled on the remote port.
*Oct 13 22:41:47.128: %EC-5-L3DONTBNDL2: Gi0/2 suspended: LACP currently not enabled on the remote port.
D1(config-if-range)#
*Oct 13 22:41:48.307: %EC-5-L3DONTBNDL2: Gi0/3 suspended: LACP currently not enabled on the remote port.
D1(config-if-range)#exit
D1(config)#interface port-channel 12
D1(config-if)#port-channel min-links 2
                     ^
% Invalid input detected at '^' marker.

D1(config-if)#lacp max-bundle 3
D1(config-if)#end
D1#
*Oct 13 22:45:08.410: %SYS-5-CONFIG_I: Configured from console by console
D1#
```

```
*Oct 13 22:46:32.825: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
D1#show lacp internal
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 12
                            LACP port     Admin     Oper    Port
Port      Flags   State     Priority      Key       Number  State
Gi0/0     SA      bndl      32768         0xC       0x1     0x3D
Gi0/1     SA      bndl      32768         0xC       0x2     0x3D
Gi0/2     SA      bndl      32768         0xC       0x3     0x3D
Gi0/3     SA      hot-sby   32768         0xC       0xC     0x4       0x5
D1#
```

Tabla 24 Configuración Port channel 12 en D1.

Switch D2:

```
D2#show lacp sys-id
32768, 0c19.b52e.8000
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#interface range g0/0-3
D2(config-if-range)#shutdown
D2(config-if-range)#
*Oct 13 22:58:17.089: %LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to
administratively down
*Oct 13 22:58:17.200: %LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to
administratively down
*Oct 13 22:58:17.517: %LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to
administratively down
*Oct 13 22:58:17.620: %LINK-3-UPDOWN: Interface Port-channel12, changed state to down
D2(config-if-range)#
*Oct 13 22:58:17.667: %LINK-5-CHANGED: Interface GigabitEthernet0/3, changed state to
administratively down
*Oct 13 22:58:18.234: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to down
*Oct 13 22:58:18.237: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to down
*Oct 13 22:58:18.532: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2,
changed state to down
*Oct 13 22:58:18.635: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12,
changed state to down
*Oct 13 22:58:18.707: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3,
changed state to down
D2(config-if-range)#channel-group 12 mode active
D2(config-if-range)#no shutdown
D2(config-if-range)#
*Oct 13 22:59:02.008: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 13 22:59:02.323: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to up
*Oct 13 22:59:02.855: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
*Oct 13 22:59:03.017: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
```

```
changed state to up
D2(config-if-range)#
*Oct 13 22:59:03.528: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to up
*Oct 13 22:59:03.531: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to up
D2(config-if-range)#
*Oct 13 22:59:03.933: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2,
changed state to up
*Oct 13 22:59:04.541: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3,
changed state to up
D2(config-if-range)#
*Oct 13 22:59:09.646: %LINK-3-UPDOWN: Interface Port-channel12, changed state to up
*Oct 13 22:59:10.646: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12,
changed state to up
D2(config-if-range)#exit
D2(config)#interface port-channel 12
D2(config-if)#port-channel min-links 2
                     ^
% Invalid input detected at '^' marker.

D2(config-if)#lacp max-bundle 3
D2(config-if)#end
D2#
*Oct 13 23:00:16.366: %SYS-5-CONFIG_I: Configured from console by console
D2#show lacp internal
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 12
                            LACP port     Admin     Oper    Port        Port
Port      Flags   State     Priority      Key       Key     Number      State
Gi0/0     SA      bndl      1             0xC       0xC     0x1         0x3D
Gi0/1     SA      bndl      1             0xC       0xC     0x2         0xD
Gi0/2     SA      bndl      1             0xC       0xC     0x3         0x3D
Gi0/3     SA      hot-sby   1             0xC       0xC     0x4         0x5
D2#
*Oct 13 23:13:29.558: %LINK-3-UPDOWN: Interface Port-channel12, changed state to down
*Oct 13 23:13:30.558: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12,
changed state to down
D2#
*Oct 13 23:13:34.740: %LINK-3-UPDOWN: Interface Port-channel12, changed state to up
*Oct 13 23:13:35.740: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12,
changed state to up
D2#
```

Tabla 25 Configuración Port channel 12 en D2.

Se concluye, que al realizar la configuración entre los switches D1 y D2 en un solo paquete EtherChannel utilizando LACP no se reconoció el comando de configuración de tiempo de espera rápido(Rate fast). Por tanto, queda configurado por defecto con tiempo de espera Lento (Slow).Por otro lado, el valor mínimo de 2 enlaces no lo reconoce y si el máximo de 3.En consecuencia el LACP

EtherChannel bundle queda con 3 Enlaces redundantes y uno Pasivo. Finalmente, al verificar el modo, estado y velocidad de LACPDU tiene 3 interfaces en estado bndl con velocidad slow de tiempo de respuesta de 30 segundos y una interface en estado hot-sby.

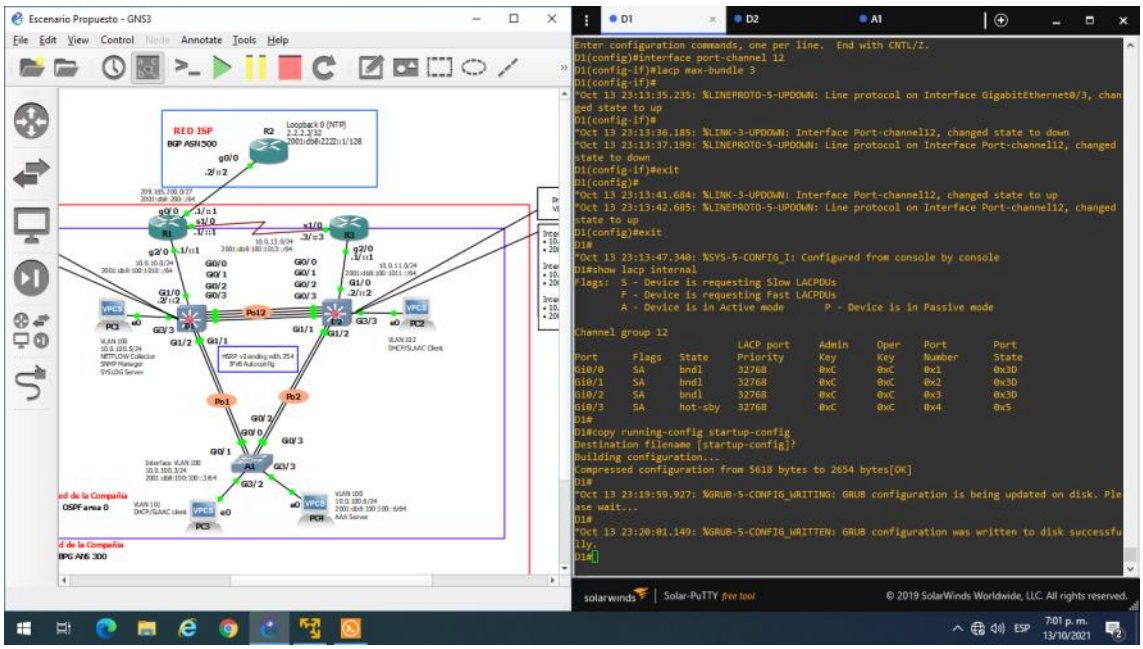

Figura 22 Verification Port channel 12

2.5.2 D1 a A1 – Port channel 1:

Se configura el criterio del switch maestro en D1 para que tenga el menor valor, y el sistema lo identifique como el maestro. En consecuencia, el Switch D1 con el valor de prioridad del sistema más bajo en 1 determinara los enlaces entre los switches D1 y A1 asociados de LACP que estarán en estado activo y en espera para cada canal de puerto LACP.

Switch D1:

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#end
D1#
*Oct 14 18:02:08.217: %SYS-5-CONFIG_I: Configured from console by console
```

```
D1#show lacp sys-id
1, 0c19.b50a.8000
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#lacp system-priority 1
D1(config)#exit
D1#
*Oct 14 18:03:10.829: %SYS-5-CONFIG_I: Configured from console by console
D1#show lacp sys-id
1, 0c19.b50a.8000
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#interface range g1/1-2
D1(config-if-range)#shutdown
D1(config-if-range)#
*Oct 14 18:04:42.556: %LINK-5-CHANGED: Interface GigabitEthernet1/1, changed state to administratively down
*Oct 14 18:04:42.940: %LINK-5-CHANGED: Interface GigabitEthernet1/2, changed state to administratively down
*Oct 14 18:04:43.559: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1, changed state to down
D1(config-if-range)#
*Oct 14 18:04:44.075: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/2, changed state to down
D1(config-if-range)#channel-group 1 mode active
Creating a port-channel interface Port-channel 1

D1(config-if-range)#no shutdown
D1(config-if-range)#
*Oct 14 18:05:12.627: %LINK-3-UPDOWN: Interface GigabitEthernet1/1, changed state to up
*Oct 14 18:05:13.230: %LINK-3-UPDOWN: Interface GigabitEthernet1/2, changed state to up
D1(config-if-range)#exit
D1(config)#
*Oct 14 18:05:22.692: %EC-5-L3DONTBNDL2: Gi1/1 suspended: LACP currently not enabled on the remote port.
*Oct 14 18:05:23.379: %EC-5-L3DONTBNDL2: Gi1/2 suspended: LACP currently not enabled on the remote port.
D1(config)#interface port-channel 1
D1(config-if)#lacp max-bundle 2
D1(config-if)#end
D1#
*Oct 14 18:06:41.923: %SYS-5-CONFIG_I: Configured from console by console
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#interface range g1/1-2
D1(config-if-range)#lacp port-priority 1
D1(config-if-range)#end
D1#
*Oct 14 18:07:39.999: %SYS-5-CONFIG_I: Configured from console by console
D1#show lacp internal
```

```
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 1
                            LACP port     Admin     Oper    Port        Port
Port      Flags   State     Priority      Key       Key     Number      State
Gi1/1     SA      susp      1             0x1       0x1     0x102       0x7D
Gi1/2     SA      susp      1             0x1       0x1     0x103       0x7D

Channel group 12
                            LACP port     Admin     Oper    Port        Port
Port      Flags   State     Priority      Key       Key     Number      State
Gi0/0     SA      bndl      32768         0xC       0xC     0x1         0x3D
Gi0/1     SA      bndl      32768         0xC       0xC     0x2         0x3D
Gi0/2     SA      bndl      32768         0xC       0xC     0x3         0x3D
Gi0/3     SA      hot-sby   32768         0xC       0xC     0x4         0x5
D1#
*Oct 14 18:11:32.806: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1,
changed state to up
*Oct 14 18:11:32.873: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/2,
changed state to up
D1#
```

Tabla 26 Configuración Port channel 1 en D1.

Switch A1:

```
A1>enable
Password:
A1#show lacp sys-id
32768, 0c19.b544.8000
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#interface range g0/0-1
A1(config-if-range)#shutdown
A1(config-if-range)#
*Oct 14 18:10:47.375: %LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to
administratively down
*Oct 14 18:10:47.504: %LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to
administratively down
*Oct 14 18:10:48.376: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to down
A1(config-if-range)#
*Oct 14 18:10:48.504: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to down
A1(config-if-range)#channel-group 1 mode active
Creating a port-channel interface Port-channel 1

A1(config-if-range)#no shutdown
A1(config-if-range)#
*Oct 14 18:11:19.470: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 14 18:11:20.090: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to up
```

```
A1(config-if-range)#
*Oct 14 18:11:22.019: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
*Oct 14 18:11:22.621: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
A1(config-if-range)#exit
A1(config)#
*Oct 14 18:11:26.817: %LINK-3-UPDOWN: Interface Port-channel1, changed state to up
*Oct 14 18:11:27.817: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up
A1(config)#interface port-channel 1
A1(config-if)#lacp max-bundle 2
A1(config-if)#end
A1#
*Oct 14 18:11:56.962: %SYS-5-CONFIG_I: Configured from console by console
A1#show lacp internal
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 1
                            LACP port     Admin     Oper    Port        Port
Port      Flags   State     Priority      Key       Key     Number      State
Gi0/0     SA      bndl      32768         0x1       0x1     0x1         0x3D
Gi0/1     SA      bndl      32768         0x1       0x1     0x2         0x3D
A1#
```

Tabla 27 Configuración Port channel 12 en A1.

Se concluye, que al realizar la configuración entre los switches D1 y A1 en un solo paquete EtherChannel utilizando LACP no se reconoció el comando de configuración de tiempo de espera rápido(Rate fast). Por tanto, queda configurado por defecto con tiempo de espera Lento (Slow). En consecuencia el LACP EtherChannel bundle queda con 2 Enlaces redundantes. Finalmente, al verificar el modo, estado y velocidad de LACPDU tiene 2 interfaces en estado bndl con velocidad slow de tiempo de respuesta de 30 segundos.

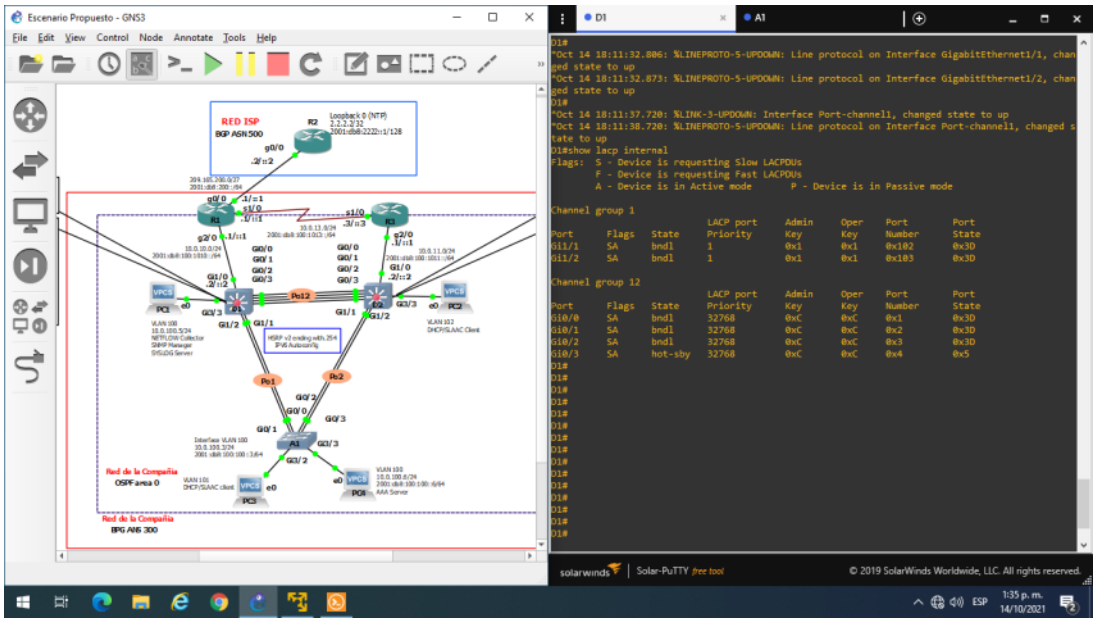

Figura 23 Verificación Port channel 1

2.5.3 D2 a A1 – Port channel 2:

Se configura el criterio del switch maestro en D2 para que tenga el menor valor, y el sistema lo identifique como el maestro. En consecuencia, el Switch D2 con el valor de prioridad del sistema más bajo en 1 determinara los enlaces entre los switches D2 y A1 asociados de LACP que estarán en estado activo y en espera para cada canal de puerto LACP.

Switch D2:

```
D2>enable
Password:
D2#
*Oct 14 18:40:02.914: %SYS-5-CONFIG_I: Configured from console by console
D2#show lacp sys-id
32768, 0c19.b52e.8000
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#lacp system-priority 1
D2(config)#
*Oct 14 18:41:01.897: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to down
D2(config)#exit
D2#
*Oct 14 18:41:03.904: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3,
changed state to down
D2#
*Oct 14 18:41:05.515: %SYS-5-CONFIG_I: Configured from console by console
```

```
D2#show lacp sys-id
1, 0c19.b52e.8000
*Oct 14 18:41:12.007: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to up
*Oct 14 18:41:12.029: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2,
changed state to up
*Oct 14 18:41:12.049: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3,
changed state to upf
D2#config
*Oct 14 18:41:12.994: %LINK-3-UPDOWN: Interface Port-channel12, changed state to down
*Oct 14 18:41:14.042: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12,
changed state to down
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#
*Oct 14 18:41:16.977: %LINK-3-UPDOWN: Interface Port-channel12, changed state to up
*Oct 14 18:41:18.053: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12,
changed state to up
D2(config)#interface range g1/1-2
D2(config-if-range)#shutdown
D2(config-if-range)#
*Oct 14 18:41:51.214: %LINK-5-CHANGED: Interface GigabitEthernet1/1, changed state to
administratively down
*Oct 14 18:41:51.349: %LINK-5-CHANGED: Interface GigabitEthernet1/2, changed state to
administratively down
*Oct 14 18:41:52.214: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/1,
changed state to down
D2(config-if-range)#
*Oct 14 18:41:52.349: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/2,
changed state to down
D2(config-if-range)#channel-group 2 mode active
Creating a port-channel interface Port-channel 2

D2(config-if-range)#no shutdown
D2(config-if-range)#
*Oct 14 18:42:10.507: %LINK-3-UPDOWN: Interface GigabitEthernet1/1, changed state to up
*Oct 14 18:42:11.112: %LINK-3-UPDOWN: Interface GigabitEthernet1/2, changed state to up
D2(config-if-range)# exit
D2(config)#
*Oct 14 18:42:20.111: %EC-5-L3DONTBNDL2: Gi1/1 suspended: LACP currently not enabled on
the remote port.
*Oct 14 18:42:21.020: %EC-5-L3DONTBNDL2: Gi1/2 suspended: LACP currently not enabled on
the remote port.
D2(config)#interface port-channel 2
D2(config-if)#lacp max-bundle 2
D2(config-if)#end
D2#
*Oct 14 18:42:44.711: %SYS-5-CONFIG_I: Configured from console by console
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#interface range g1/1-2
```

```
D2(config-if-range)#lacp port-priority 1
D2(config-if-range)#end
D2#show lacp internal
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 2
                            LACP port     Admin     Oper    Port        Port
Port        Flags   State   Priority      Key       Key     Number      State
Gi1/1       SA      bndl    1             0x2       0x2     0x102       0x3D
Gi1/2       SA      bndl    1             0x2       0x2     0x103       0x3D

Channel group 12
                            LACP port     Admin     Oper    Port        Port
Port        Flags   State   Priority      Key       Key     Number      State
Gi0/0       SA      bndl    1             0xC       0xC     0x1         0x3D
Gi0/1       SA      bndl    1             0xC       0xC     0x2         0x3D
Gi0/2       SA      bndl    1             0xC       0xC     0x3         0x3D
Gi0/3       SA      hot-sby 1             0xC       0xC     0x4         0x5
D2#
```

Tabla 28 Configuración Port channel 2 en D2.

Switch A1:

```
A1#show lacp sys-id
32768, 0c19.b544.8000
*Oct 14 18:49:33.466: %SYS-5-CONFIG_I: Configured from console by console
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#
*Oct 14 18:49:49.984: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
A1(config)#
*Oct 14 18:49:50.976: %LINK-3-UPDOWN: Interface Port-channel1, changed state to down
*Oct 14 18:49:51.984: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1,
changed state to down
A1(config)#
*Oct 14 18:49:57.016: %LINK-3-UPDOWN: Interface Port-channel1, changed state to up
*Oct 14 18:49:58.023: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1,
changed state to up
A1(config)#interface range g0/2-3
A1(config-if-range)#shutdown
A1(config-if-range)#
*Oct 14 18:50:48.428: %LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to
administratively down
*Oct 14 18:50:48.532: %LINK-5-CHANGED: Interface GigabitEthernet0/3, changed state to
administratively down
*Oct 14 18:50:49.429: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2,
changed state to down
A1(config-if-range)#
*Oct 14 18:50:49.532: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3,
changed state to down
```

```
A1(config-if-range)#channel-group 2 mode active
Creating a port-channel interface Port-channel 2

A1(config-if-range)# no shutdown
A1(config-if-range)#
*Oct 14 18:51:17.380: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
*Oct 14 18:51:17.876: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to up
A1(config-if-range)#
*Oct 14 18:51:19.935: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2,
changed state to up
*Oct 14 18:51:20.367: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3,
changed state to up
A1(config-if-range)#exit
A1(config)#
*Oct 14 18:51:24.426: %LINK-3-UPDOWN: Interface Port-channel2, changed state to up
A1(config)#
*Oct 14 18:51:25.428: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2,
changed state to up
A1(config)#interface port-channel 2
A1(config-if)#lacp max-bundle 2
A1(config-if)#end
A1#
*Oct 14 18:52:13.807: %SYS-5-CONFIG_I: Configured from console by console
A1#show lacp internal
Flags:  S - Device is requesting Slow LACPDUs
        F - Device is requesting Fast LACPDUs
        A - Device is in Active mode       P - Device is in Passive mode

Channel group 1
                            LACP port     Admin     Oper    Port        Port
Port        Flags   State   Priority      Key       Key     Number      State
Gi0/0       SA      bndl    32768         0x1       0x1     0x1         0x3D
Gi0/1       SA      bndl    32768         0x1       0x1     0x2         0x3D

Channel group 2
                            LACP port     Admin     Oper    Port        Port
Port        Flags   State   Priority      Key       Key     Number      State
Gi0/2       SA      bndl    32768         0x2       0x2     0x3         0x3D
Gi0/3       SA      bndl    32768         0x2       0x2     0x4         0x3D
A1#
```

Tabla 29 Configuración Port channel 2 en A1.

Se concluye, que al realizar la configuración entre los switches D2 y A1 en un solo paquete EtherChannel utilizando LACP no se reconoció el comando de configuración de tiempo de espera rápido(Rate fast). Por tanto, queda configurado por defecto con tiempo de espera Lento (Slow). En consecuencia el LACP EtherChannel bundle queda con 2 Enlaces redundantes. Finalmente, al verificar el modo, estado y velocidad de LACPDU tiene 2 interfaces en estado bndl con velocidad slow de tiempo de respuesta de 30 segundos.

2.6 Configuración de los puertos de acceso con la configuración de VLAN adecuada en los Switches:

Switch D1:

```
D1#
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#interface range g3/0-3
D1(config-if-range)#switchport mode access
D1(config-if-range)#switchport access vlan 100
D1(config-if-range)#interface range g0/0-3, g1/1-2
D1(config-if-range)#switchport  trunk allowed vlan 100,101,102
D1(config-if-range)#
*Oct 15 19:07:59.109: %EC-5-CANNOT_BUNDLE2: Gi0/0 is not compatible with Gi0/1 and will be suspended (vlan mask is different)
*Oct 15 19:07:59.176: %EC-5-CANNOT_BUNDLE2: Gi0/1 is not compatible with Gi0/2 and will be suspended (vlan mask is different)
*Oct 15 19:07:59.255: %EC-5-CANNOT_BUNDLE2: Gi0/0 is not compatible with Gi0/3 and will be suspended (vlan mask is different)
*Oct 15 19:07:59.257: %EC-5-CANNOT_BUNDLE2: Gi0/1 is not compatible with Gi0/3 and will be suspended (vlan mask is different)
*Oct 15 19:07:59.259: %EC-5-CANNOT_BUNDLE2: Gi0/2 is not compatible with Gi0/3 and will be suspended (vlan mask is different)
D1(config-if-range)#end
D1#
```

Tabla 30 Configuración de puertos de acceso D1

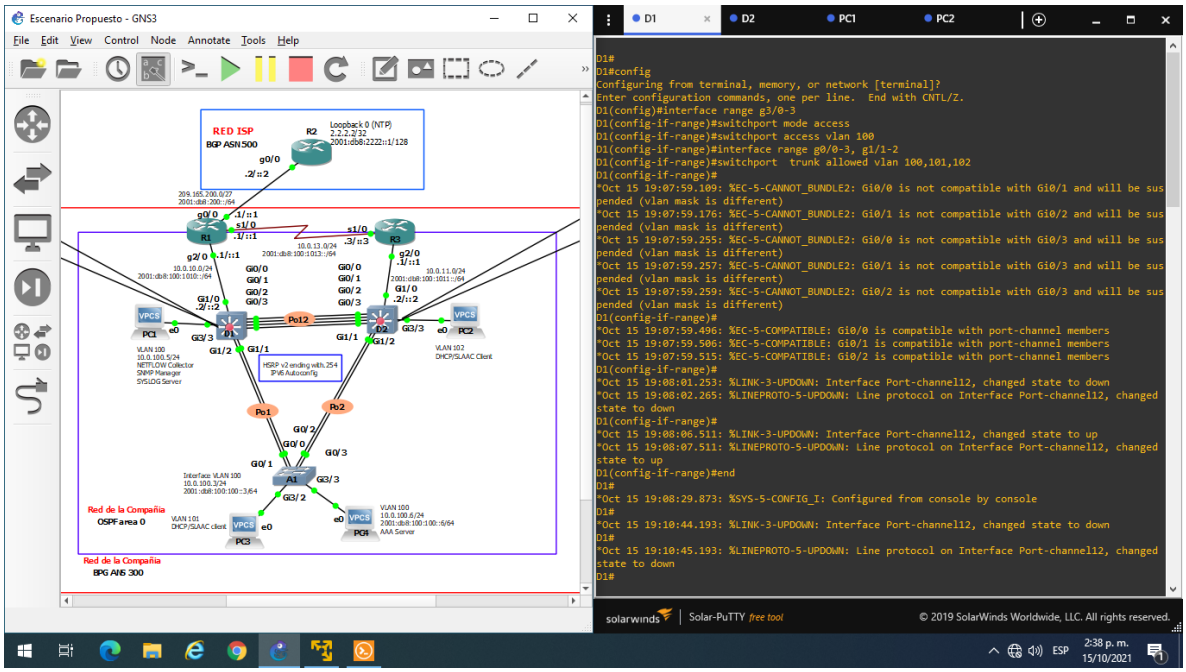

Figura 24 Configuración de puertos de acceso D1

Switch D2:

```
D2#
*Oct 15 18:26:44.308: %LINK-3-UPDOWN: Interface Port-channel12, changed state to up
*Oct 15 18:26:45.309: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12, changed
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#interface range g3/0-3
D2(config-if-range)#switchport mode access
D2(config-if-range)#switchport access vlan 102
D2(config-if-range)#interface range g0/0-3, g1/1-2
D2(config-if-range)#switchport  trunk allowed vlan 100,101,102
D2(config-if-range)#
*Oct 15 18:29:19.352: %EC-5-CANNOT_BUNDLE2: Gi0/0 is not compatible with Gi0/1 and will be
suspended (vlan mask is different)
*Oct 15 18:29:19.422: %EC-5-CANNOT_BUNDLE2: Gi0/1 is not compatible with Gi0/2 and will be
suspended (vlan mask is different)
D2(config-if-range)#end
D2#
```

Tabla 31 Configuración de puertos de acceso D2

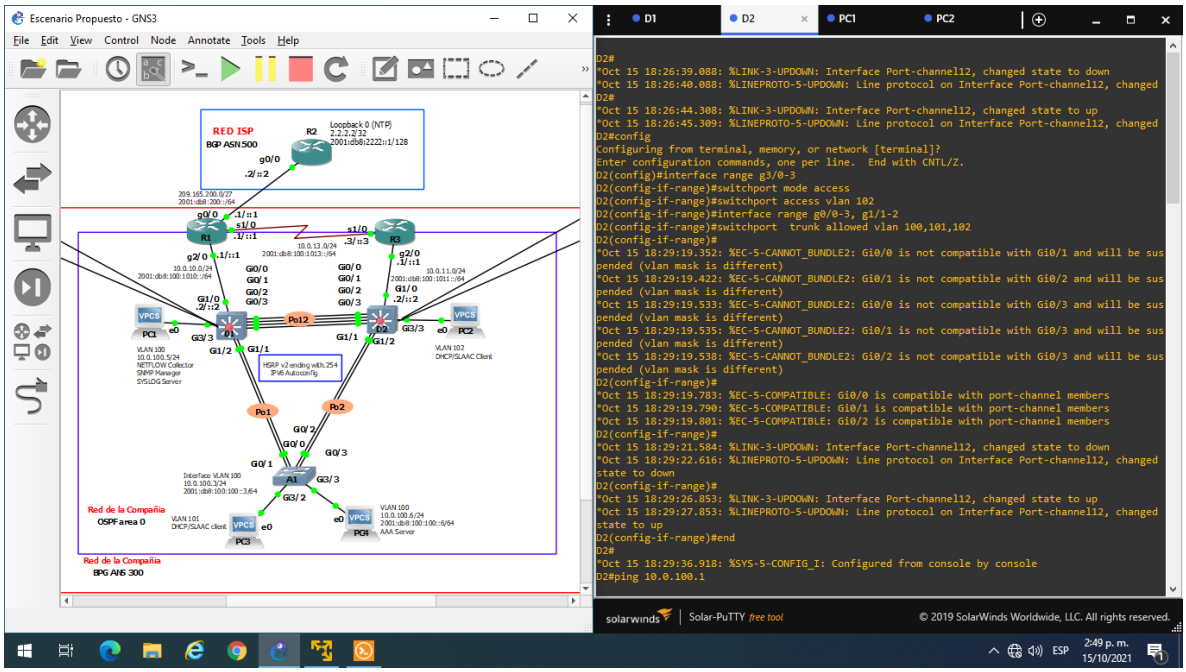

Figura 25 Configuración de puertos de Acceso D1

Switch A1:

```
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#interface g3/2
A1(config-if)#switchport mode access
A1(config-if)#switchport access vlan 101
A1(config-if)#no shutdown
A1(config-if)#interface g3/3
A1(config-if)#switchport mode access
A1(config-if)#switchport access vlan 100
A1(config-if)#no shutdown
A1(config-if)#switchport  trunk allowed vlan 100,101,102
A1(config-if)#end
A1#
*Oct 15 17:32:17.694: %SYS-5-CONFIG_I: Configured from console by console
A1#
```

Tabla 32 Configuración de puertos de acceso A1

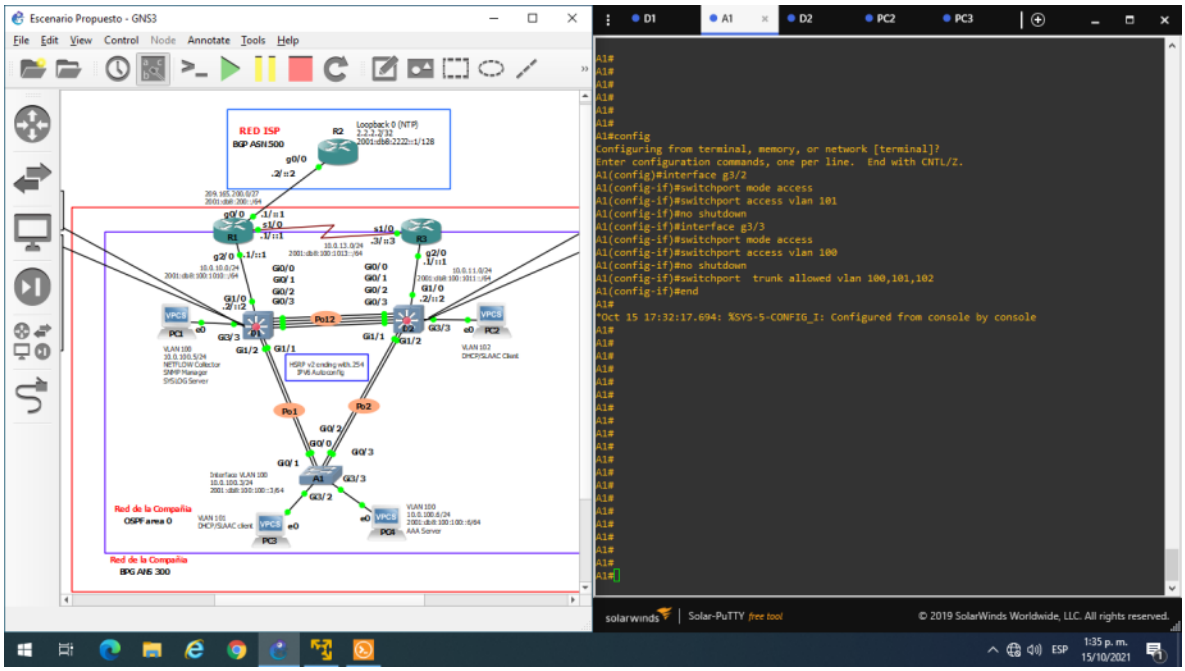

Figura 26 Configuración de puertos de acceso A1

2.7 Verificación de los servicios DHCP IPv4

PC2:

```
PC2> show

NAME   IP/MASK              GATEWAY          MAC              LPORT  RHOST:PORT
PC2    0.0.0.0/0            0.0.0.0          00:50:79:66:68:01  20142  127.0.0.1:20143
       fe80::250:79ff:fe66:6801/64
       2001:db8:100:102:2050:79ff:fe66:6801/64 eui-64

PC2> dhcp
DDORA IP 10.0.102.210/24 GW 10.0.102.254

PC2> save
Saving startup configuration to startup.vpc
.  done

PC2> show

NAME   IP/MASK              GATEWAY          MAC              LPORT  RHOST:PORT
PC2    10.0.102.210/24      10.0.102.254     00:50:79:66:68:01  20142  127.0.0.1:20143
       fe80::250:79ff:fe66:6801/64
       2001:db8:100:102:2050:79ff:fe66:6801/64 eui-64

PC2>
```

Tabla 33 Configuración de servicios dhcp PC2

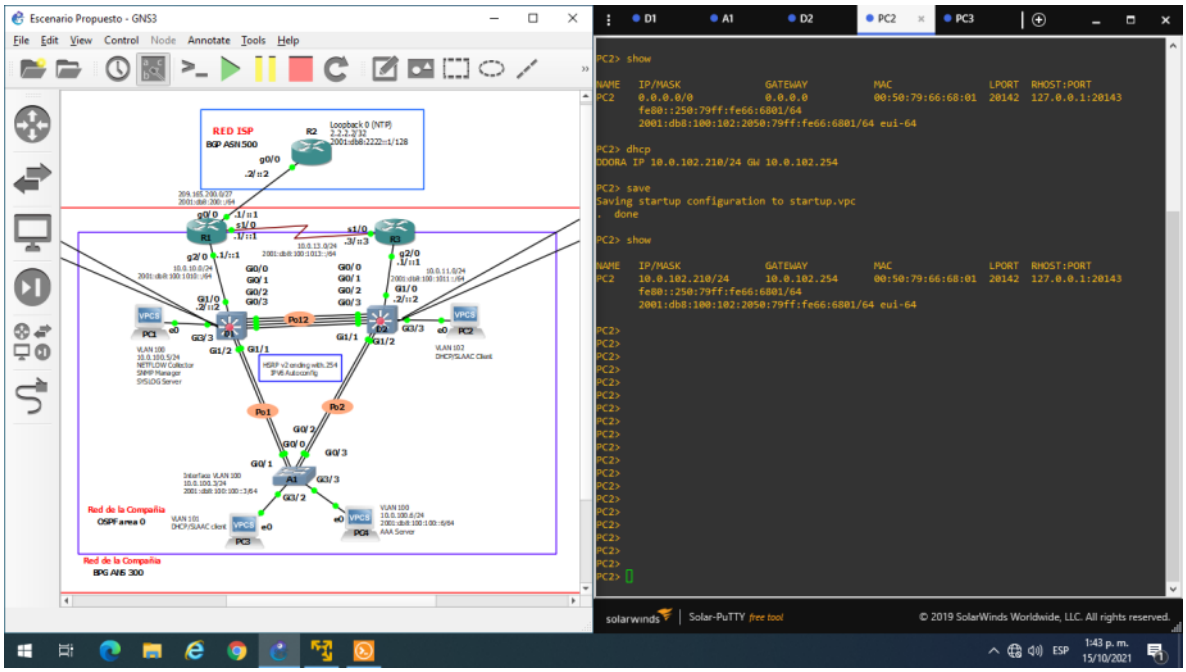

Figura 27 Verificación de servicios dhcp PC2

PC3:

```
PC3> show

NAME   IP/MASK              GATEWAY         MAC               LPORT  RHOST:PORT
PC3    0.0.0.0/0            0.0.0.0         00:50:79:66:68:02  20144  127.0.0.1:20145
       fe80::250:79ff:fe66:6802/64
       2001:db8:100:101:2050:79ff:fe66:6802/64 eui-64

PC3> dhcp
DDORA IP 10.0.101.110/24 GW 10.0.101.254

PC3> save
Saving startup configuration to startup.vpc
.  done

PC3> show

NAME   IP/MASK              GATEWAY         MAC               LPORT  RHOST:PORT
PC3    10.0.101.110/24      10.0.101.254    00:50:79:66:68:02  20144  127.0.0.1:20145
       fe80::250:79ff:fe66:6802/64
       2001:db8:100:101:2050:79ff:fe66:6802/64 eui-64

PC3>
```

Tabla 34 Configuración de servicios dhcp PC3

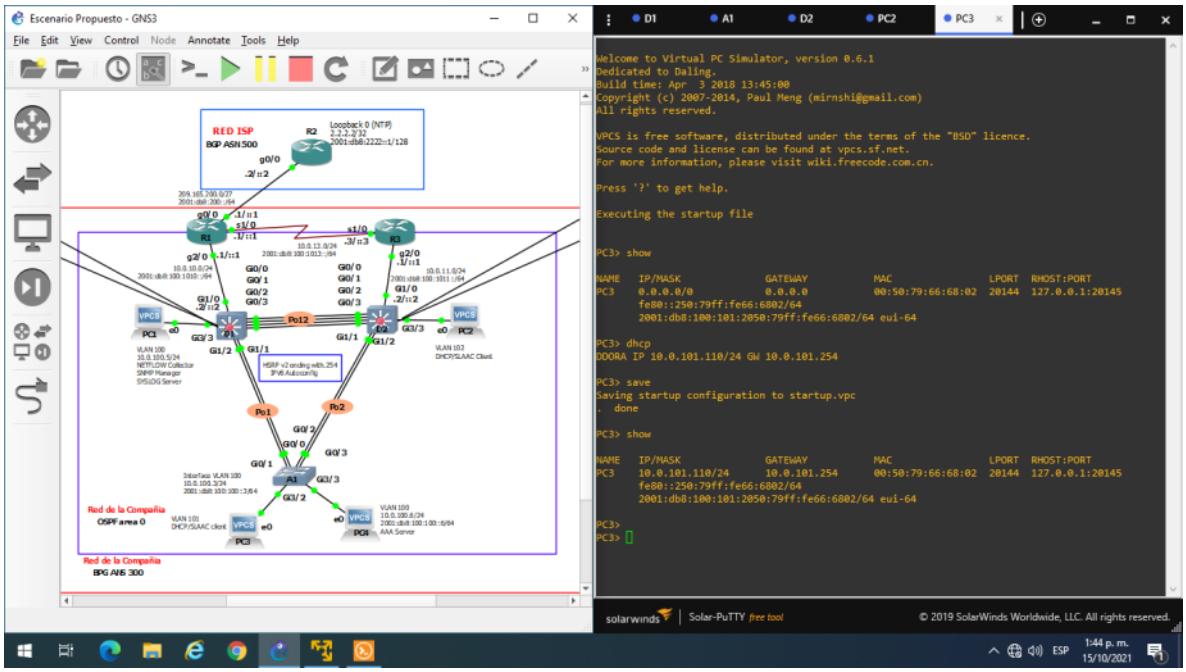

Figura 28 Verificación de servicios dhcp PC3

2.8 Verificación de la conectividad de la Red LAN

PC1:

```
PC1> show

NAME   IP/MASK             GATEWAY          MAC                LPORT  RHOST:PORT
PC1    10.0.100.5/24       10.0.100.254     00:50:79:66:68:00  20140  127.0.0.1:20141
       fe80::250:79ff:fe66:6800/64
       2001:db8:100:100::5/64

PC1> ping 10.0.100.1
84 bytes from 10.0.100.1 icmp_seq=1 ttl=255 time=24.866 ms
84 bytes from 10.0.100.1 icmp_seq=2 ttl=255 time=2.480 ms
84 bytes from 10.0.100.1 icmp_seq=3 ttl=255 time=3.965 ms
84 bytes from 10.0.100.1 icmp_seq=4 ttl=255 time=5.495 ms
84 bytes from 10.0.100.1 icmp_seq=5 ttl=255 time=2.695 ms

PC1> ping 10.0.100.2
84 bytes from 10.0.100.2 icmp_seq=1 ttl=255 time=33.926 ms
84 bytes from 10.0.100.2 icmp_seq=2 ttl=255 time=20.906 ms
84 bytes from 10.0.100.2 icmp_seq=3 ttl=255 time=13.994 ms
84 bytes from 10.0.100.2 icmp_seq=4 ttl=255 time=10.814 ms
84 bytes from 10.0.100.2 icmp_seq=5 ttl=255 time=10.652 ms
```

```
PC1> ping 10.0.100.6
84 bytes from 10.0.100.6 icmp_seq=1 ttl=64 time=25.250 ms
84 bytes from 10.0.100.6 icmp_seq=2 ttl=64 time=20.076 ms
84 bytes from 10.0.100.6 icmp_seq=3 ttl=64 time=19.545 ms
84 bytes from 10.0.100.6 icmp_seq=4 ttl=64 time=20.712 ms
84 bytes from 10.0.100.6 icmp_seq=5 ttl=64 time=6.090 ms

PC1>
```

Tabla 35 Conectividad a la Red LAN PC1

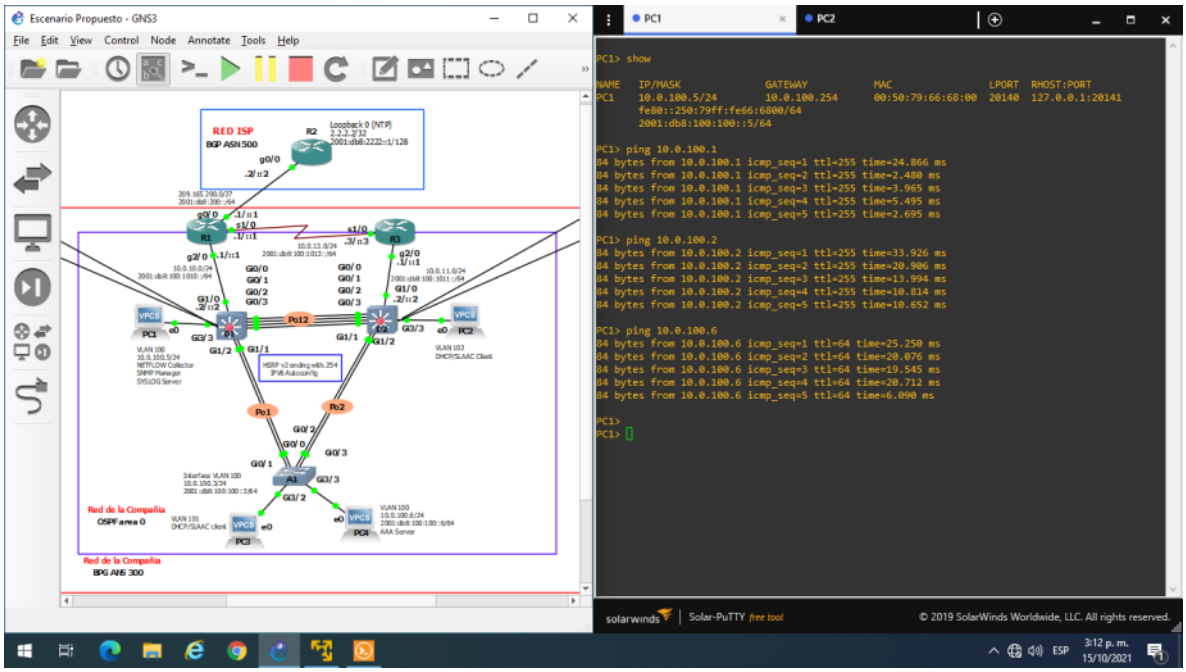

Figura 29 Conectividad a la Red LAN PC1

PC2:

```
PC2> show

NAME   IP/MASK              GATEWAY          MAC              LPORT  RHOST:PORT
PC2    10.0.102.210/24      10.0.102.254     00:50:79:66:68:01  20142  127.0.0.1:20143
       fe80::250:79ff:fe66:6801/64
       2001:db8:100:102:2050:79ff:fe66:6801/64 eui-64

PC2> ping 10.0.102.1
84 bytes from 10.0.102.1 icmp_seq=1 ttl=255 time=35.673 ms
84 bytes from 10.0.102.1 icmp_seq=2 ttl=255 time=16.310 ms
84 bytes from 10.0.102.1 icmp_seq=3 ttl=255 time=17.722 ms
84 bytes from 10.0.102.1 icmp_seq=4 ttl=255 time=28.608 ms
84 bytes from 10.0.102.1 icmp_seq=5 ttl=255 time=20.392 ms

PC2> ping 10.0.102.2
```

```
84 bytes from 10.0.102.2 icmp_seq=1 ttl=255 time=13.442 ms
84 bytes from 10.0.102.2 icmp_seq=2 ttl=255 time=2.819 ms
84 bytes from 10.0.102.2 icmp_seq=3 ttl=255 time=2.856 ms
84 bytes from 10.0.102.2 icmp_seq=4 ttl=255 time=3.065 ms
84 bytes from 10.0.102.2 icmp_seq=5 ttl=255 time=2.651 ms

PC2>
```

Tabla 36 Conectividad a la Red LAN PC2

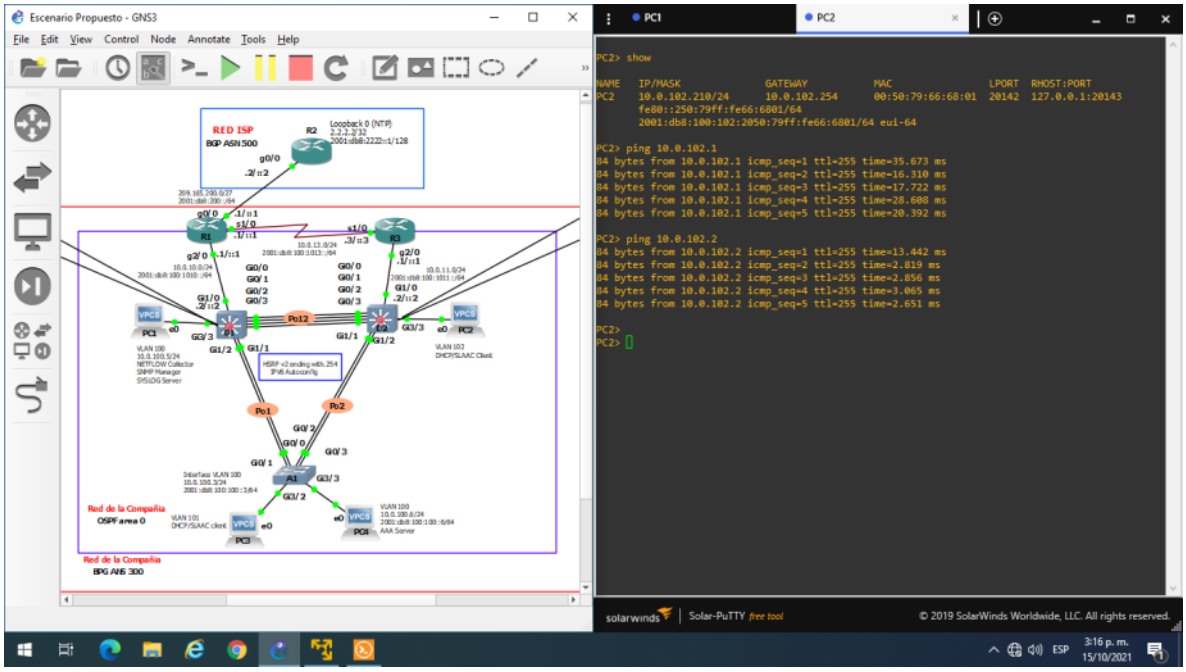

Figura 30 Conectividad a la Red LAN PC2

PC3:

```
PC3> show

NAME   IP/MASK             GATEWAY          MAC               LPORT  RHOST:PORT
PC3    10.0.101.110/24     10.0.101.254     00:50:79:66:68:02  20144  127.0.0.1:20145
       fe80::250:79ff:fe66:6802/64
       2001:db8:100:101:2050:79ff:fe66:6802/64 eui-64

PC3> ping 10.0.101.1
84 bytes from 10.0.101.1 icmp_seq=1 ttl=255 time=52.890 ms
84 bytes from 10.0.101.1 icmp_seq=2 ttl=255 time=5.227 ms
84 bytes from 10.0.101.1 icmp_seq=3 ttl=255 time=7.078 ms
84 bytes from 10.0.101.1 icmp_seq=4 ttl=255 time=9.797 ms
84 bytes from 10.0.101.1 icmp_seq=5 ttl=255 time=5.221 ms

PC3> ping 10.0.101.2
84 bytes from 10.0.101.2 icmp_seq=1 ttl=255 time=25.639 ms
```

```
84 bytes from 10.0.101.2 icmp_seq=2 ttl=255 time=5.589 ms
84 bytes from 10.0.101.2 icmp_seq=3 ttl=255 time=8.213 ms
84 bytes from 10.0.101.2 icmp_seq=4 ttl=255 time=20.122 ms
84 bytes from 10.0.101.2 icmp_seq=5 ttl=255 time=6.811 ms

PC3>
```

Tabla 37 Conectividad a la Red LAN PC3

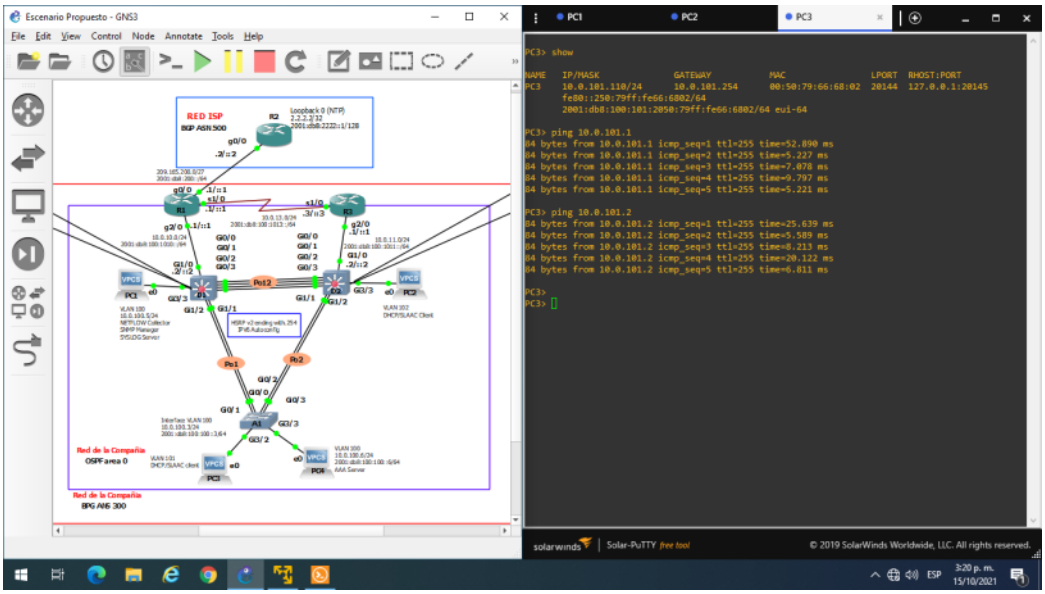

Figura 31 Conectividad a la Red LAN PC3

PC4:

```
PC4> show

NAME   IP/MASK              GATEWAY          MAC               LPORT  RHOST:PORT
PC4    10.0.100.6/24        10.0.100.254     00:50:79:66:68:03  20146  127.0.0.1:20147
       fe80::250:79ff:fe66:6803/64
       2001:db8:100:100::6/64

PC4> ping 10.0.100.1
84 bytes from 10.0.100.1 icmp_seq=1 ttl=255 time=41.628 ms
84 bytes from 10.0.100.1 icmp_seq=2 ttl=255 time=18.734 ms
84 bytes from 10.0.100.1 icmp_seq=3 ttl=255 time=19.285 ms
84 bytes from 10.0.100.1 icmp_seq=4 ttl=255 time=20.608 ms
84 bytes from 10.0.100.1 icmp_seq=5 ttl=255 time=11.427 ms

PC4> ping 10.0.100.2
84 bytes from 10.0.100.2 icmp_seq=1 ttl=255 time=31.758 ms
84 bytes from 10.0.100.2 icmp_seq=2 ttl=255 time=6.037 ms
84 bytes from 10.0.100.2 icmp_seq=3 ttl=255 time=5.184 ms
84 bytes from 10.0.100.2 icmp_seq=4 ttl=255 time=5.668 ms
84 bytes from 10.0.100.2 icmp_seq=5 ttl=255 time=5.965 ms

PC4> ping 10.0.100.5
```

```
84 bytes from 10.0.100.5 icmp_seq=1 ttl=64 time=30.110 ms
84 bytes from 10.0.100.5 icmp_seq=2 ttl=64 time=6.000 ms
84 bytes from 10.0.100.5 icmp_seq=3 ttl=64 time=8.089 ms
84 bytes from 10.0.100.5 icmp_seq=4 ttl=64 time=7.998 ms
84 bytes from 10.0.100.5 icmp_seq=5 ttl=64 time=11.858 ms

PC4>
```

Tabla 38 Conectividad a la Red LAN PC4

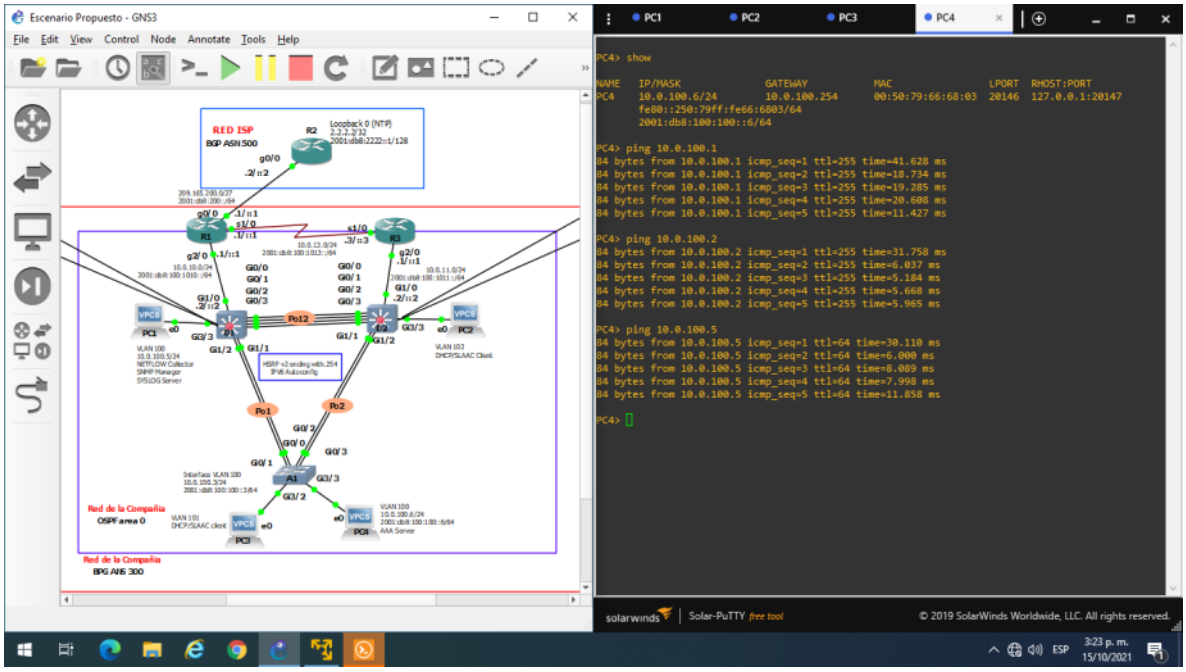

Figura 32 Conectividad a la Red LAN PC4

Parte 3: Configuración de los protocolos de enrutamiento

3.1 Configuration single-area OSPFv2 en area 0.

Router R1:

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router ospf 4
R1(config-router)#router-id 0.0.4.1
R1(config-router)#network 10.0.10.0 0.0.0.255 area 0
R1(config-router)#network 10.0.13.0 0.0.0.255 area 0
R1(config-router)#exit
R1(config)#ip route 0.0.0.0 0.0.0.0  209.165.200.226
%Default route without gateway, if not a point-to-point interface, may impact performance
R1(config)#exit
R1#
*Oct 15 22:43:11.691: %SYS-5-CONFIG_I: Configured from console by console
```

```
R1#
*Oct 15 22:44:06.655: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on Serial1/0 from LOADING to FULL, Loading Done
R1#
*Oct 15 22:45:56.311: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on GigabitEthernet2/0 from LOADING to FULL, Loading Done
R1#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
0.0.4.3           0   FULL/  -        00:00:34    10.0.13.3       Serial1/0
0.0.4.131         1   FULL/BDR        00:00:31    10.0.10.2       GigabitEthernet2/0
R1#
```

Tabla 39 Configuración OSPFv2 en R1

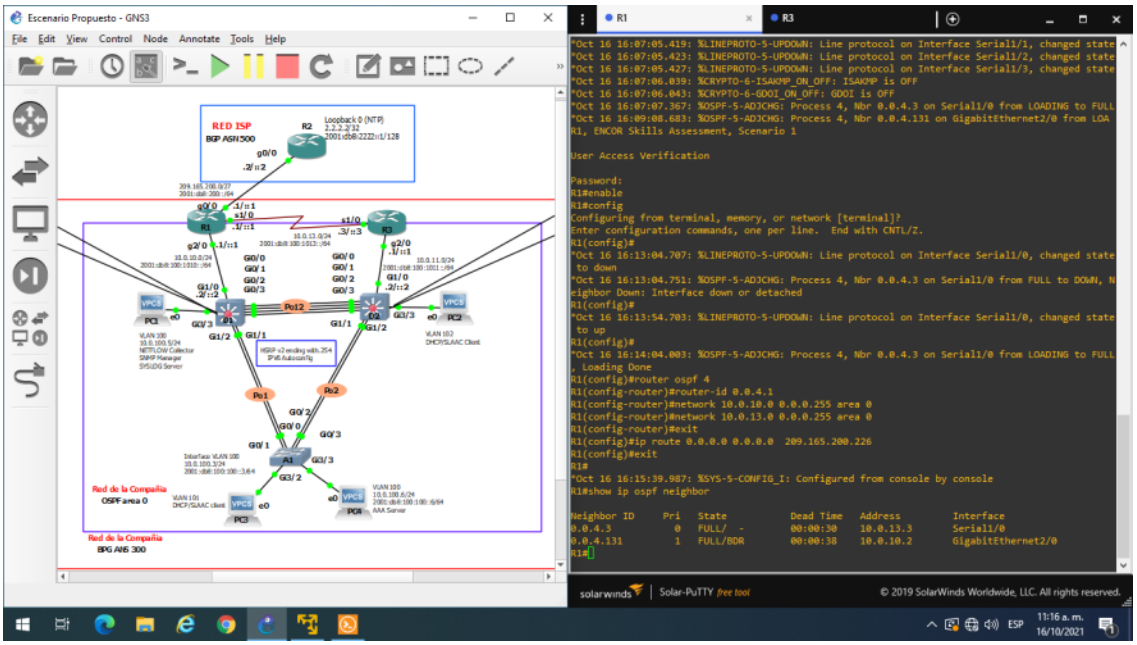

Figura 33 Configuración OSPFv2 en R1

Router R3:

```
R3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 4
R3(config-router)#router-id 0.0.4.3
R3(config-router)#network 10.0.11.0 0.0.0.255 area 0
R3(config-router)#network 10.0.13.0 0.0.0.255 area 0
R3(config-router)#
*Oct 15 22:44:06.759: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Serial1/0 from LOADING to FULL, Loading Done
R3(config-router)#end
R3#
*Oct 15 22:44:23.151: %SYS-5-CONFIG_I: Configured from console by console
R3#
*Oct 15 22:49:28.871: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on GigabitEthernet2/0 from
```

```
LOADING to FULL, Loading Done
R3#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
0.0.4.1           0   FULL/  -        00:00:30    10.0.13.1       Serial1/0
0.0.4.132         1   FULL/BDR        00:00:36    10.0.11.2       GigabitEthernet2/0
R3#
R3#
```

Tabla 40 Configuración OSPFv2 en R3

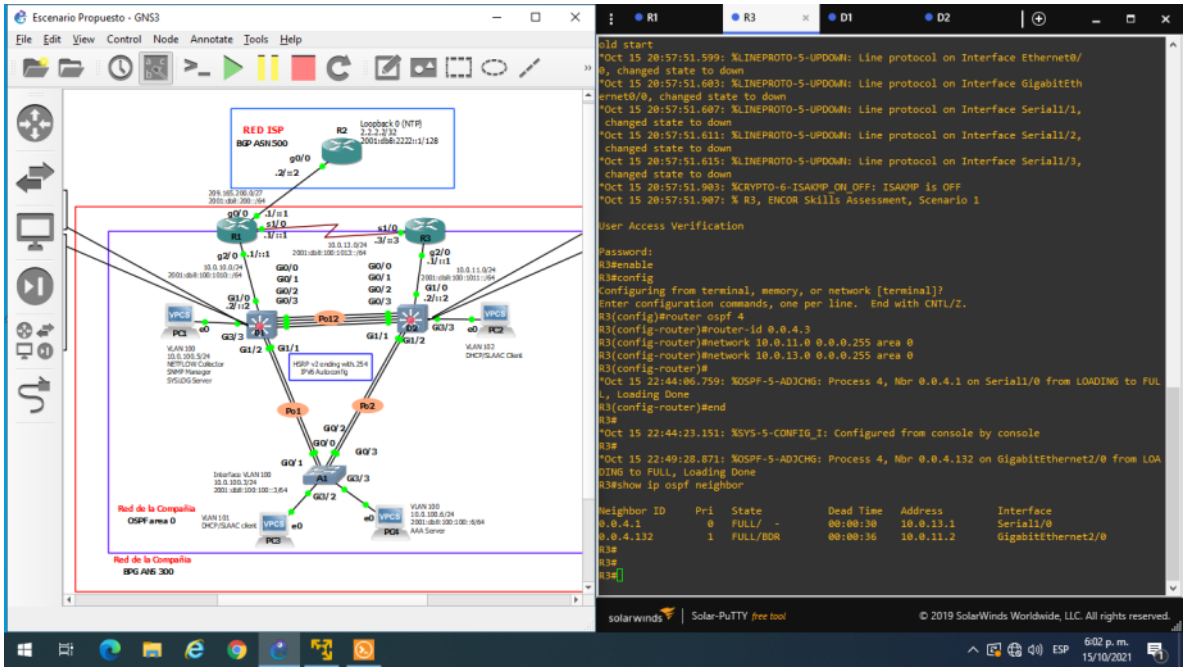

Figura 34 Configuración OSPFv2 en R3

Switch D1:

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#router ospf 4
D1(config-router)#router-id 0.0.4.131
D1(config-router)#network 10.0.10.0 0.0.0.255 area 0
D1(config-router)#
*Oct 15 22:43:16.209: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on GigabitEthernet1/0 from
LOADING to FULL, Loading Done
D1(config-router)#network 10.0.100.0 0.0.0.255 area 0
D1(config-router)#network 10.0.101.0 0.0.0.255 area 0
D1(config-router)#network 10.0.102.0 0.0.0.255 area 0
D1(config-router)#end
D1#
*Oct 15 22:43:57.712: %SYS-5-CONFIG_I: Configured from console by console
D1#config
Configuring from terminal, memory, or network [terminal]?
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#router ospf 4
D1(config-router)#passive-interface g3/3
D1(config-router)#passive-interface g1/1
D1(config-router)#passive-interface g1/2
D1(config-router)#end
D1#
*Oct 15 22:45:01.079: %SYS-5-CONFIG_I: Configured from console by console
D1#
*Oct 15 22:46:51.464: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Vlan100 from LOADING to FULL, Loading Done
D1#
*Oct 15 22:47:02.402: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Vlan101 from LOADING to FULL, Loading Done
D1#
*Oct 15 22:47:18.916: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Vlan102 from LOADING to FULL, Loading Done
D1#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
0.0.4.132         1   FULL/BDR        00:00:38    10.0.102.2      Vlan102
0.0.4.132         1   FULL/BDR        00:00:38    10.0.101.2      Vlan101
0.0.4.132         1   FULL/BDR        00:00:37    10.0.100.2      Vlan100
0.0.4.1           1   FULL/DR         00:00:30    10.0.10.1       GigabitEthernet1/0
D1#
```

Tabla 41 Configuración OSPFv2 en D1

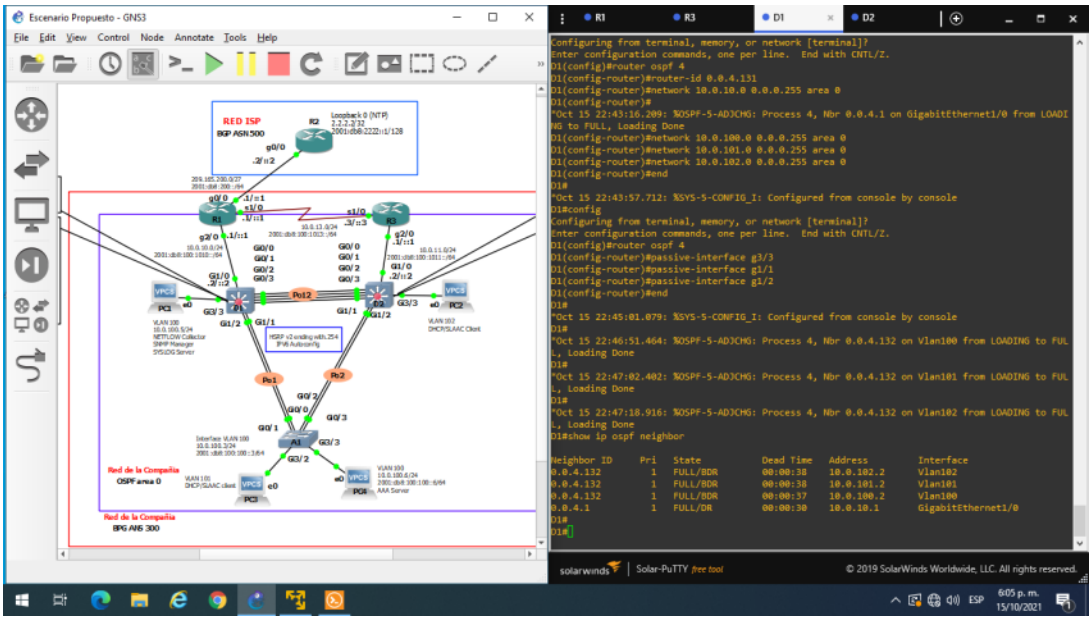

Figura 35 Configuración OSPFv2 en D1

Switch D2:

```
D2#config
Configuring from terminal, memory, or network [terminal]?
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#router ospf 4
D2(config-router)#router-id 0.0.4.132
D2(config-router)#network 10.0.11.0 0.0.0.255 area 0
D2(config-router)#
*Oct 15 22:47:08.992: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on GigabitEthernet1/0 from
LOADING to FULL, Loading Done
D2(config-router)#network 10.0.100.0 0.0.0.255 area 0
D2(config-router)#
*Oct 15 22:47:17.060: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on Vlan100 from
LOADING to FULL, Loading Done
D2(config-router)#network 10.0.101.0 0.0.0.255 area 0
D2(config-router)#
*Oct 15 22:47:27.862: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on Vlan101 from
LOADING to FULL, Loading Done
D2(config-router)#network 10.0.102.0 0.0.0.255 area 0
D2(config-router)#
*Oct 15 22:47:44.312: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on Vlan102 from
LOADING to FULL, Loading Done
D2(config-router)#end
D2#
*Oct 15 22:47:54.076: %SYS-5-CONFIG_I: Configured from console by console
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#router ospf 4
D2(config-router)#passive-interface g3/3
D2(config-router)#passive-interface g1/1
D2(config-router)#passive-interface g1/2
D2(config-router)#end
D2#
*Oct 15 22:48:56.925: %SYS-5-CONFIG_I: Configured from console by console
D2#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
0.0.4.131         1   FULL/DR         00:00:39    10.0.102.1      Vlan102
0.0.4.131         1   FULL/DR         00:00:30    10.0.101.1      Vlan101
0.0.4.131         1   FULL/DR         00:00:31    10.0.100.1      Vlan100
0.0.4.3           1   FULL/DR         00:00:35    10.0.11.1       GigabitEthernet1/0
D2#
```

Tabla 42 Configuración OSPFv2 en D2

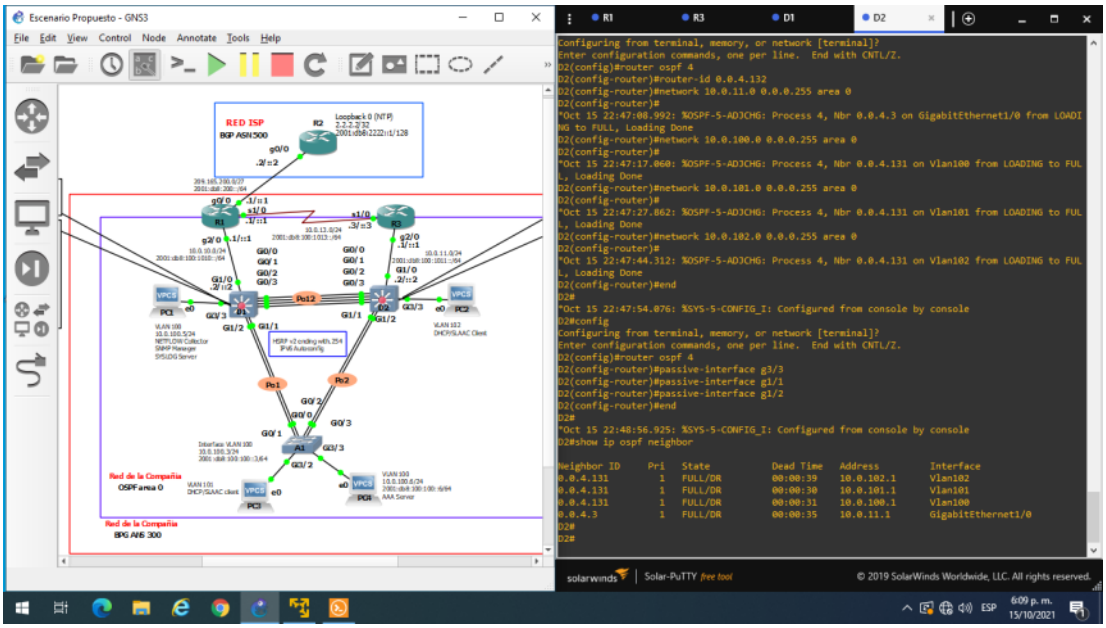

Figura 36 Configuración OSPFv2 en D2

3.2 Configuración classic single-area OSPFv3 en area 0.

Router R1:

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 router ospf 6
R1(config-rtr)#router-id 0.0.6.1
R1(config-rtr)#interface g2/0
R1(config-if)#ipv6 ospf 6 area 0
R1(config-if)#interface s1/0
R1(config-if)#ipv6 ospf 6 area 0
R1(config-if)#exit
R1(config)#ipv6 route ::/0 2001:db8:200::2
R1(config)#exit
R1#
*Oct 16 18:38:08.703: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Oct 16 18:39:54.443: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.3 on Serial1/0 from LOADING to FULL, Loading Done
R1#show ipv6 ospf neighbor

          OSPFv3 Router with ID (0.0.6.1) (Process ID 6)

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
0.0.6.3           0   FULL/  -        00:00:31    5               Serial1/0
R1#
```

Tabla 43 Configuración OSPFv3 en R1

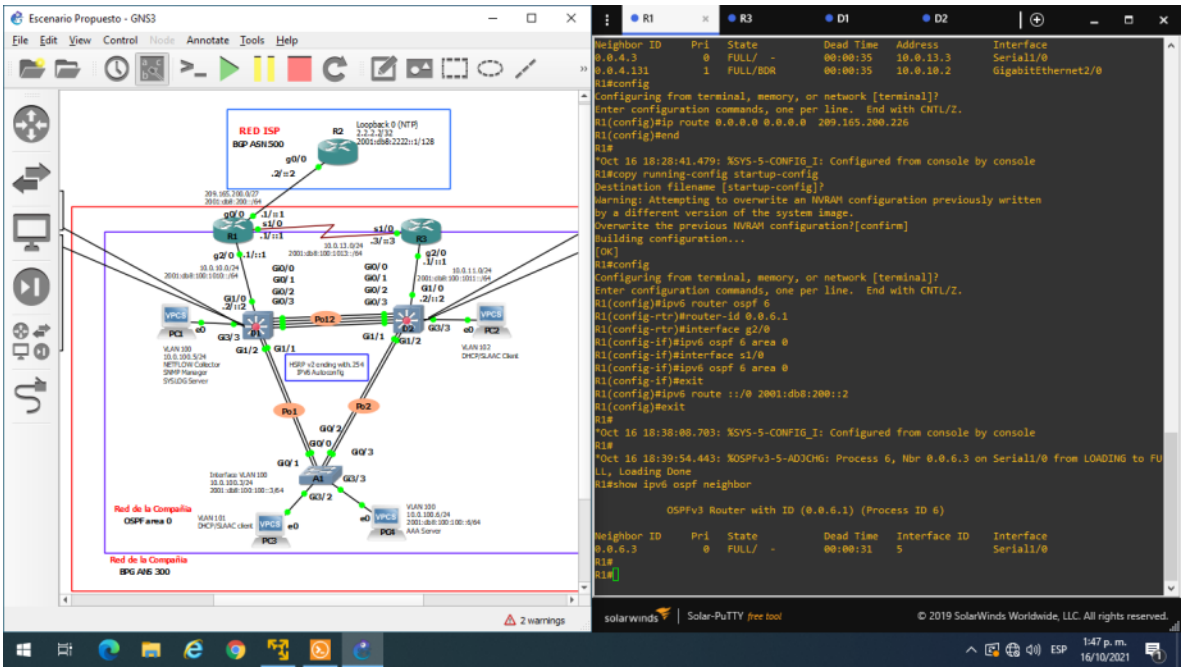

Figura 37 Configuración OSPFv3 en R1

Router R3:

```
R3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 router ospf 6
R3(config-rtr)#router-id 0.0.6.3
R3(config-rtr)#interface g2/0
R3(config-if)#ipv6 ospf 6 area 0
R3(config-if)#interface s1/0
R3(config-if)#ipv6 ospf 6 area 0
R3(config-if)#
*Oct 16 18:39:54.491: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.1 on Serial1/0 from LOADING to FULL, Loading Done
R3(config-if)#end
R3#
*Oct 16 18:40:04.031: %SYS-5-CONFIG_I: Configured from console by console
R3#show ipv6 ospf neighbor

          OSPFv3 Router with ID (0.0.6.3) (Process ID 6)

Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
0.0.6.1           0   FULL/  -        00:00:37    5               Serial1/0
R3#
```

Tabla 44 Configuración OSPFv3 en R3

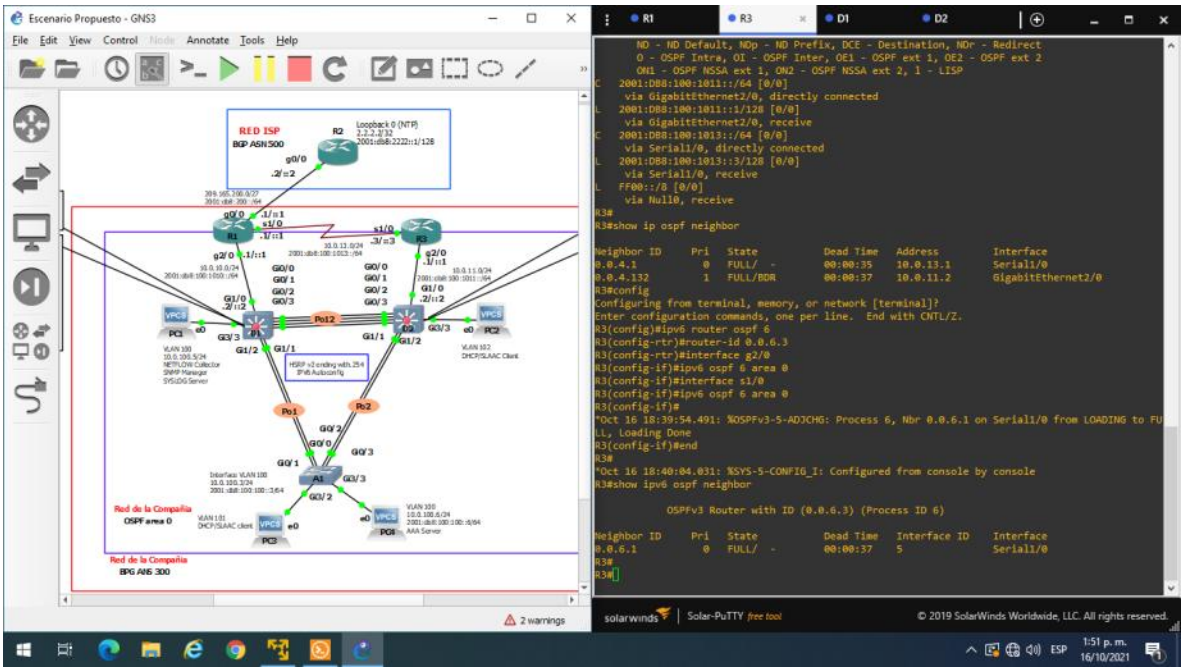

Figura 38 Configuración OSPFv3 en R3

Se identifica que el iosvl2 de Switch multicapa para GNS3 de Cisco CCNP no cuenta con el protocolo OSPF para IPV6. Por tanto, a manera de contingencia se procedió a realizar la configuración de enrutamiento para IPV6 CON EIGERP.

Switch D1:

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#ipv6 router eigrp 6
D1(config-rtr)#router-id 0.0.6.131
D1(config-rtr)#interface g1/0
D1(config-if)#ipv6 eigrp 6
D1(config-if)#interface g0/0
D1(config-if)#ipv6 eigrp 6
D1(config-if)#interface g0/1
D1(config-if)#ipv6 eigrp 6
D1(config-if)#interface g0/2
D1(config-if)#ipv6 eigrp 6
D1(config-if)#interface g0/3
D1(config-if)#ipv6 eigrp 6
D1(config-if)#exit
D1(config)#ipv6 router eigrp 6
D1(config-rtr)#passive-interface g3/3
D1(config-rtr)#passive-interface g1/1
D1(config-rtr)#passive-interface g1/2
D1(config-rtr)#end
```

```
D1#
#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, 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
       RL - RPL, la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
C   2001:DB8:100:100::/64 [0/0]
     via Vlan100, directly connected
L   2001:DB8:100:100::1/128 [0/0]
     via Vlan100, receive
C   2001:DB8:100:101::/64 [0/0]
     via Vlan101, directly connected
L   2001:DB8:100:101::1/128 [0/0]
     via Vlan101, receive
C   2001:DB8:100:102::/64 [0/0]
     via Vlan102, directly connected
L   2001:DB8:100:102::1/128 [0/0]
     via Vlan102, receive
C   2001:DB8:100:1010::/64 [0/0]
     via GigabitEthernet1/0, directly connected
L   2001:DB8:100:1010::2/128 [0/0]
     via GigabitEthernet1/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

Tabla 45 Configuración EIGRP en D1

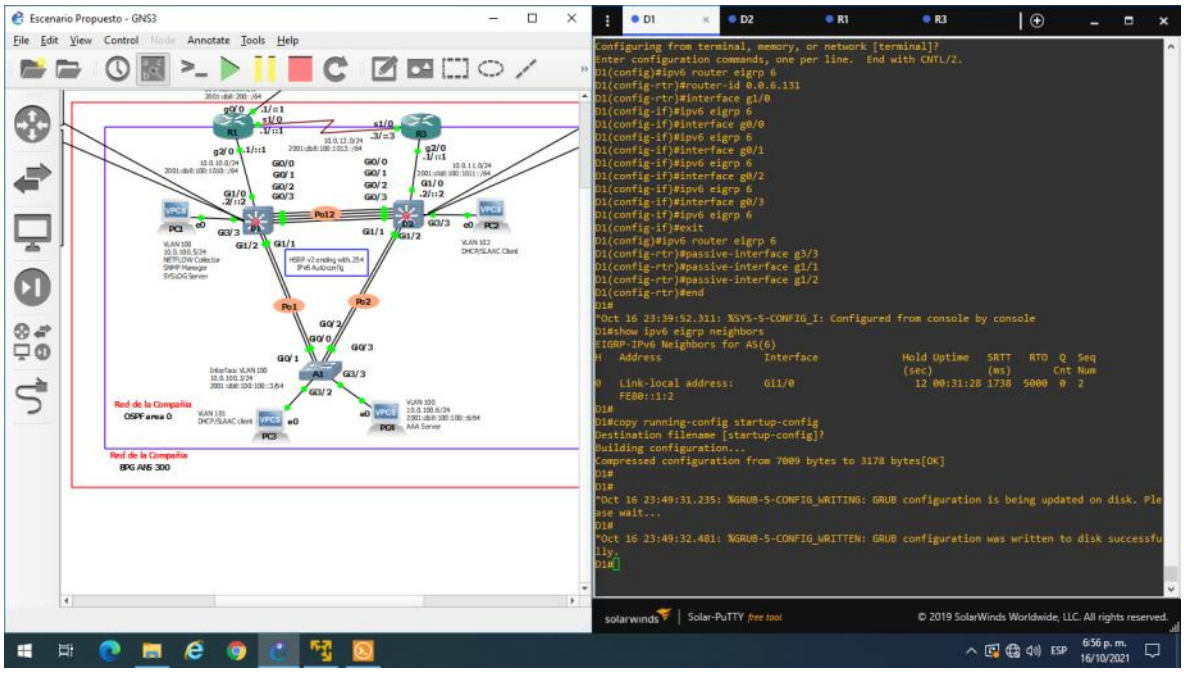

Figura 39 Configuración EIGRP en D1

Switch D2:

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#ipv6 router eigrp 6
D2(config-rtr)#router-id 0.0.6.132
D2(config-rtr)#interface g1/0
D2(config-if)#ipv6 eigrp 6
D2(config-if)#interface g0/0
D2(config-if)#ipv6 eigrp 6
D2(config-if)#interface g0/1
D2(config-if)#ipv6 eigrp 6
D2(config-if)#interface g0/2
D2(config-if)#ipv6 eigrp 6
D2(config-if)#interface g0/3
D2(config-if)#ipv6 eigrp 6
D2(config-if)#exit
D2(config)#ipv6 router eigrp 6
D2(config-rtr)#passive-interface g3/3
D2(config-rtr)#passive-interface g1/1
D2(config-rtr)#passive-interface g1/2
D2(config-rtr)#end
D2#
D2#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, 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
       RL - RPL, la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       lA - LISP away, a - Application
C   2001:DB8:100:100::/64 [0/0]
     via Vlan100, directly connected
L   2001:DB8:100:100::2/128 [0/0]
     via Vlan100, receive
C   2001:DB8:100:101::/64 [0/0]
     via Vlan101, directly connected
L   2001:DB8:100:101::2/128 [0/0]
     via Vlan101, receive
C   2001:DB8:100:102::/64 [0/0]
     via Vlan102, directly connected
L   2001:DB8:100:102::2/128 [0/0]
     via Vlan102, receive
C   2001:DB8:100:1011::/64 [0/0]
     via GigabitEthernet1/0, directly connected
L   2001:DB8:100:1011::2/128 [0/0]
     via GigabitEthernet1/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

Tabla 46 Configuración EIGRP en D2

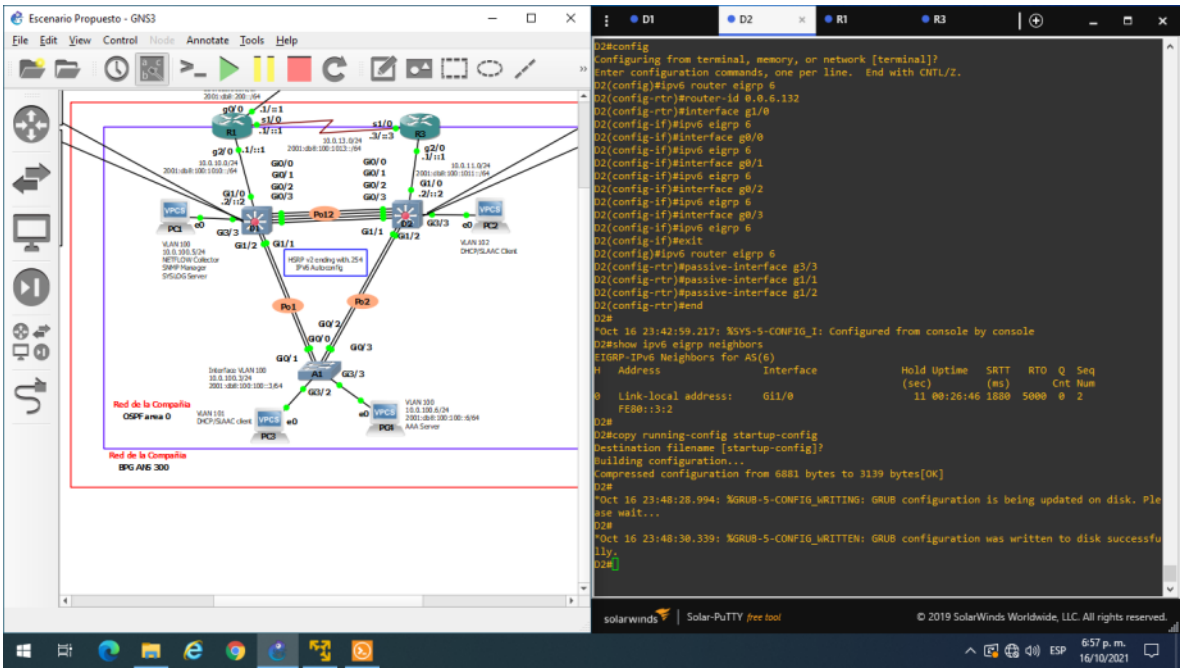

Figura 40 Configuración EIGRP en D2

3.3 configure MP-BGP.

Router R2:

```
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip route 0.0.0.0 0.0.0.0  209.165.200.225
R2(config)#ipv6 route ::/0 2001:db8:200::1
R2(config)#router bgp 500
R2(config-router)#bgp router-id 2.2.2.2
R2(config-router)#no bgp default ipv4-unicast
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)# network 0.0.0.0 mask 0.0.0.0
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)#exit-address-family
R2(config-router)#address-family ipv6
R2(config-router-af)#network ::/0
R2(config-router-af)#network ::/0
R2(config-router-af)#neighbor 2001:db8:200::1 activate
R2(config-router-af)#exit-address-family
R2(config-router)#end
```

```
R2#show bgp ipv4 unicast summary
BGP router identifier 2.2.2.2, local AS number 500
BGP table version is 3, main routing table version 3
2 network entries using 296 bytes of memory
2 path entries using 128 bytes of memory
2/2 BGP path/bestpath attribute entries using 272 bytes of memory
1 BGP AS-PATH entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 720 total bytes of memory
BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
209.165.200.225 4          300       8       8        3    0    0 00:03:32        1
R2#show bgp ipv6 unicast summary
BGP router identifier 2.2.2.2, local AS number 500
BGP table version is 3, main routing table version 3
2 network entries using 344 bytes of memory
2 path entries using 176 bytes of memory
2/2 BGP path/bestpath attribute entries using 272 bytes of memory
1 BGP AS-PATH entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 816 total bytes of memory
BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
2001:DB8:200::1 4          300       8       8        3    0    0 00:02:56        1
R2#
```

Tabla 47 Configuración MP-BGP en R2

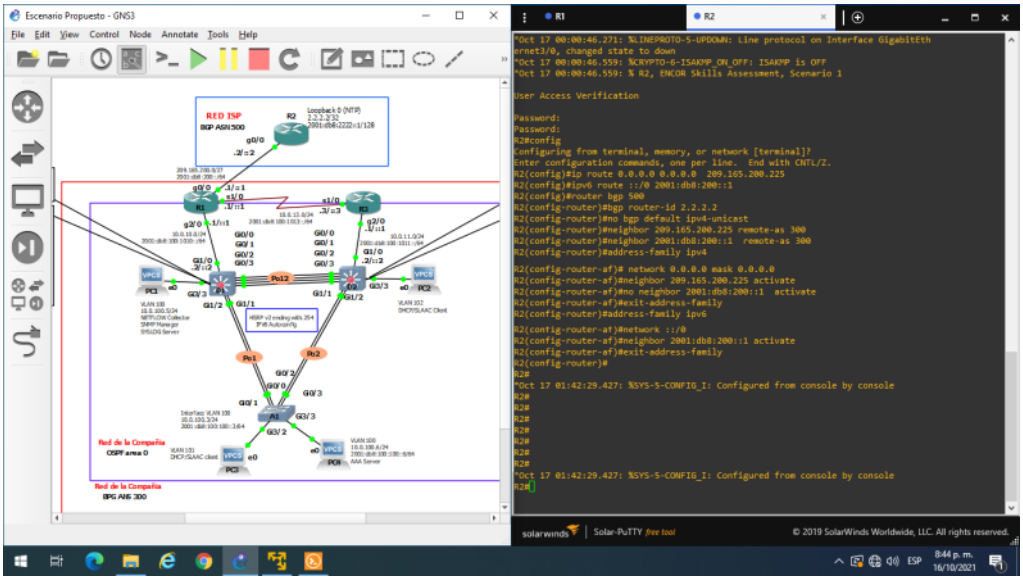

Figura 41 Configuración MP-BGP en R2

Router R1:

```
R1(config)#ip route 10.0.0.0 255.0.0.0  209.165.200.226
R1(config)#ipv6 route 2001:db8:100::/48  2001:db8:200::2
R1(config)# router bgp 300
R1(config-router)#bgp router-id 1.1.1.1
R1(config-router)#no bgp default ipv4-unicast
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
R1(config-router-af)#network 10.0.0.0 mask 255.0.0.0
R1(config-router-af)#neighbor 209.165.200.226 activate
R1(config-router-af)#
*Oct 17 01:55:45.279: %BGP-5-ADJCHANGE: neighbor 209.165.200.226 Up
R1(config-router-af)#no neighbor 2001:db8:200::2  activate
R1(config-router-af)#exit-address-family
R1(config-router)#address-family ipv6
R1(config-router-af)# network 2001:db8:100::/48
R1(config-router-af)#neighbor 2001:db8:200::2 activate
R1(config-router-af)#
*Oct 17 01:56:43.531: %BGP-5-ADJCHANGE: neighbor 2001:DB8:200::2 Up
R1(config-router-af)#no neighbor  209.165.200.226  activate
R1(config-router-af)#exit-address-family
R1(config-router)#end
R1#
*Oct 17 01:57:46.379: %SYS-5-CONFIG_I: Configured from console by console
R1#R1(config)#
% Bad IP address or host name
% Unknown command or computer name, or unable to find computer address
R1#R1(config)#ip route 10.0.0.0/8  209.165.200.226
R1#
R1#show bgp ipv4 unicast summary
BGP router identifier 1.1.1.1, local AS number 300
BGP table version is 3, main routing table version 3
2 network entries using 296 bytes of memory
2 path entries using 128 bytes of memory
2/2 BGP path/bestpath attribute entries using 272 bytes of memory
1 BGP AS-PATH entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 720 total bytes of memory
BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
209.165.200.226 4          500      16      16        3    0    0 00:10:37        1
R1#show bgp ipv6 unicast summary
BGP router identifier 1.1.1.1, local AS number 300
BGP table version is 3, main routing table version 3
2 network entries using 344 bytes of memory
2 path entries using 176 bytes of memory
2/2 BGP path/bestpath attribute entries using 272 bytes of memory
1 BGP AS-PATH entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
```

```
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 816 total bytes of memory
BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
2001:DB8:200::2 4          500      15      16        3    0    0 00:09:53        1
R1#
```

Tabla 48 Configuración MP-BGP en R1

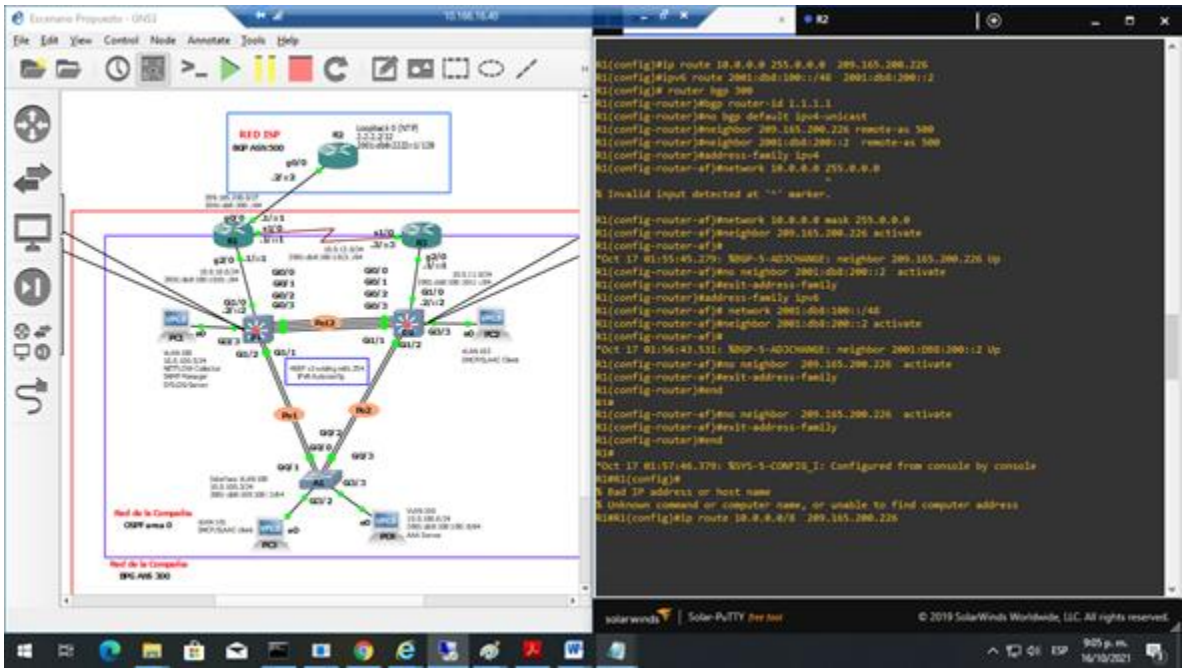

Figura 42 Configuración MP-BGP en R1

Parte 4: Configurar la Redundancia del Primer Salto (Fisto Hop Redundancia)

En esta parte, se configuro HSRP versión 2 para proveer redundancia de primer salto para los host en la “Red de la Compañía”. A continuación se muestra la configuración realizada:

4.1 Creación de IP SLA en el switch D1.

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#ip slab 4
D1(confié-ip-sal)#imp.-echo 10.0.10.1
D1(confié-ip-sal-echo)#frecuencia 5
D1(confié-ip-sal-echo)#éxito
D1(confié)#ip sal 6
```

```
D1(confié-ip-sal)#imp.-echo 2001:db8:100:1010::1
D1(confié-ip-sal-echo)#frecuencia 5
D1(confié-ip-sal-echo)#éxito
D1(config)#ip slab schedule 4 life forever start-time now
D1(config)#ip slab schedule 6 life forever start-time now
D1(config)#show ip slab summary

D1(config)#exit
D1#
*Nov 23 22:16:45.642: %SYS-5-CONFIG_I: Configured from console by console
D1#show ip slab summary
IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending

ID          Type        Destination       Stats       Return          Last
                                (ms)        Code        Run
---------------------------------------------------------------------
*4          imp-echo    10.0.10.1         RTT=11      OK          1 second ago




*6          imp-echo    2001:DB8:100:1010 RTT=4    OK          2 seconds ago
                        ::1

D1#show ip slab configuration 4
IP SLAs Infrastructure Engine-III
Entry number: 4
Owner:
Tag:
Operation timeout (milliseconds): 5000
Type of operation to perform: imp-echo
Target address/Source address: 10.0.10.1/0.0.0.0
Type Of Service parameter: 0x0
Request size (ARR data portion): 28
Data pattern: 0xABCDABCD
Verify data: No
Verve Name:
Schedule:
   Operation frequency (seconds): 5  (not considered if randomly scheduled)
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled : FALSE
   Randomly Scheduled : FALSE
   Life (seconds): Forever
   Entry Age out (seconds): never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP Row Status): Active
Threshold (milliseconds): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 1
   Statistic distribution interval (milliseconds): 20
Enhanced History:
```

```
History Statistics:
   Number of history Lives kept: 0
   Number of history Buckets kept: 15
   History Filter Type: None
D1#
D1#show ip slab statistics 4
IPSLAs Latest Operation Statistics
IPSLA operation id: 4
        Latest RTT: 9 milliseconds
Latest operation start time: 22:17:36 UTC Tue Nov 23 2021
Latest operation return code: OK
Number of successes: 21
Number of failures: 0
Operation time to live: Forever

D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#track 4 ip slab 4
D1(config-track)#delay down 10 up 15
D1(config-track)#exit
D1(config)#track 6 ip slab 6
D1(config-track)#delay down 10 up 15
D1(config-track)#exit
D1(config)#copy running-config startup-config
```

Tabla 49 Creación de IP SLA en el switch D1

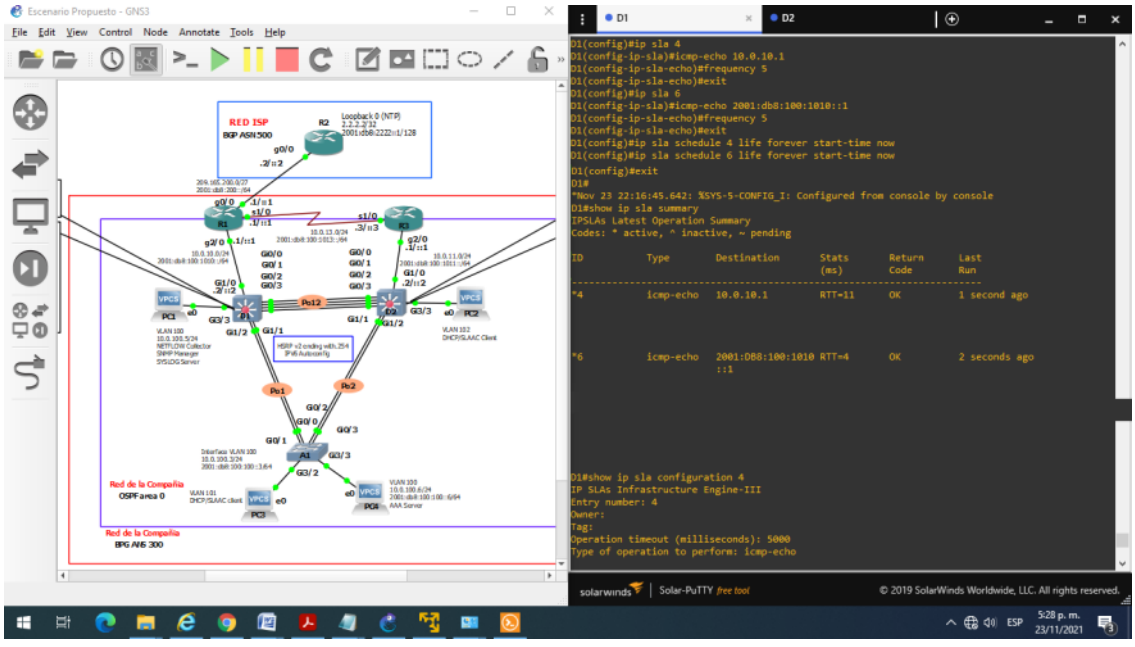

Figura 43 Creación de IP SLA en el switch D1

4.2 Creación de IP SLA en el switch D2.

```
D2(confié)#ip sal 4
D2(confié-ip-sal)#imp.-echo 10.0.11.1
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
D2(config)#exit
D2#
*Nov 23 22:38:58.684: %SYS-5-CONFIG_I: Configured from console by console
D2#show ip sla summary
IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending

ID           Type        Destination       Stats          Return         Last
                                           (ms)           Code           Run
---------------------------------------------------------------------------
*4           icmp-echo   10.0.11.1         RTT=1          OK             1 second ago


*6           icmp-echo   2001:DB8:100:1011 RTT=2          OK             3 seconds ago
                         ::1

D2#show ip sla statistics 4
IPSLAs Latest Operation Statistics

IPSLA operation id: 4
        Latest RTT: 4 milliseconds
Latest operation start time: 22:39:16 UTC Tue Nov 23 2021
Latest operation return code: OK
Number of successes: 24
Number of failures: 0
Operation time to live: Forever


D2#show ip sla configuration 4
IP SLAs Infrastructure Engine-III
Entry number: 4
Owner:
Tag:
Operation timeout (milliseconds): 5000
Type of operation to perform: icmp-echo
```

Target address/Source address: 10.0.11.1/0.0.0.0
Type Of Service parameter: 0x0
Request size (ARR data portion): 28
Data pattern: 0xABCDABCD
Verify data: No
Vrf Name:
Schedule:
  Operation frequency (seconds): 5 (not considered if randomly scheduled)
  Next Scheduled Start Time: Start Time already passed
  Group Scheduled : FALSE
  Randomly Scheduled : FALSE
  Life (seconds): Forever
  Entry Ageout (seconds): never
  Recurring (Starting Everyday): FALSE
  Status of entry (SNMP RowStatus): Active
Threshold (milliseconds): 5000
Distribution Statistics:
  Number of statistic hours kept: 2
  Number of statistic distribution buckets kept: 1
  Statistic distribution interval (milliseconds): 20
Enhanced History:
History Statistics:
  Number of history Lives kept: 0
  Number of history Buckets kept: 15
  History Filter Type: None

Tabla 50 Creación de IP SLA en el switch D2

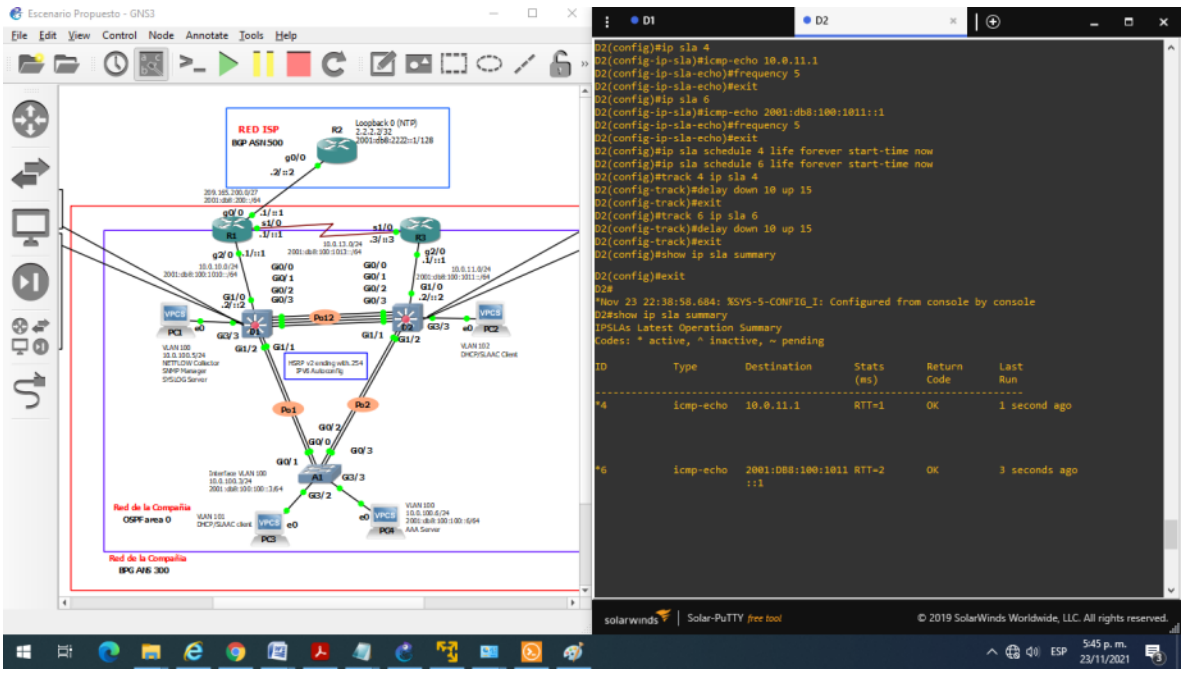

Figura 44 Creación de IP SLA en el switch D2

4.3 Configuración de HSRPv2 switch D1.

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#interface vlan 100
D1(config-if)#standby version 2
D1(config-if)#standby 104 ip 10.0.100.254
D1(config-if)#standby 104 priority 150
D1(config-if)#standby 104 preempt
D1(config-if)#standby 104 track 4 decrement 60
D1(config-if)#exit
D1(config)#
*Nov 23 22:51:16.155: %HSRP-5-STATECHANGE: Vlan100 Grp 104 state Standby -> Active
D1(config)#interface vlan 101
D1(config-if)#standby version 2
D1(config-if)#standby 114 ip 10.0.101.254
D1(config-if)#standby 114 preempt
D1(config-if)#standby 114 track 4 decrement 60
D1(config-if)#exit
D1(config)#
*Nov 23 22:51:58.373: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Standby -> Active
D1(config)#interface vlan 102
D1(config-if)#standby version 2
D1(config-if)#standby 124 priority 150
D1(config-if)#standby 124 ip 10.0.102.254
D1(config-if)#standby 124 preempt
D1(config-if)#standby 124 track 4 decrement 60
D1(config-if)#exit
D1(config)#
*Nov 23 22:52:49.038: %HSRP-5-STATECHANGE: Vlan102 Grp 124 state Standby -> Active
D1(config)#interface vlan 100
D1(config-if)#standby 106 ipv6 autoconfig
D1(config-if)#standby 106 priority 150
D1(config-if)#standby 106 preempt
D1(config-if)#standby 106 track 6 decrement 60
D1(config-if)#
*Nov 23 22:53:26.845: %HSRP-5-STATECHANGE: Vlan100 Grp 106 state Standby -> Active
D1(config-if)#exit
D1(config)#interface vlan 101
D1(config-if)#standby version 2
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)#
*Nov 23 22:54:17.681: %HSRP-5-STATECHANGE: Vlan101 Grp 116 state Standby -> Active
D1(config)#interface vlan 102
D1(config-if)#standby 126 ipv6 autoconfig
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
```

```
*Nov 23 22:54:55.973: %HSRP-5-STATECHANGE: Vlan102 Grp 126 state Standby -> Active
D1(config-if)#exit
D1(config)#exit
D1#
*Nov 23 22:55:04.232: %SYS-5-CONFIG_I: Configured from console by console
D1#show standby
Vlan100 - Group 104 (version 2)
  State is Active
    2 state changes, last state change 00:05:03
  Virtual IP address is 10.0.100.254
  Active virtual MAC address is 0000.0c9f.f068 (MAC In Use)
    Local virtual MAC address is 0000.0c9f.f068 (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 2.512 secs
  Preemption enabled
  Active router is local
  Standby router is unknown
  Priority 150 (configured 150)
    Track object 4 state Up decrement 60
  Group name is "hsrp-Vl100-104" (default)
Vlan100 - Group 106 (version 2)
  State is Active
    2 state changes, last state change 00:02:52
  Link-Local Virtual IPv6 address is FE80::5:73FF:FEA0:6A (conf auto EUI64)
  Active virtual MAC address is 0005.73a0.006a (MAC In Use)
    Local virtual MAC address is 0005.73a0.006a (v2 IPv6 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.480 secs
  Preemption enabled
  Active router is local
  Standby router is unknown
  Priority 150 (configured 150)
    Track object 6 state Up decrement 60
  Group name is "hsrp-Vl100-106" (default)
Vlan101 - Group 114 (version 2)
  State is Active
    2 state changes, last state change 00:04:21
  Virtual IP address is 10.0.101.254
  Active virtual MAC address is 0000.0c9f.f072 (MAC In Use)
    Local virtual MAC address is 0000.0c9f.f072 (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 2.240 secs
  Preemption enabled
  Active router is local
  Standby router is unknown
  Priority 100 (default 100)
    Track object 4 state Up decrement 60
  Group name is "hsrp-Vl101-114" (default)
Vlan101 - Group 116 (version 2)
  State is Active
    2 state changes, last state change 00:02:02
  Link-Local Virtual IPv6 address is FE80::5:73FF:FEA0:74 (conf auto EUI64)
  Active virtual MAC address is 0005.73a0.0074 (MAC In Use)
```

```
    Local virtual MAC address is 0005.73a0.0074 (v2 IPv6 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.128 secs
  Preemption enabled
  Active router is local
  Standby router is unknown
  Priority 100 (default 100)
    Track object 6 state Up decrement 60
  Group name is "hsrp-Vl101-116" (default)
Vlan102 - Group 124 (version 2)
  State is Active
    2 state changes, last state change 00:03:30
  Virtual IP address is 10.0.102.254
  Active virtual MAC address is 0000.0c9f.f07c (MAC In Use)
    Local virtual MAC address is 0000.0c9f.f07c (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.712 secs
  Preemption enabled
  Active router is local
  Standby router is unknown
  Priority 150 (configured 150)
    Track object 4 state Up decrement 60
  Group name is "hsrp-Vl102-124" (default)
Vlan102 - Group 126 (version 2)
  State is Active
    2 state changes, last state change 00:01:23
  Link-Local Virtual IPv6 address is FE80::5:73FF:FEA0:7E (conf auto EUI64)
  Active virtual MAC address is 0005.73a0.007e (MAC In Use)
    Local virtual MAC address is 0005.73a0.007e (v2 IPv6 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.072 secs
  Preemption enabled
  Active router is local
  Standby router is unknown
  Priority 150 (configured 150)
    Track object 6 state Up decrement 60
  Group name is "hsrp-Vl102-126" (default)
```

Tabla 51 Configuración de HSRPv2 switch D1

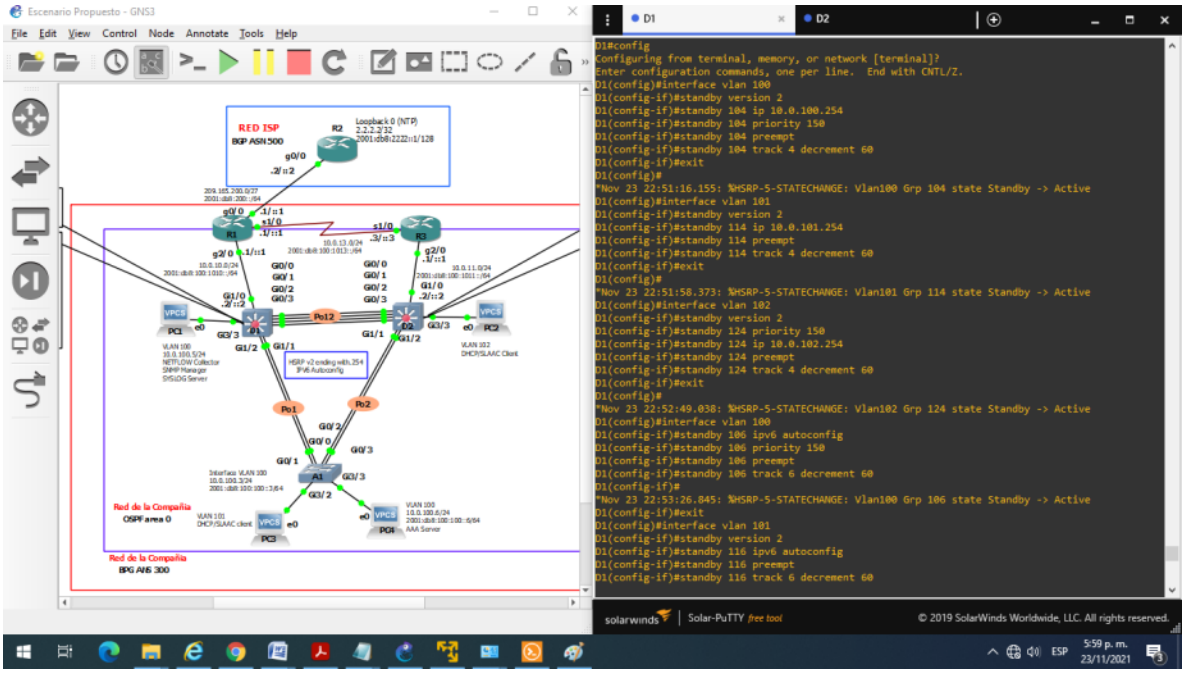

Figura 45 Configuración de HSRPv2 switch D1

4.4. Configuración de HSRPv2 switch D2.

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#interface vlan 100
D2(config-if)#standby version 2
D2(config-if)#standby 104 ip 10.0.100.254
D2(config-if)#standby 104 preempt
D2(config-if)#standby 104 track 4 decrement 60
D2(config-if)#exit
D2(config)#
*Nov 23 23:01:00.931: %HSRP-5-STATECHANGE: Vlan100 Grp 104 state Speak -> Standby
D2(config)#interface vlan 101
D2(config-if)#standby version 2
D2(config-if)#standby 114 priority 150
D2(config-if)#standby 114 ip 10.0.101.254
D2(config-if)#standby 114 preempt
D2(config-if)#
*Nov 23 23:01:39.274: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Listen -> Active
D2(config-if)#standby 114 track 4 decrement 60
D2(config-if)#exit
D2(config)#interface vlan 102
D2(config-if)#standby version 2
```

```
D2(config-if)#standby 124 ip 10.0.102.254
D2(config-if)#standby 124 preempt
D2(config-if)#standby 124 track 4 decrement 60
D2(config-if)#exit
D2(config)#
*Nov 23 23:02:49.581: %HSRP-5-STATECHANGE: Vlan102 Grp 124 state Speak -> Standby
D2(config)#interface vlan 100
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)#
*Nov 23 23:03:26.048: %HSRP-5-STATECHANGE: Vlan100 Grp 106 state Speak -> Standby
D2(config)#interface vlan 101
D2(config-if)#standby version 2
D2(config-if)#standby 116 ipv6 autoconfig
D2(config-if)#standby 116 priority 150
D2(config-if)#standby 116 preempt
D2(config-if)#
*Nov 23 23:04:04.032: %HSRP-5-STATECHANGE: Vlan101 Grp 116 state Speak -> Active
D2(config-if)#standby 116 track 6 decrement 60
D2(config-if)#exit
D2(config)#interface vlan 102
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)#end
D2#
*Nov 23 23:04:53.421: %SYS-5-CONFIG_I: Configured from console by console
D2#
*Nov 23 23:04:57.790: %HSRP-5-STATECHANGE: Vlan102 Grp 126 state Speak -> Standby
D2#show standby
Vlan100 - Group 104 (version 2)
  State is Standby
    1 state change, last state change 00:05:01
  Virtual IP address is 10.0.100.254
  Active virtual MAC address is 0000.0c9f.f068 (MAC Not In Use)
    Local virtual MAC address is 0000.0c9f.f068 (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.224 secs
  Preemption enabled
  Active router is 10.0.100.1, priority 150 (expires in 9.408 sec)
    MAC address is 0c19.b50a.8064
  Standby router is local
  Priority 100 (default 100)
    Track object 4 state Up decrement 60
  Group name is "hsrp-Vl100-104" (default)
Vlan100 - Group 106 (version 2)
  State is Standby
    1 state change, last state change 00:02:36
  Link-Local Virtual IPv6 address is FE80::5:73FF:FEA0:6A (conf auto EUI64)
  Active virtual MAC address is 0005.73a0.006a (MAC Not In Use)
    Local virtual MAC address is 0005.73a0.006a (v2 IPv6 default)
```

```
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.432 secs
  Preemption enabled
  Active router is FE80::D1:2, priority 150 (expires in 11.216 sec)
    MAC address is 0c19.b50a.8064
  Standby router is local
  Priority 100 (default 100)
    Track object 6 state Up decrement 60
  Group name is "hsrp-Vl100-106" (default)
Vlan101 - Group 114 (version 2)
  State is Active
    1 state change, last state change 00:04:22
  Virtual IP address is 10.0.101.254
  Active virtual MAC address is 0000.0c9f.f072 (MAC In Use)
    Local virtual MAC address is 0000.0c9f.f072 (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.248 secs
  Preemption enabled
  Active router is local
  Standby router is 10.0.101.1, priority 100 (expires in 8.752 sec)
  Priority 150 (configured 150)
    Track object 4 state Up decrement 60
  Group name is "hsrp-Vl101-114" (default)
Vlan101 - Group 116 (version 2)
  State is Active
    1 state change, last state change 00:01:58
  Link-Local Virtual IPv6 address is FE80::5:73FF:FEA0:74 (conf auto EUI64)
  Active virtual MAC address is 0005.73a0.0074 (MAC In Use)
    Local virtual MAC address is 0005.73a0.0074 (v2 IPv6 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.848 secs
  Preemption enabled
  Active router is local
  Standby router is FE80::D1:3, priority 100 (expires in 10.448 sec)
  Priority 150 (configured 150)
    Track object 6 state Up decrement 60
  Group name is "hsrp-Vl101-116" (default)
Vlan102 - Group 124 (version 2)
  State is Standby
    1 state change, last state change 00:03:12
  Virtual IP address is 10.0.102.254
  Active virtual MAC address is 0000.0c9f.f07c (MAC Not In Use)
    Local virtual MAC address is 0000.0c9f.f07c (v2 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.720 secs
  Preemption enabled
  Active router is 10.0.102.1, priority 150 (expires in 9.952 sec)
    MAC address is 0c19.b50a.8066
  Standby router is local
  Priority 100 (default 100)
    Track object 4 state Up decrement 60
  Group name is "hsrp-Vl102-124" (default)
Vlan102 - Group 126 (version 2)
```

```
State is Standby
  1 state change, last state change 00:01:04
Link-Local Virtual IPv6 address is FE80::5:73FF:FEA0:7E (conf auto EUI64)
Active virtual MAC address is 0005.73a0.007e (MAC Not In Use)
  Local virtual MAC address is 0005.73a0.007e (v2 IPv6 default)
Hello time 3 sec, hold time 10 sec
  Next hello sent in 0.864 secs
Preemption enabled
Active router is FE80::D1:4, priority 150 (expires in 10.464 sec)
  MAC address is 0c19.b50a.8066
Standby router is local
Priority 100 (default 100)
  Track object 6 state Up decrement 60
Group name is "hsrp-Vl102-126" (default)
```

Tabla 52 Configuración de HSRPv2 switch D2

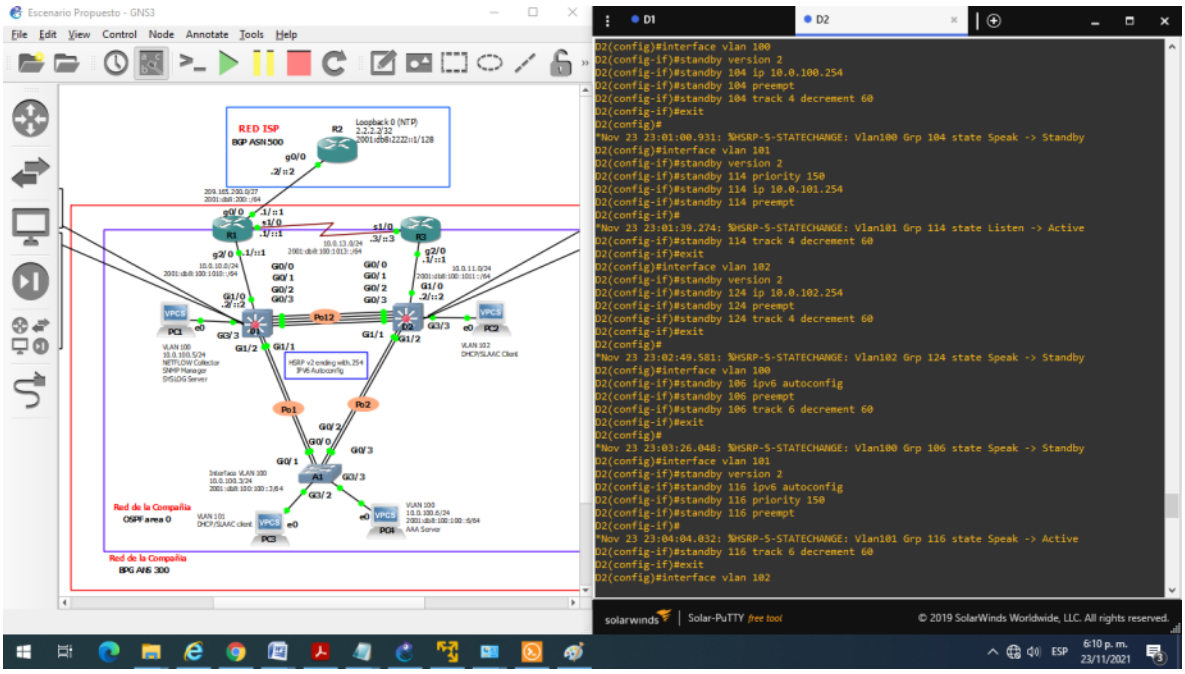

Figura 46 Configuración de HSRPv2 switch D2

Parte 5: Seguridad

Para esta parte se configuraron varios mecanismos de seguridad en los dispositivos de la topología. A continuación, se muestran las tareas de configuración realizadas:

5.1. Configuración de protección del EXEC privilegiado usando el algoritmo de encripción SCRYPT en todos los dispositivos.

Configuración en el Router R1

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#line console 0
R1(config-line)#password cisco12345cisco
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#end
R1#
*Nov 24 23:08:28.255: %SYS-5-CONFIG_I: Configured from console by console
R2#exit
```

Tabla 53 Configuración en el Router R1

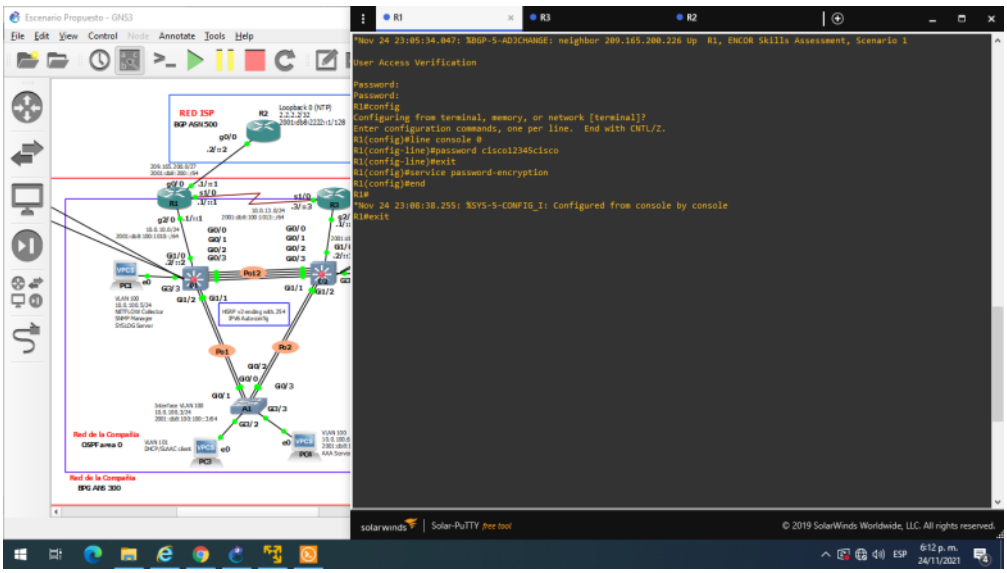

Figura 47 Configuración en el Router R1

Configuración en el Router R2

```
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#line console 0
R2(config-line)#password cisco12345cisco
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#end
R2#
*Nov 25 15:51:50.331: %SYS-5-CONFIG_I: Configured from console by console
R2#copy running-config startup-config
```

Tabla 54 Configuración en el Router R2

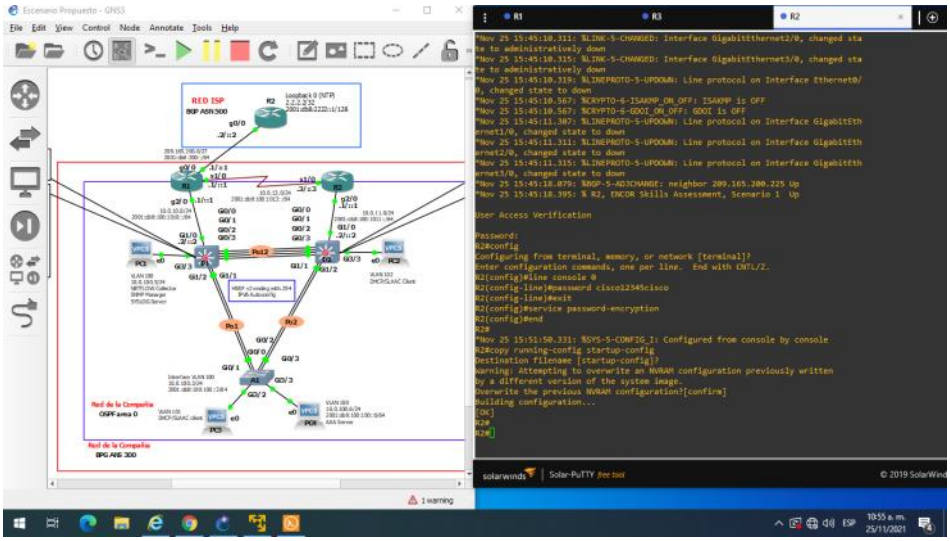

Figura 48 Configuración en el Router R2

Configuración en el Router R3

R3(config)#line console 0 R3(config-line)#password cisco12345cisco R3(config-line)#exit R3(config)#service password-encryption R3(config)#end R3# *Nov 25 15:58:05.779: %SYS-5-CONFIG_I: Configured from console by console R3#copy running-config startup-config

Tabla 55 Configuración en el Router R3

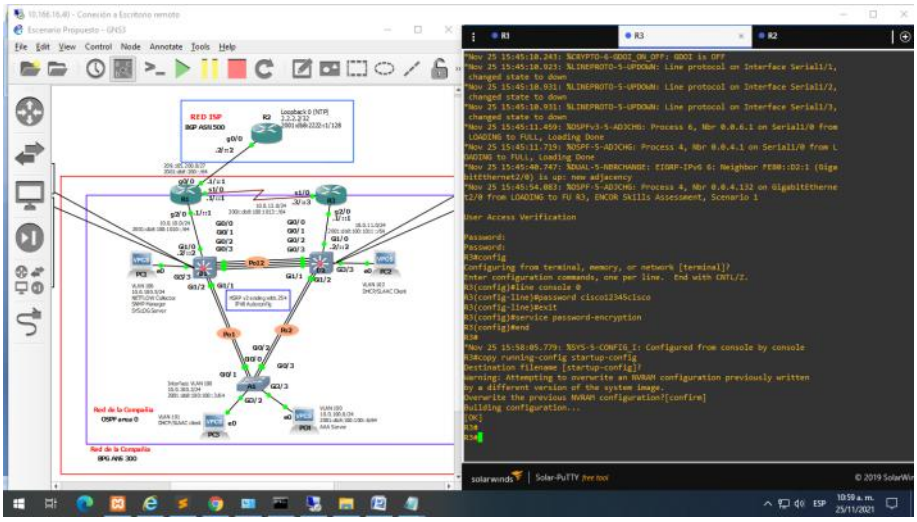

Figura 49 Configuración en el Router R3

Configuración en el Switch D1

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#line console 0
D1(config-line)#password cisco12345cisco
D1(config-line)#exit
D1(config)#service password-encryption
D1(config)#end
D1#
*Nov 25 16:01:28.349: %SYS-5-CONFIG_I: Configured from console by console
D1#copy running-config startup-config
```

Tabla 56 Configuración en el Switch D1

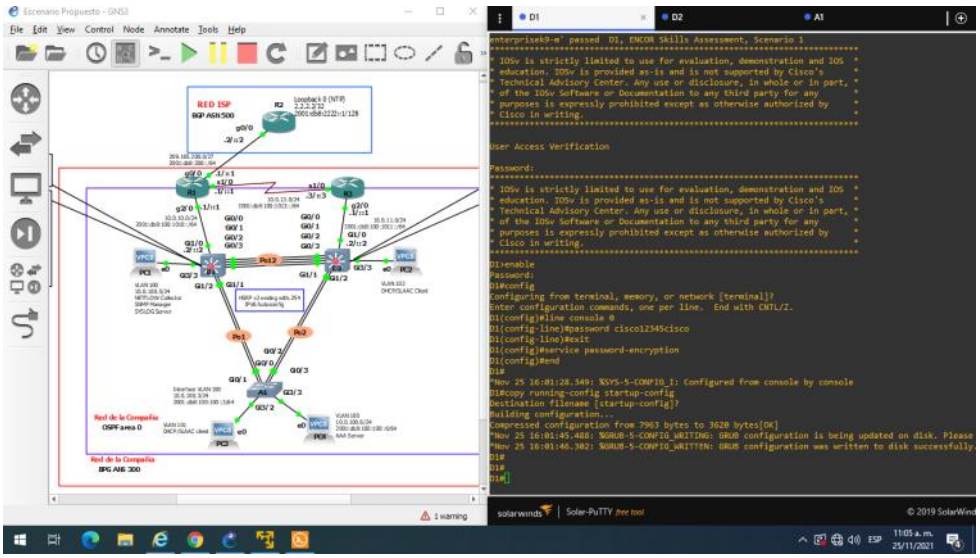

Figura 50 Configuración en el Switch D1

Configuración en el Switch D2

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#line console 0
D2(config-line)#password cisco12345cisco
D2(config-line)#exit
D2(config)#service password-encryption
D2(config)#end
D2#
*Nov 25 16:07:03.445: %SYS-5-CONFIG_I: Configured from console by console
D2#copy running-config startup-config
```

Tabla 57 Configuración en el Switch D2

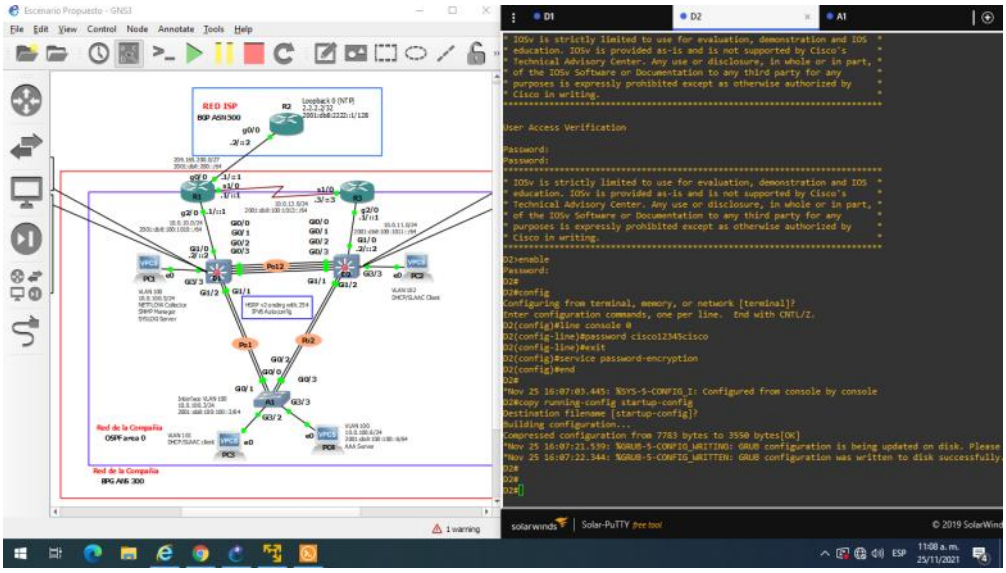

Figura 51 Configuración en el Switch D2

Configuración en el Switch A1

```
A1(config)#line console 0
A1(config-line)#password cisco12345cisco
A1(config-line)#exit
A1(config)#service password-encryption
A1(config)#end
A1#
*Nov 25 16:10:17.383: %SYS-5-CONFIG_I: Configured from console by console
A1#copy running-config startup-config
```

Tabla 58 Configuración en el Switch A1

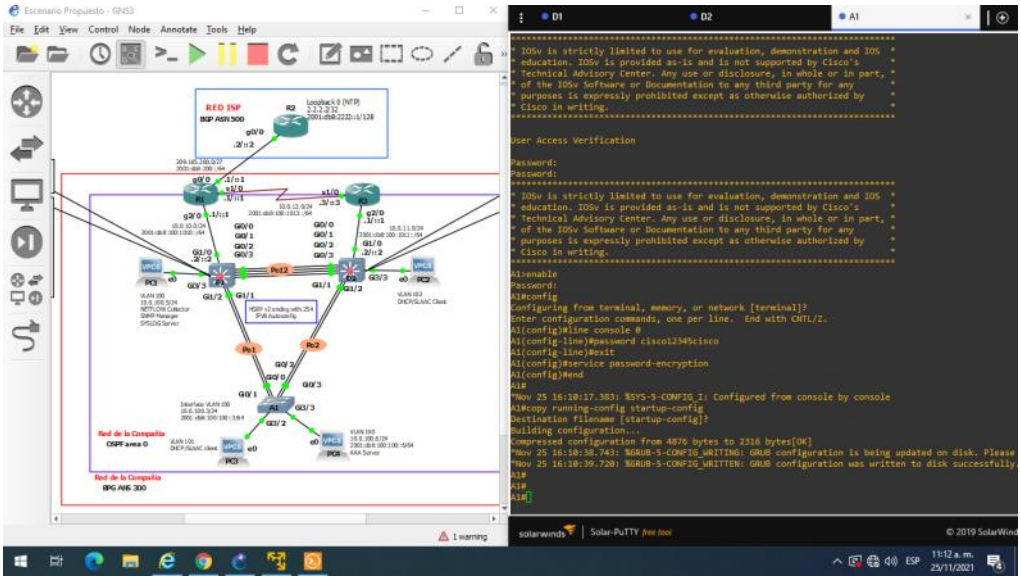

Figura 52 Configuración en el Switch A1

5.2. Configuración de un usuario local y protección con el algoritmo de encripción SCRYPT.

Configuración en el Router R1

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#line console 0
R1(config-line)#username sadmin password cisco12345cisco
R1(config)#line console 0
R1(config-line)#privilege level 15
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#end
R1#
*Nov 25 16:49:49.763: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

Tabla 59 Configuración en el Router R1

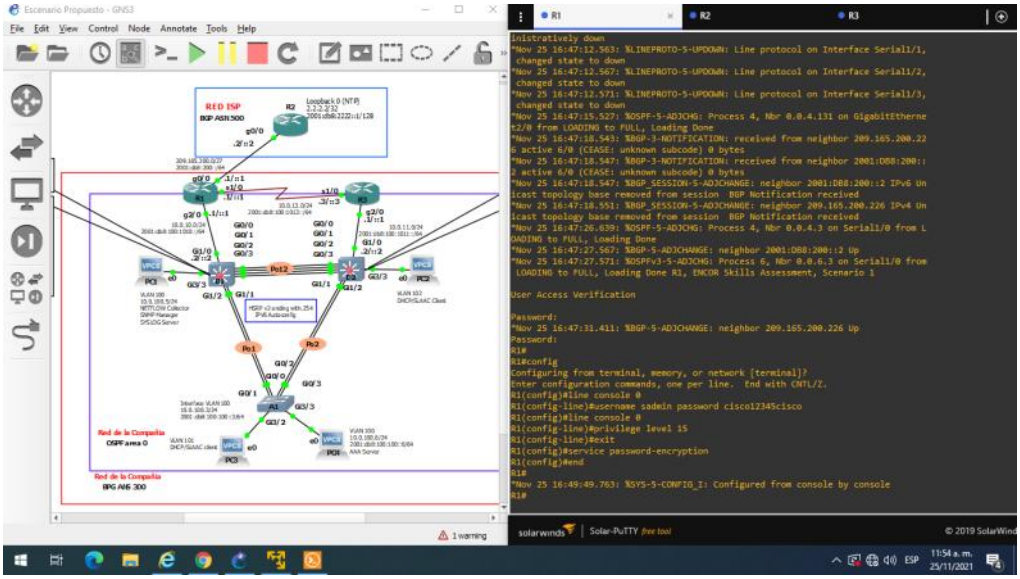

Figura 53 Configuración en el Router R1

Configuración en el Router R2

```
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#line console 0
R2(config-line)#username sadmin password cisco12345cisco
R2(config)#line console 0
R2(config-line)#privilege level 15
R2(config-line)#exit
R2(config)#service password-encryption
```

```
R2(config)#end
R2#
```

Tabla 60 Configuración en el Router R2

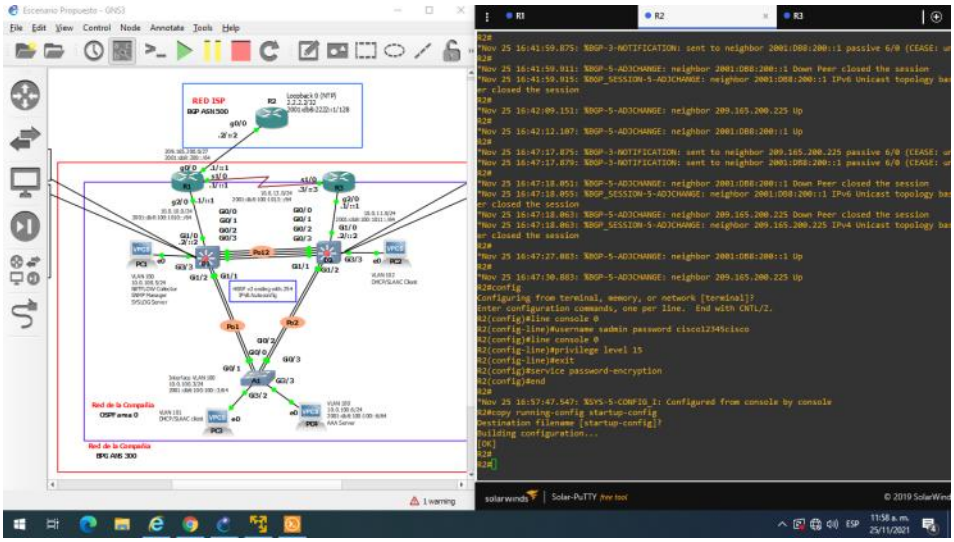

Figura 54 Configuración en el Router R2

Configuración en el Router R3

```
R3(config)#line console 0
R3(config-line)#username sadmin password cisco12345cisco
R3(config)#line console 0
R3(config-line)#privilege level 15
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#end
R3#
```

Tabla 61 Configuración en el Router R3

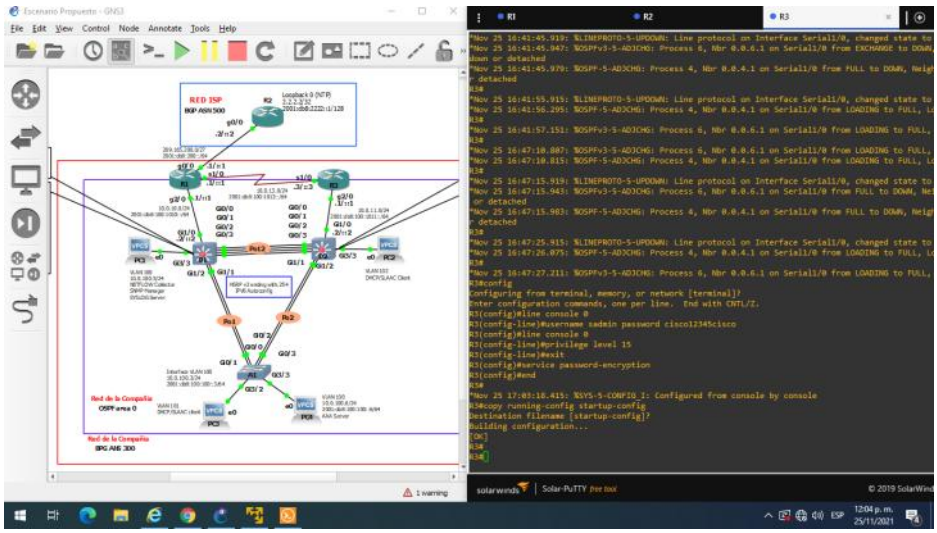

Figura 55 Configuración en el Router R3

Configuración en el Switch D1

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#line console 0
D1(config-line)#username sadmin password cisco12345cisco
D1(config)#line console 0
D1(config-line)#privilege level 15
D1(config-line)#exit
D1(config)#service password-encryption
D1(config)#end
D1#
```

Tabla 62 Configuración en el Switch D1

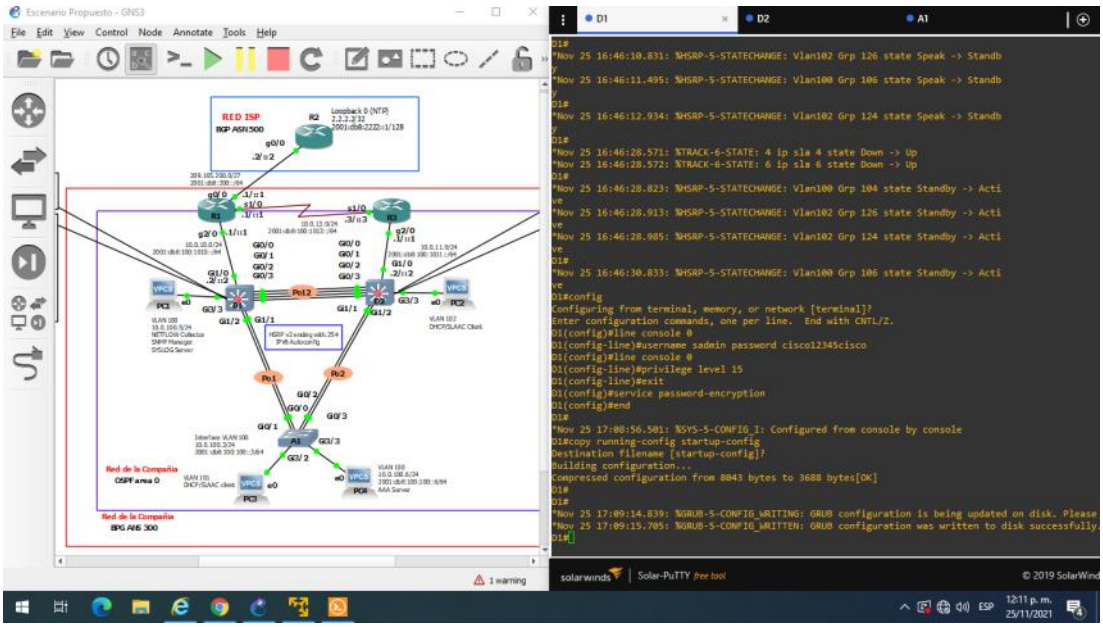

Figura 56 Configuración en el Switch D1

Configuración en el Switch D2

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#line console 0
D2(config-line)#username sadmin password cisco12345cisco
D2(config)#line console 0
D2(config-line)#privilege level 15
D2(config-line)#exit
D2(config)#service password-encryption
D2(config)#end
D2#
```

Tabla 63 Configuración en el Switch D2

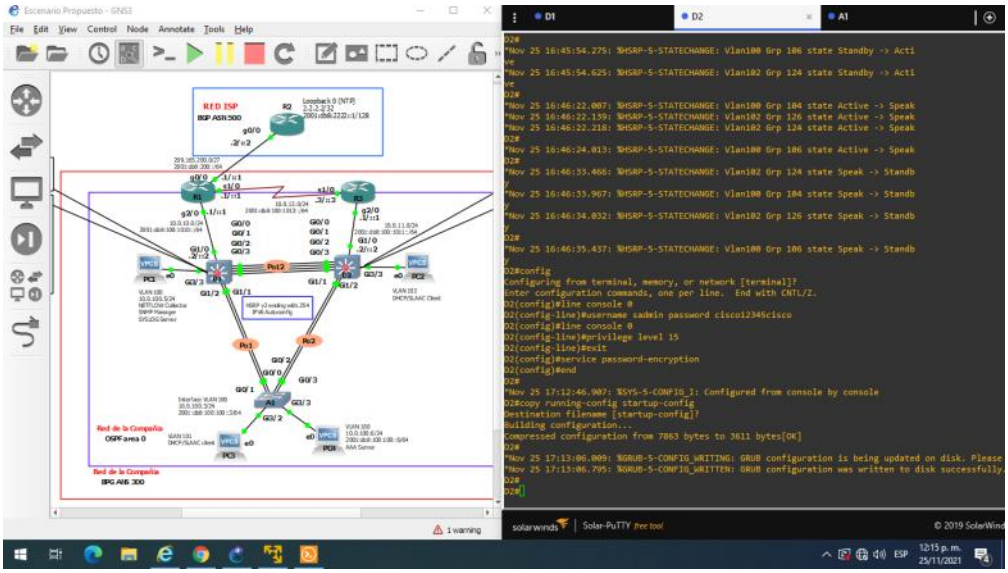

Figura 57 Configuración en el Switch D2

Configuración en el Switch A1

```
A1(config)#line console 0
A1(config-line)#username sadmin password cisco12345cisco
A1(config)#line console 0
A1(config-line)#privilege level 15
A1(config-line)#exit
A1(config)#service password-encryption
A1(config)#end
A1#
```

Tabla 64 Configuración en el Switch A1

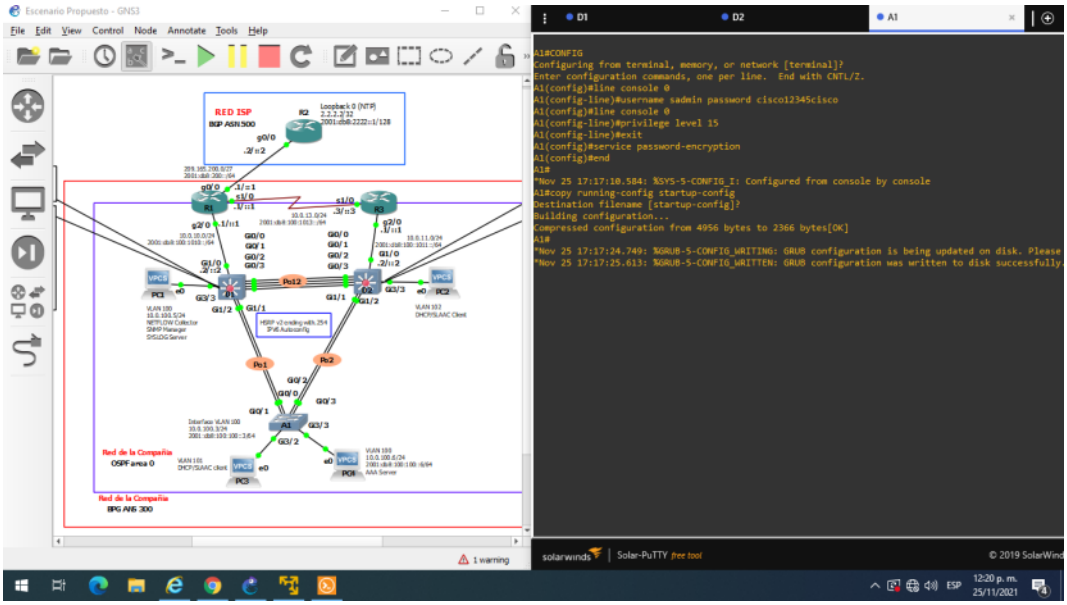

Figura 58 Configuración en el Switch A1

5.3. Habilitación de AAA en todos los dispositivos (excepto R2).

Configuración en el Router R1

```
R1(config)#aaa new-model
R1(config)#
R1#
*Nov 25 17:27:01.827: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

Tabla 65 Configuración en el Router R1

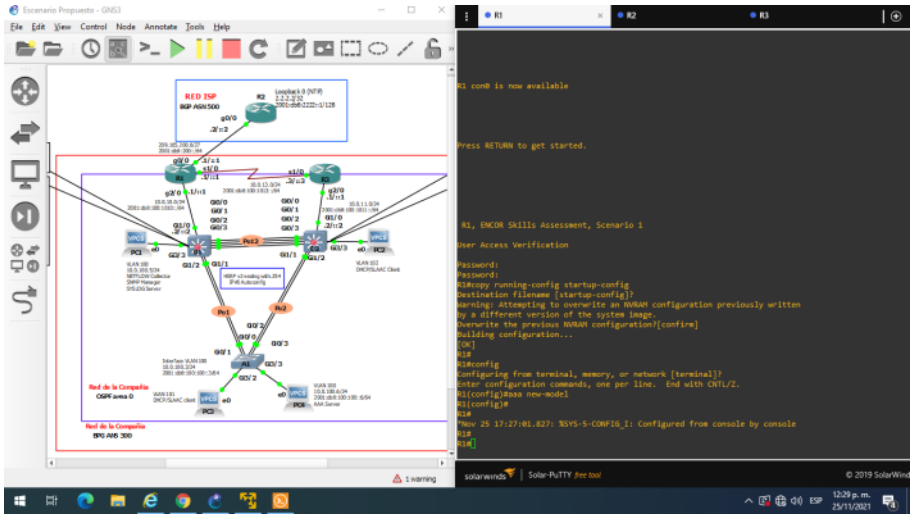

Figura 59 Configuración en el Router R1

Configuración en el Router R3

```
R3(config)#aaa new-model
R3(config)#
R3#
*Nov 25 17:33:03.699: %SYS-5-CONFIG_I: Configured from console by console
```

Tabla 66 Configuración en el Router R3

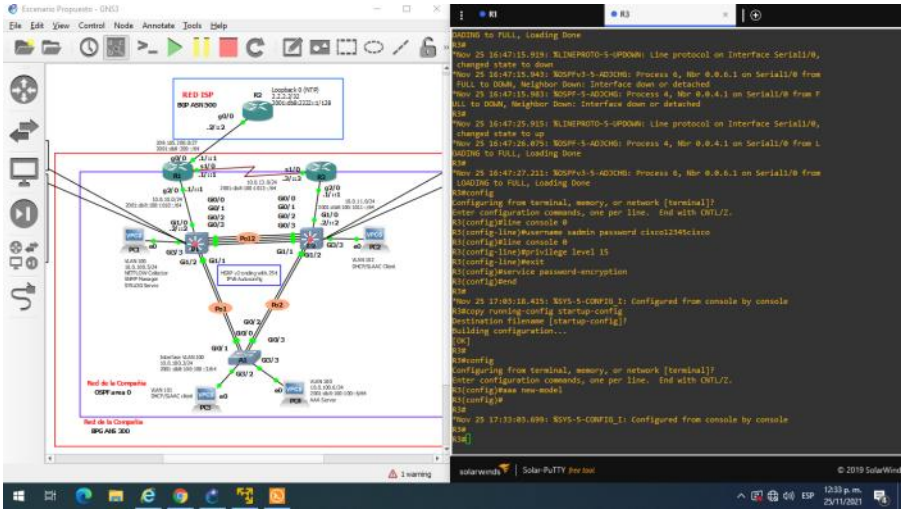

Figura 60 Configuración en el Router R3

Configuración en el Switch D1

```
D1(config)#aaa new-model
D1(config)#
D1#
*Nov 25 17:36:28.098: %SYS-5-CONFIG_I: Configured from console by console
D1#
```

Tabla 67 Configuración en el Switch D1

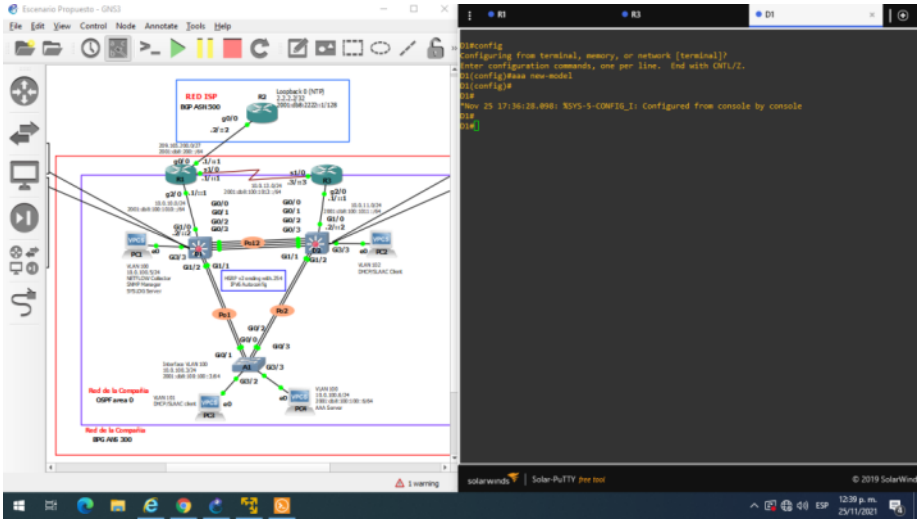

Figura 61 Configuración en el Switch D1

Configuración en el Switch D2

```
D2(config)#aaa new-model
D2(config)#
D2#
*Nov 25 17:39:11.414: %SYS-5-CONFIG_I: Configured from console by console
D2#
```

Tabla 68 Configuración en el Switch D2

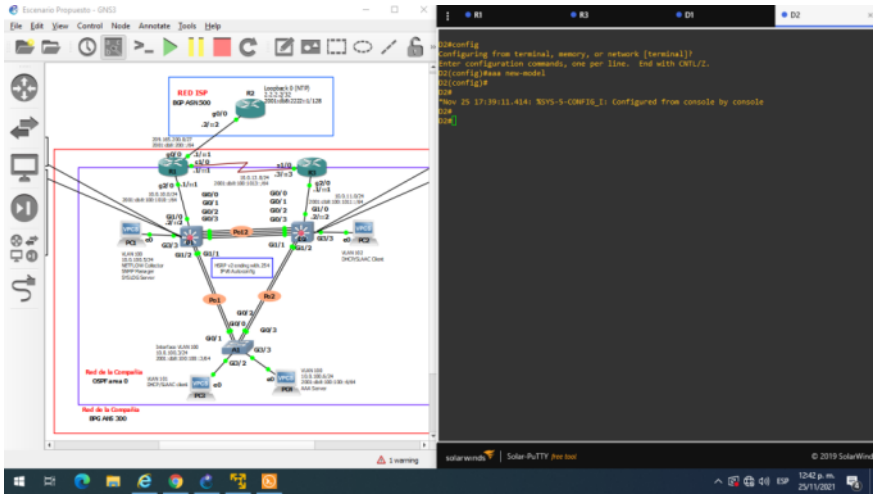

Figura 62 Configuración en el Switch D2

Configuración en el Switch A1

```
A1(config)#aaa new-model
A1(config)#
A1#
*Nov 25 17:53:09.601: %SYS-5-CONFIG_I: Configured from console by console
```

Tabla 69 Configuración en el Switch A1

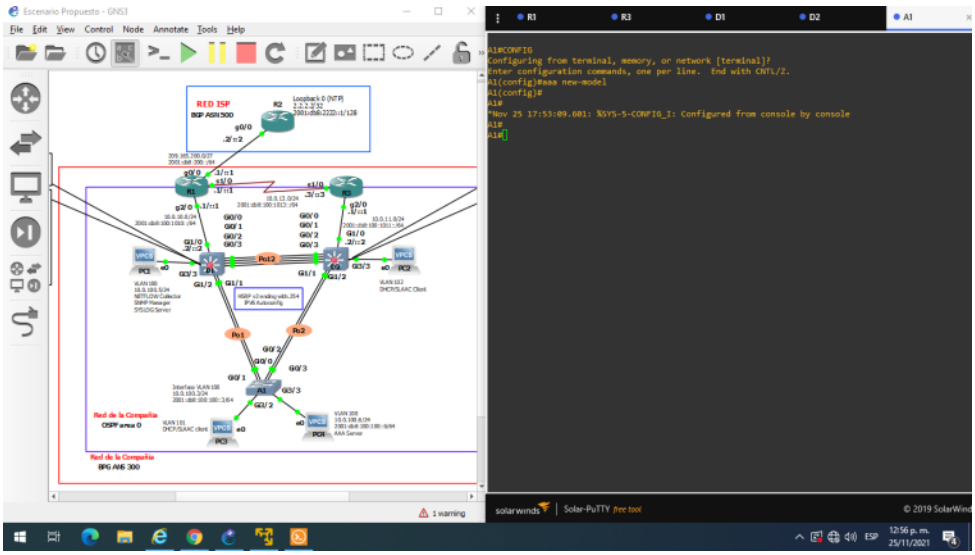

Figura 63 Configuración en el Switch A1

5.4. Configuración de las especificaciones del servidor RADIUS (excepto R2).

Configuración en el Router R1

```
R1(config)#radius-server host 10.0.100.6 auth-port 1812 key $trongPass
 Warning: The CLI will be deprecated soon
 'radius-server host 10.0.100.6 auth-port 1812 key $trongPass'
 Please move to 'radius server <name>' CLI.
R1(config)#radius-server host 10.0.100.6 acct-port 1813 key $trongPass
 Warning: The CLI will be deprecated soon
 'radius-server host 10.0.100.6 acct-port 1813 key $trongPass'
 Please move to 'radius server <name>' CLI.
R1(config)#
```

Tabla 70 Configuración del servidor RADIUS en el Router R1

Configuración en el Router R3

```
R3(config)#radius-server host 10.0.100.6 auth-port 1812 key $trongPass
 Warning: The CLI will be deprecated soon
 'radius-server host 10.0.100.6 auth-port 1812 key $trongPass'
 Please move to 'radius server <name>' CLI.
R3(config)#radius-server host 10.0.100.6 acct-port 1813 key $trongPass
 Warning: The CLI will be deprecated soon
 'radius-server host 10.0.100.6 acct-port 1813 key $trongPass'
 Please move to 'radius server <name>' CLI.
R3(config)#
```

Tabla 71 Configuración del servidor RADIUS en el Router R3

Configuración en el Switch D1

```
D1(config)#aaa group server radius group-radius
D1(config-sg-radius)#server 10.0.100.6 auth-port 1812
D1(config-sg-radius)#
*Nov 26 17:41:31.929: %RADIUS-4-NOSERV: Warning: Server 10.0.100.6:1812,1646 is not
defined.
D1(config-sg-radius)#server 10.0.100.6 acct-port 1813
D1(config-sg-radius)#
*Nov 26 17:41:42.678: %RADIUS-4-NOSERV: Warning: Server 10.0.100.6:1645,1813 is not
defined.
D1(config-sg-radius)#exit
D1(config)#username sadmin password cisco12345cisco
D1(config)#line console 0
D1(config-line)#username sadmin password cisco12345cisco
D1(config)#radius-server key $trongPass
D1(config)#
```

Tabla 72 Configuración del servidor RADIUS en el Switch D1

Configuración en el Switch D2

```
D2(config)#aaa group server radius group-radius
D2(config-sg-radius)#server 10.0.100.6 auth-port 1812
D2(config-sg-radius)#
*Nov 26 17:57:05.760: %RADIUS-4-NOSERV: Warning: Server 10.0.100.6:1812,1646 is not
defined.
D2(config-sg-radius)#server 10.0.100.6 acct-port 1813
D2(config-sg-radius)#
*Nov 26 17:57:14.611: %RADIUS-4-NOSERV: Warning: Server 10.0.100.6:1645,1813 is not
defined.
D2(config-sg-radius)#exit
D2(config)#username sadmin password cisco12345cisco
D2(config)#line console 0
D2(config-line)#username sadmin password cisco12345cisco
D2(config)#radius-server key $trongPass
D2(config)#
```

Tabla 73 Configuración del servidor RADIUS en el Switch D2

Configuración en el Switch A1

```
A1(config)#aaa group server radius group-radius
A1(config-sg-radius)#server 10.0.100.6 auth-port 1812
A1(config-sg-radius)#
*Nov 26 18:09:26.287: %RADIUS-4-NOSERV: Warning: Server 10.0.100.6:1812,1646 is not
defined.
A1(config-sg-radius)#server 10.0.100.6 acct-port 1813
A1(config-sg-radius)#
*Nov 26 18:09:37.592: %RADIUS-4-NOSERV: Warning: Server 10.0.100.6:1645,1813 is not
defined.
A1(config-sg-radius)#exit
A1(config)#username sadmin password cisco12345cisco
A1(config)#line console 0
A1(config-line)#username sadmin password cisco12345cisco
```

```
A1(config)#radius-server key $trongPass
A1(config)#
```

Tabla 74 Configuración del servidor RADIUS en el Switch A1

5.5. Configuración de lista de métodos de autenticación AAA (excepto R2)

Configuración en el Router R1

```
R1(config)#aaa authentication login default group radius local
R1(config-line)#exit
R1(config)#end
R1#
*Nov 25 22:46:16.503: %SYS-5-CONFIG_I: Configured from console by console
```

Tabla 75 Configuración métodos de autenticación AAA en el Router R1

Configuración en el Router R3

```
R3(config)#aaa authentication login default group radius local
R3(config)#exit
R3#
*Nov 26 15:13:34.359: %SYS-5-CONFIG_I: Configured from console by console
R3#exit
```

Tabla 76 Configuración métodos de autenticación AAA en el Router R3

Configuración en el Switch D1

```
D1(config)#aaa authentication login default group radius local
D1(config)#end
D1#
*Nov 26 17:42:48.028: %SYS-5-CONFIG_I: Configured from console by console
D1#exit
```

Tabla 77 Configuración métodos de autenticación AAA en el Switch D1

Configuración en el Switch D2

```
D2(config)#aaa authentication login default group radius local
D2(config)#end
D2#
*Nov 26 17:58:33.686: %SYS-5-CONFIG_I: Configured from console by console
D2#exit
```

Tabla 78 Configuración métodos de autenticación AAA en el Switch D2

Configuración en el Switch A1

```
A1(config)#aaa authentication login default group radius local
A1(config)#end
A1#
*Nov 26 18:10:53.336: %SYS-5-CONFIG_I: Configured from console by console
A1#exit
```

Tabla 79 Configuración métodos de autenticación AAA en el Switch A1

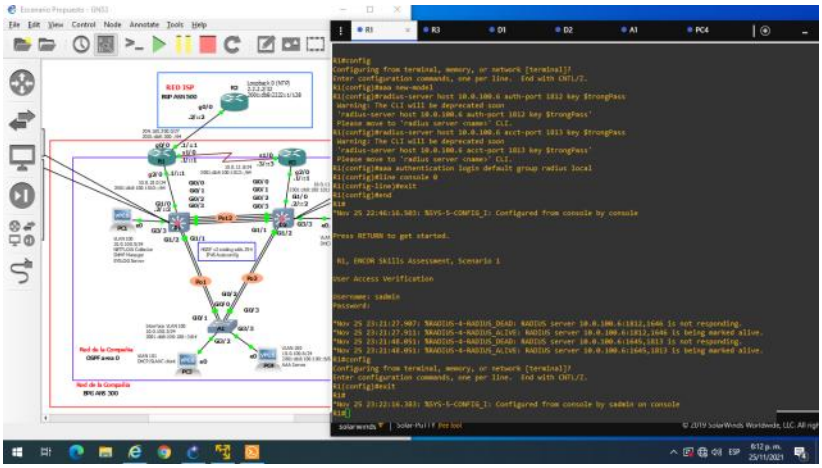

Figura 64 Configuración métodos de autenticación AAA en el Router R1

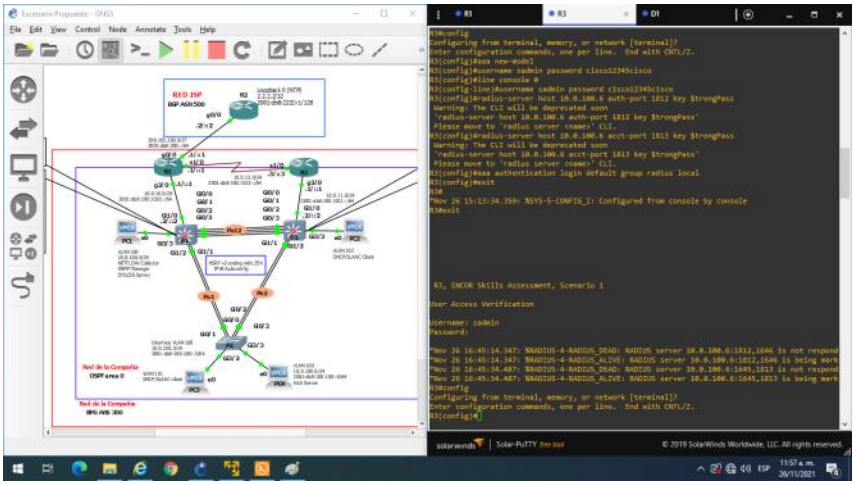

*Figura 65 Configuración métodos de au*tenticación AAA en el Router R3

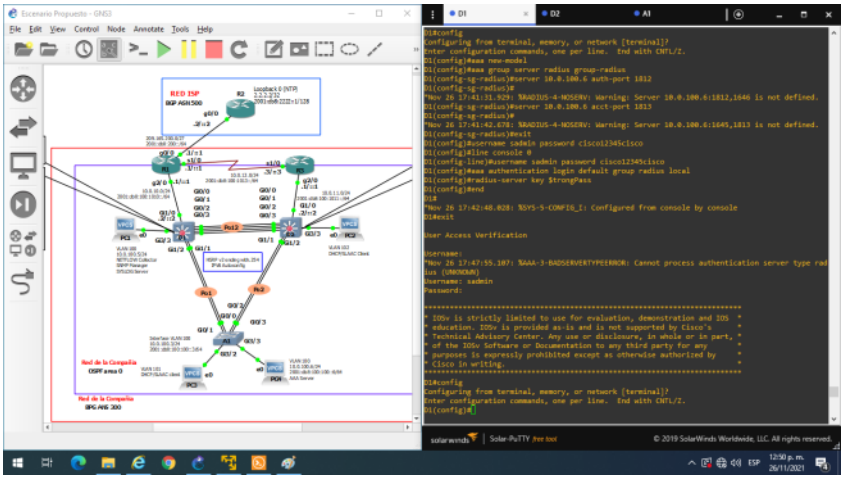

Figura 66 Configuración métodos de autenticación AAA en el Switch D*1*

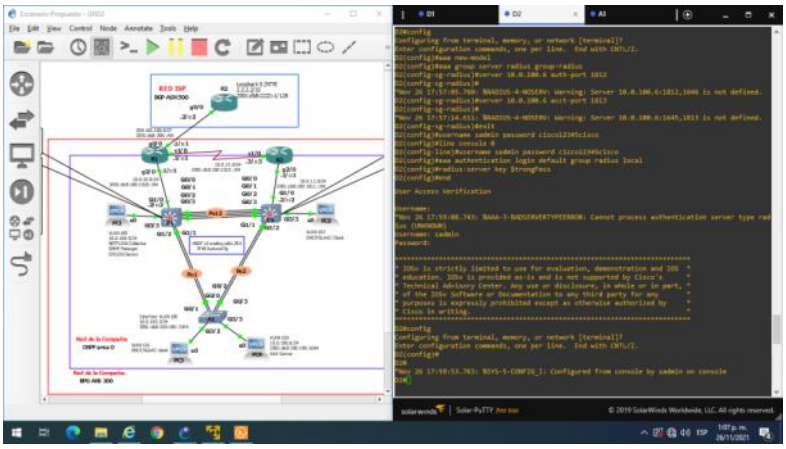

Figura 67 Configuración métodos de autenticación AAA en el Switch D2

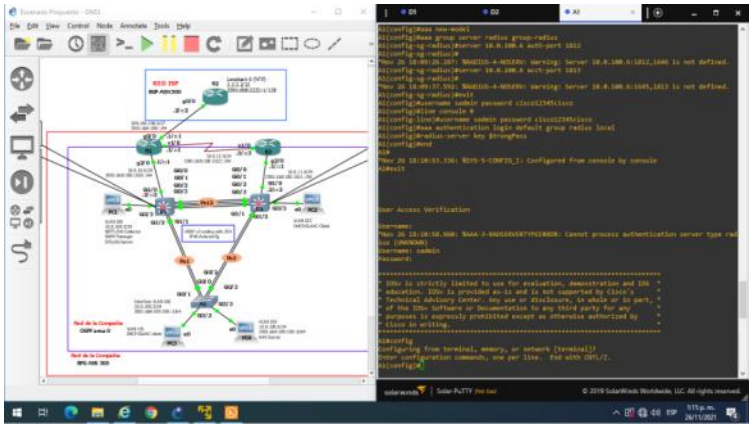

Figura 68 Configuración métodos de autenticación AAA en el Switch A1

5.6. Verificación del servicio AAA en todos los dispositivos (excepto R2).

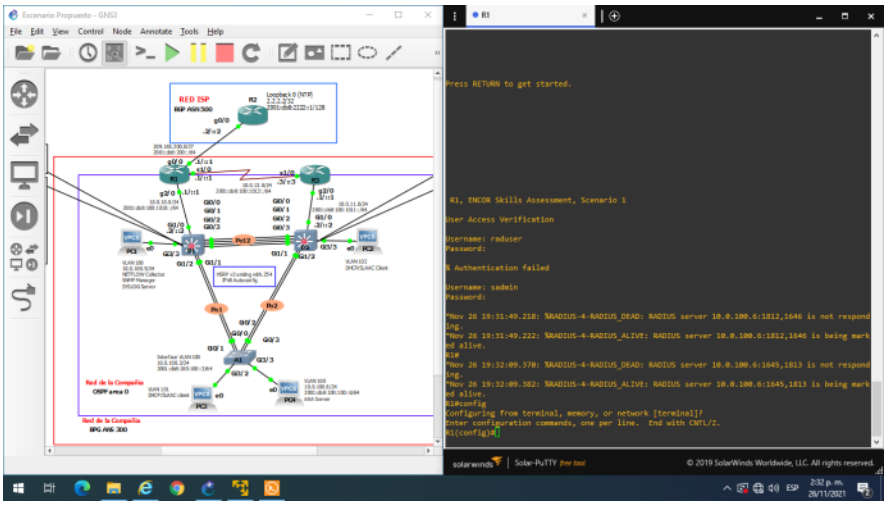

Figura 69 Verificación del servicio AAA en el Router R1

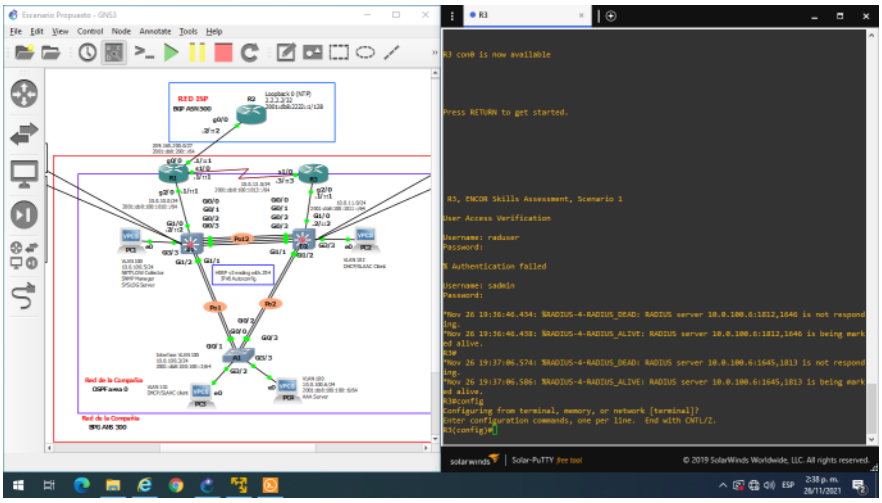

Figura 70 Verificación del servicio AAA en el Router R3

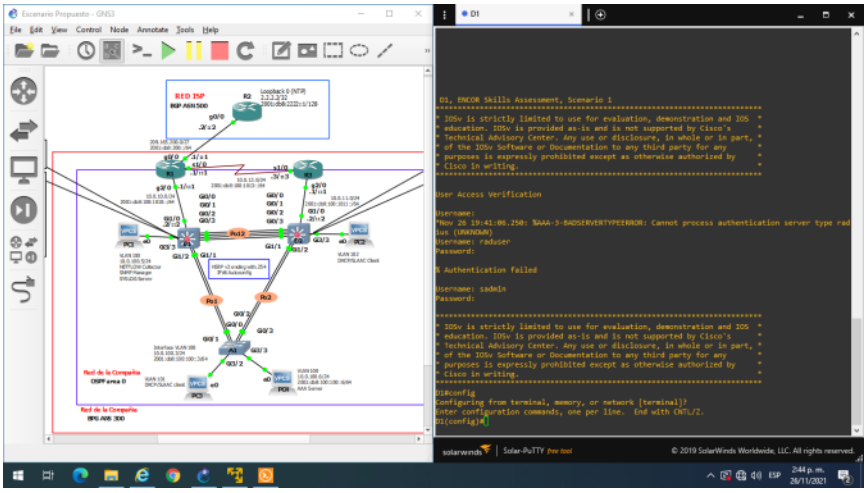

Figura 71 Verificación del servicio AAA en el Switch D1

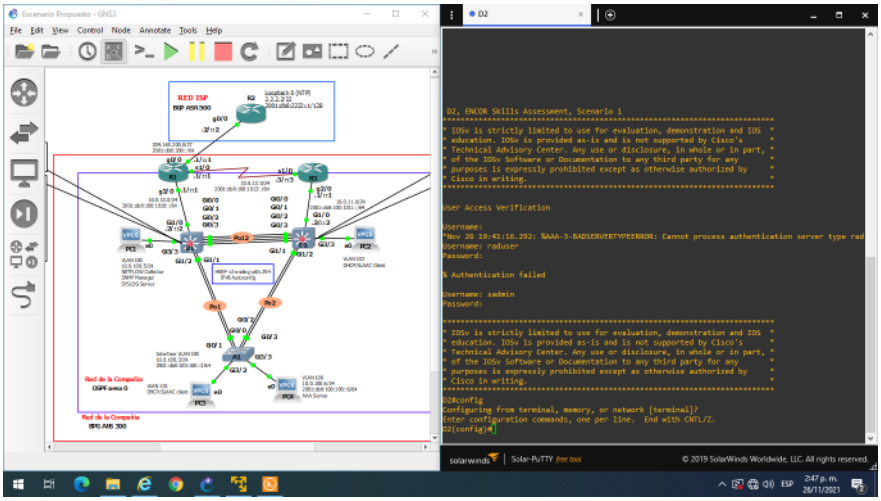

Figura 72 Verificación del servicio AAA en el Switch D2

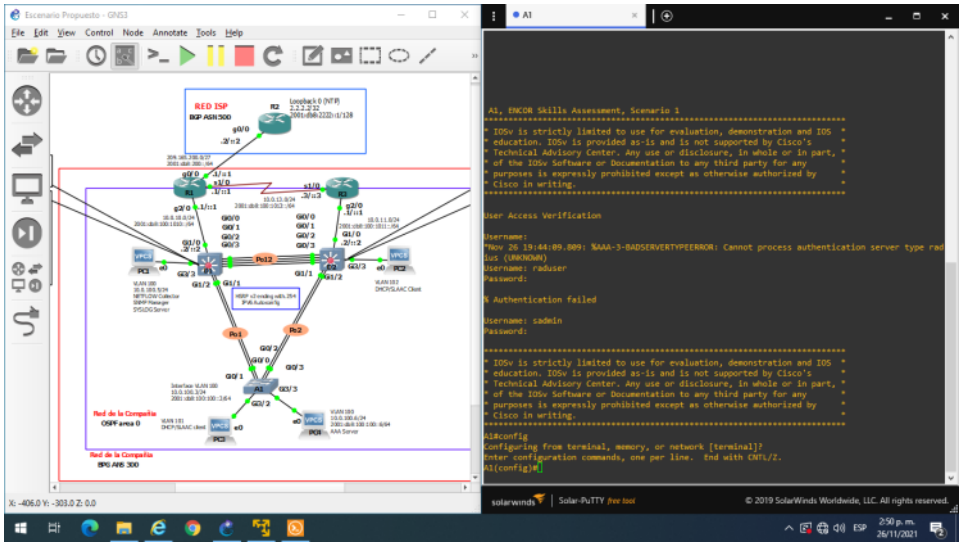

Figura 73 Verificación del servicio AAA en el Switch A1

Parte 6: Configure las funciones de Administración de Red

Para esta parte se configuraron varias funciones de administración de red en los dispositivos de la topología. A continuación, se muestran las tareas de configuración realizadas:

6.1 Configuración del reloj local a la hora UTC actual en todos los dispositivos

Configuración en el Router R1

```
R1#
*Nov 26 20:01:02.882: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show clock
*20:01:07.158 UTC Fri Nov 26 2021
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#clock timezone UTC -5
R1(config)#
*Nov 26 20:01:55.662: %SYS-6-CLOCKUPDATE: System clock has been updated from 20:01:55
UTC Fri Nov 26 2021 to 15:01:55 UTC Fri Nov 26 2021, configured from console by sadmin on
console.
R1(config)#exit
R1#
*Nov 26 20:02:28.738: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show clock
*15:02:32.658 UTC Fri Nov 26 2021
R1#copy running-config startup-config
```

Tabla 80 Configuración reloj local a la hora UTC en el Router R1

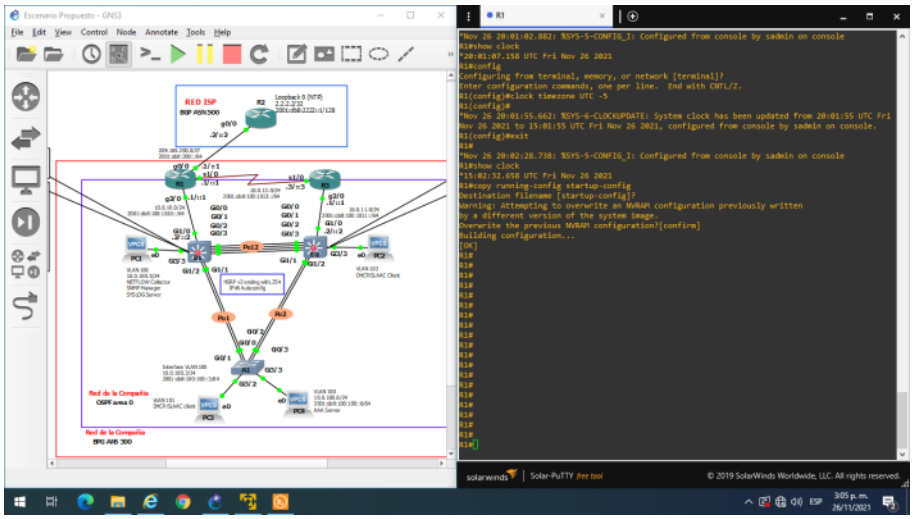

Figura 74 Configuración reloj local a la hora UTC en el Router R1

Configuración en el Router R2

```
R2#show clock
*20:06:53.466 UTC Fri Nov 26 2021
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#clock timezone UTC -5
R2(config)#
*Nov 26 20:07:19.078: %SYS-6-CLOCKUPDATE: System clock has been updated from 20:07:19
UTC Fri Nov 26 2021 to 15:07:19 UTC Fri Nov 26 2021, configured from console by console.
R2(config)#exit
R2#show clock
*15:07:52.214 UTC Fri Nov 26 2021
R2#
```

Tabla 81 Configuración reloj local a la hora UTC en el Router R2

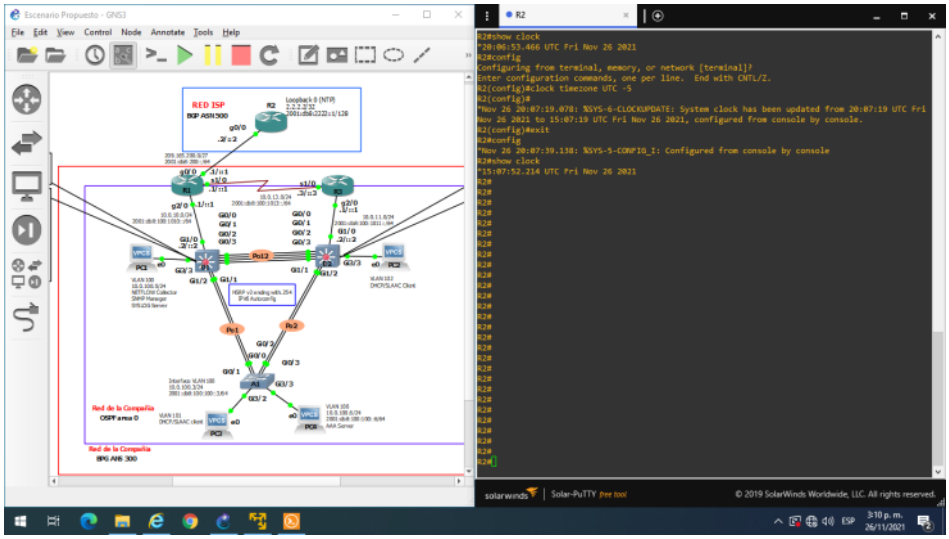

Figura 75 Configuración reloj local a la hora UTC en el Router R1

Configuración en el Router R3

```
R3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#clock timezone UTC -5
R3(config)#exit
R3#clock timezone UTC -5
Nov 26 21:02:52.891: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R3#show clock
16:03:09.539 UTC Fri Nov 26 2021
R3#
```

Tabla 82 Configuración reloj local a la hora UTC en el Router R3

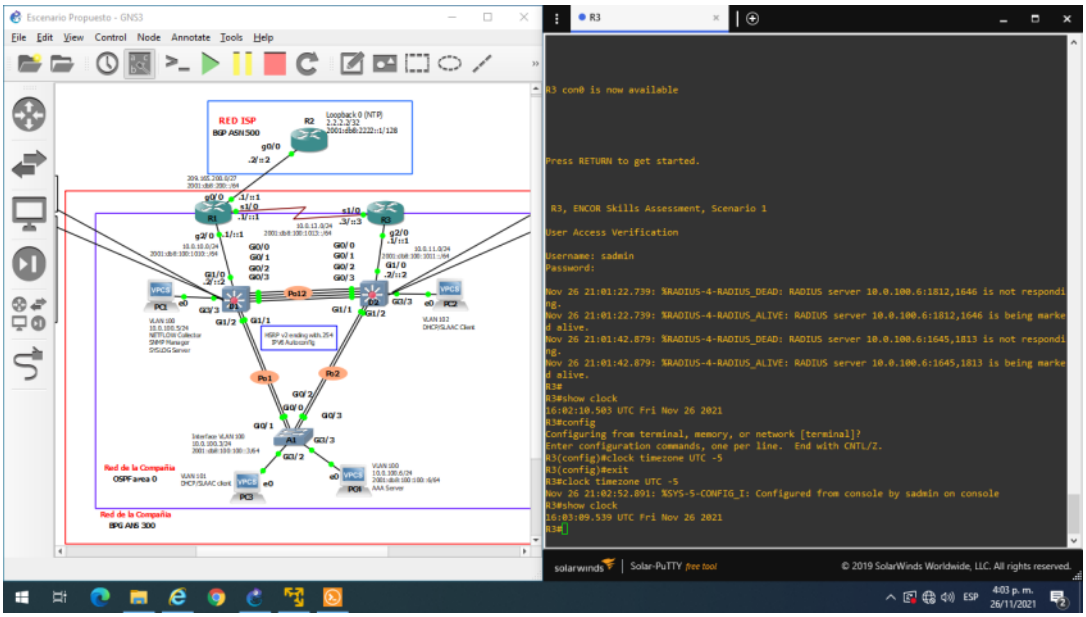

Figura 76 Configuración reloj local a la hora UTC en el Router R3

Configuración en el Switch D1

```
D1#show clock
11:11:48.787 UTC Fri Nov 26 2021
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#clock timezone UTC -5
D1(config)#exit
D1#
Nov 26 16:12:51.814: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D1#
```

Tabla 83 Configuración reloj local a la hora UTC en el Switch D1

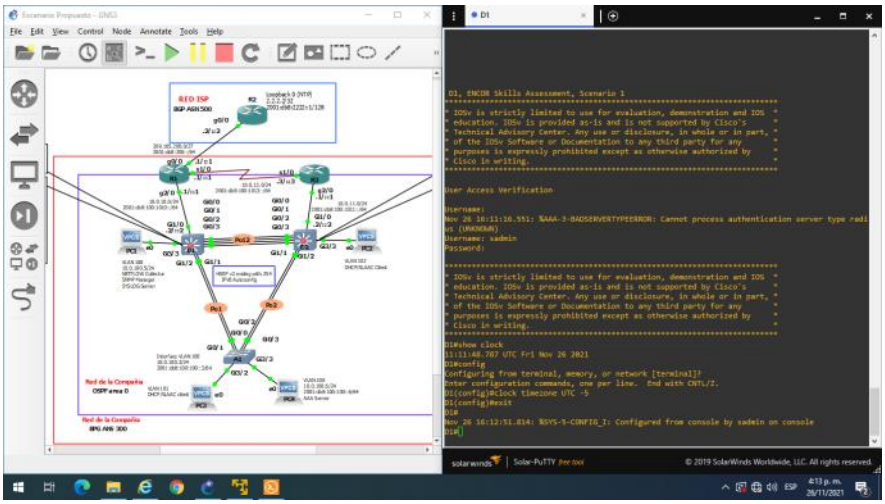

Figura 77 Configuración reloj local a la hora UTC en el Switch D1

Configuración en el Switch D2

```
D2#show clock
*21:13:21.872 UTC Fri Nov 26 2021
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#clock timezone UTC -5
D2(config)#
*Nov 26 21:13:45.311: %SYS-6-CLOCKUPDATE: System clock has been updated from 21:13:45
UTC Fri i Nov 26 2021, configured from console by sadmin on console.
D2(config)#exit
D2#
*Nov 26 21:14:04.844: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D2#show clock
*16:14:18.437 UTC Fri Nov 26 2021
D2#
```

Tabla 84 Configuración reloj local a la hora UTC en el Switch D2

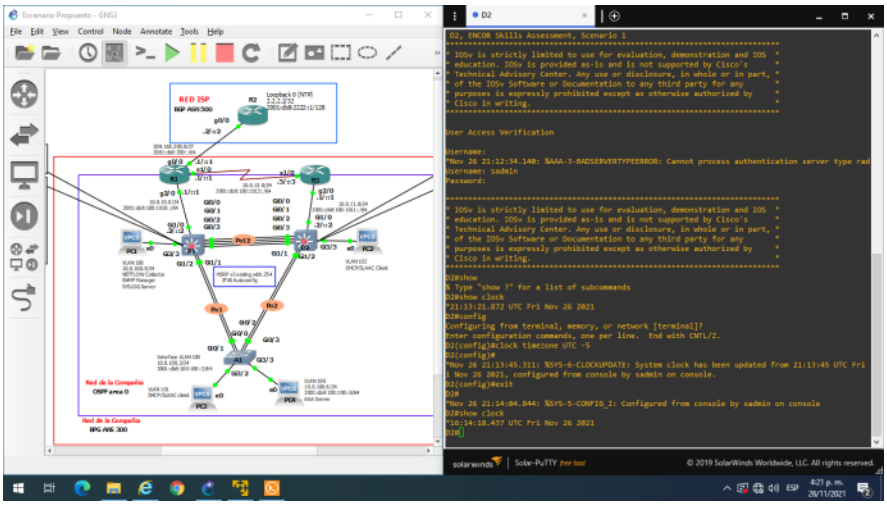

Figura 78 Configuración reloj local a la hora UTC en el Switch D2

Configuración en el Switch A1

```
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#clock timezone UTC -5
A1(config)#
*Nov 26 21:19:08.892: %SYS-6-CLOCKUPDATE: System clock has been updated from 21:19:08
UTC Fri Nov 26 2021 to 16:19:08 UTC Fri Nov 26 2021, configured from console by sadmin on
console.
A1(config)#exit
A1#show clock
*Nov 26 21:19:14.353: %SYS-5-CONFIG_I: Configured from console by sadmin on console
A1#show clock
*16:19:18.543 UTC Fri Nov 26 2021
A1#
```

Tabla 85 Configuración reloj local a la hora UTC en el Switch A1

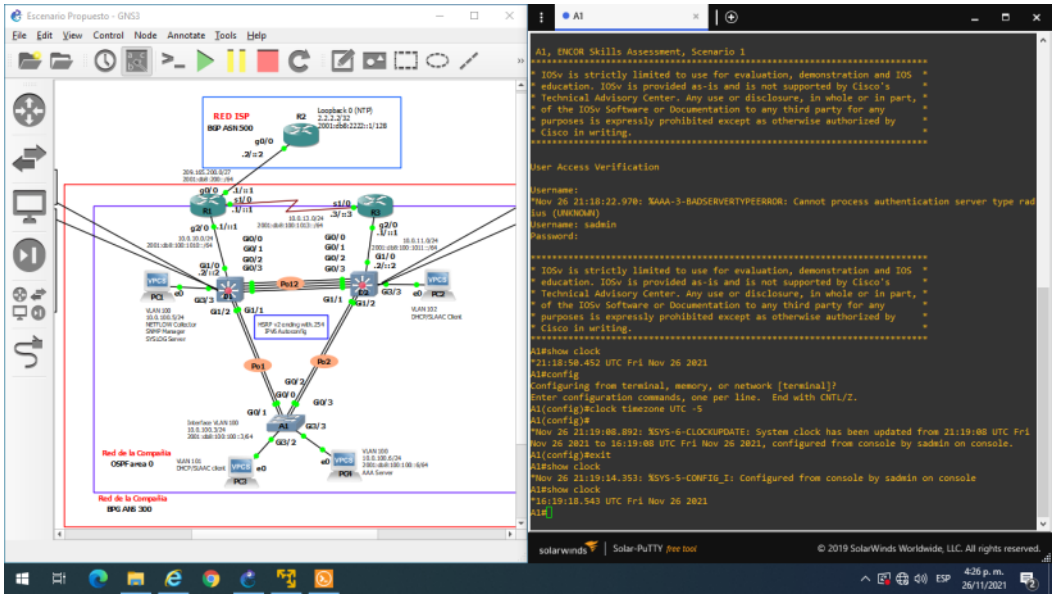

Figura 79 Configuración reloj local a la hora UTC en el Switch A1

6.2 Configuración de R2 como un NTP maestro.

Configuración en el Router R2

```
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ntp master 3
R2(config)#exit
```

```
R2#
Nov 26 16:33:17.067: %SYS-5-CONFIG_I: Configured from console by console
R2#show ntp status
Clock is unsynchronized, stratum 3, reference is 127.127.1.1
nominal freq is 250.0000 Hz, actual freq is 250.0000 Hz, precision is 2**18
ntp uptime is 7600 (1/100 of seconds), resolution is 4000
reference time is E54B8AD5.00F1D784 (16:33:25.003 UTC Fri Nov 26 2021)
clock offset is 0.0000 msec, root delay is 0.00 msec
root dispersion is 437.86 msec, peer dispersion is 437.69 msec
loopfilter state is 'FREQ' (Drift being measured), drift is 0.000000000 s/s
system poll interval is 16, last update was 11 sec ago.
R2#
```

Tabla 86 Configuración NTP maestro en el Router R2

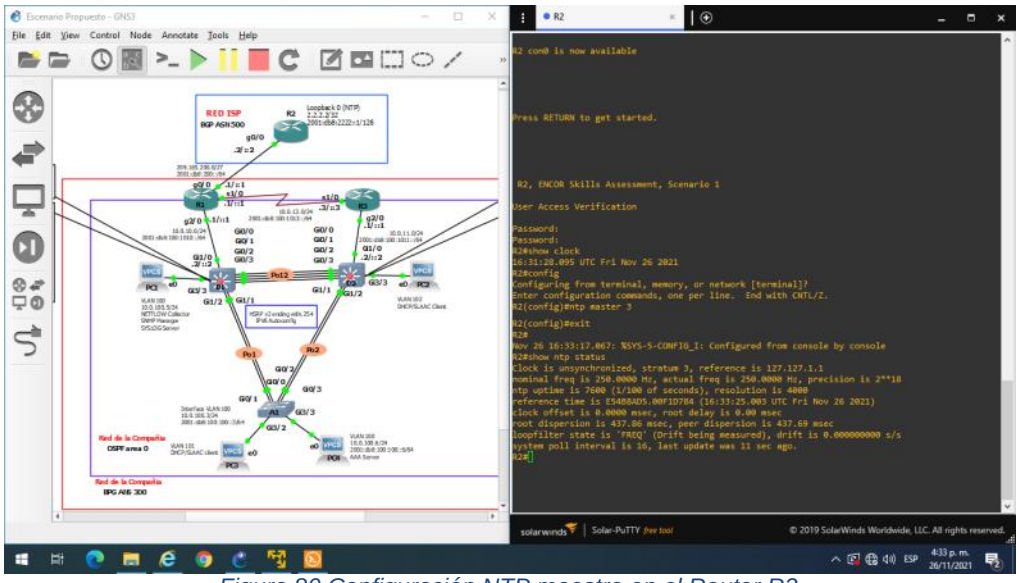

Figura 80 Configuración NTP maestro en el Router R2

6.3 Configuración de NTP en R1, R3, D1, D2, y A1.

R1 sincroniza con R2

Configuración en el Router R1

```
R1(config)#ntp server 209.165.200.226
R1(config)#exit
R1#
*Nov 26 21:39:45.374: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show clock detail
*16:40:27.342 UTC Fri Nov 26 2021
Time source is NTP
R1#show ntp status
Clock is unsynchronized, stratum 16, no reference clock
```

```
nominal freq is 250.0000 Hz, actual freq is 250.0000 Hz, precision is 2**18
ntp uptime is 10800 (1/100 of seconds), resolution is 4000
reference time is 00000000.00000000 (19:00:00.000 UTC Thu Dec 31 1899)
clock offset is 0.0000 msec, root delay is 0.00 msec
root dispersion is 1.63 msec, peer dispersion is 0.00 msec
loopfilter state is 'NSET' (Never set), drift is 0.000000000 s/s
system poll interval is 8, never updated.
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
R1#show ntp associations
  address         ref clock       st   when   poll reach  delay  offset   disp
*~209.165.200.226 127.127.1.1      3     60     64     1 14.273   2.398 3937.9
 ~10.0.13.3       .INIT.          16     16     64     0  0.000   0.000 15937.
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
R1#
```

Tabla 87 Configuracion en el Router R1 sincronización NTP con R2

R3 sincroniza la hora con R1

Configuración en el Router R1

```
R1(config)#ntp peer 10.0.13.3
R1(config)#exit
R1#
*Nov 26 16:51:09.547: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show ntp associations

  address         ref clock       st   when   poll reach  delay  offset   disp
*~209.165.200.226 127.127.1.1      3     60     64     1 14.273   2.398 3937.9
 ~10.0.13.3       10.0.13.1        16     16     64     0  0.000   0.000 15937.
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
R1#
```

Tabla 88 Configuración en el Router R1 sincronización NTP con R3

Configuración en el Router R3

```
R3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ntp peer 10.0.13.1
R3(config)#exit
R3#
Nov 26 21:52:02.095: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R3#show ntp associations
  address         ref clock       st   when   poll reach  delay  offset   disp
 ~10.0.13.1       209.165.200.226    4     12     64     0  0.000   0.000 15937.
 ~10.0.11.2       .INIT.          16      -     64     0  0.000   0.000 15937.
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
```

Tabla 89 Configuración en el Router R3 sincronización NTP con R1

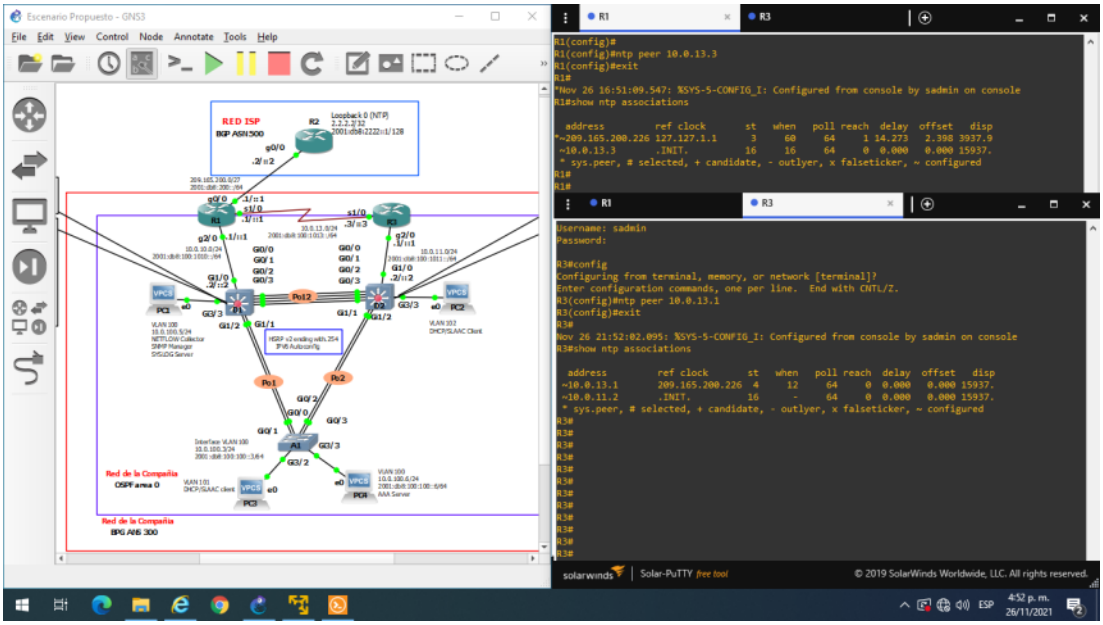

Figura 81 Configuración Router R3 sincronización NTP con R1

D1 sincroniza la hora con R1

Configuración en el Router R1

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ntp peer 10.0.10.2
R1(config)#exit
R1#
Nov 26 17:20:29.581: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show ntp associations

  address         ref clock       st   when   poll reach   delay   offset    disp
*~209.165.200.226 127.127.1.1     3      6     64   377 10.626  -1.465   4.571
 ~10.0.10.2       10.0.10.1       5     48     64     0  0.000   0.000 15937.
 ~10.0.13.3       10.0.13.1       5      6     64     1 15.995  -7.026 7937.5
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
R1#
```

Tabla 90 Configuración en el Router R1 sincronización NTP con D1

Configuración en el Switch D1

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
```

```
D1(config)#ntp peer 10.0.10.1
D1(config)#exit
D1#
Nov 26 17:19:38.024: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D1#show ntp associations

  address         ref clock       st   when   poll reach   delay   offset    disp
*~10.0.10.1   209.165.200.226  4     12     64     1 68.569 389.114 937.58
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
D1#
```

Tabla 91 Configuración en el Switch D1 sincronización NTP con R1

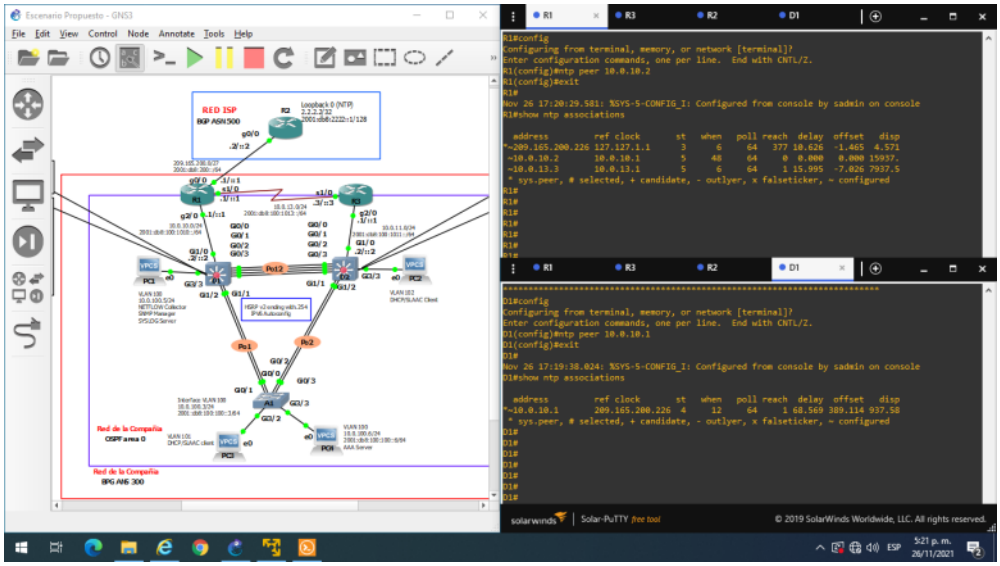

Figura 82 Configuración Switch D1 sincronización NTP con R1

A1 sincroniza la hora con R1

Configuración en el Router R1

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ntp peer 10.0.100.3
R1(config)#exit
R1#
Nov 26 17:39:39.416: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show ntp associations
  address         ref clock       st   when   poll reach   delay   offset    disp
*~209.165.200.226 127.127.1.1     3     12    128   377  7.943  -3.350   1.896
 ~10.0.10.2       .INIT.          16     31     64     0  0.000   0.000 15937.
 ~10.0.13.3       10.0.13.1        5     10    128   375 11.857  -9.723   3.798
 ~10.0.100.3      .INIT.          16      -     64     0  0.000   0.000 15937.
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
```

Tabla 92 Configuración en el Router R1 sincronización NTP con A1

Configuración en el Switch A1

```
A1(config)#ntp peer 10.0.10.1
A1(config)#exit
A1#
*Nov 26 22:32:09.852: %SYS-5-CONFIG_I: Configured from console by sadmin on console
A1#show ntp associations
  address         ref clock       st   when   poll reach  delay  offset   disp
~10.0.10.1       209.165.200.226  4     44     64     0  0.000   0.000 15937.
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
A1#
```

Tabla 93 Configuración en el Switch A1 sincronización NTP con R1

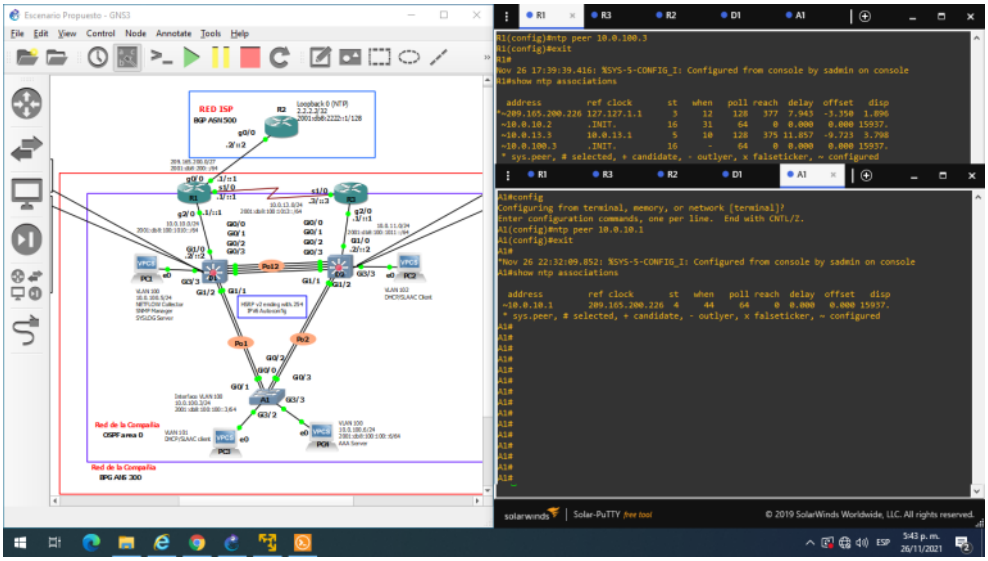

Figura 83 Configuración Switch A1 sincronización NTP con R1

D2 sincroniza la hora con R3

Configuración en el Router R3

```
R3(config)#ntp peer 10.0.11.2
R3(config)#exit
R3#config
Nov 26 17:55:10.918: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R3#show ntp associations
  address         ref clock       st   when   poll reach  delay  offset   disp
*~10.0.13.1      209.165.200.226  4     61    128   177  1.993   5.561  4.281
 ~10.0.11.2      .INIT.          16     -     64     0  0.000   0.000 15937.
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
R3#
```

Tabla 94 Configuración en el Router R3 sincronización NTP con D2

Configuración en el Switch D2

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#ntp peer 10.0.11.1
D2(config)#exit
D2#
Nov 26 17:53:38.571: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D2#show ntp associations
  address         ref clock       st   when   poll reach   delay   offset    disp
*~10.0.11.1       10.0.13.1        5     13     64     1 449.67 549.342 937.74
 * sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
D2#
```

Tabla 95 Configuración en el Switch D2 sincronización NTP con R3

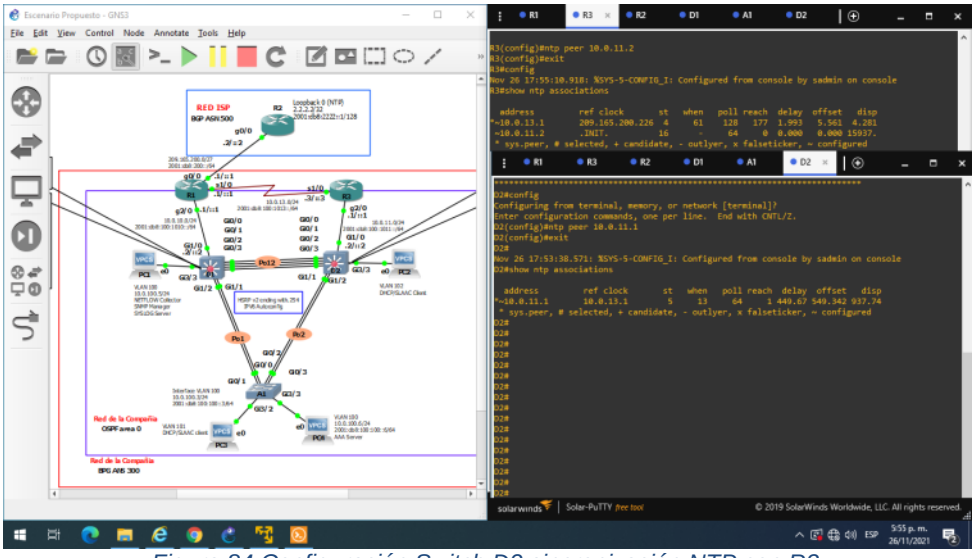

Figura 84 Configuración Switch D2 sincronización NTP con R3

6.4 Configuración de Syslog en todos los dispositivos excepto R2

A continuación, se muestra la configuración realizada de syslog en los dispositivos De la red simulada:

Configuración de Syslog en el Router R1

```
R1(config)#ntp server 2.2.2.2
R1(config)#logging 10.0.100.5
R1(config)#logging  trap warning
R1(config)#logging on
R1(config)#interface loopback 0
R1(config-if)#shutdown
R1(config-if)#
Nov 29 19:31:44.139: %LINK-5-CHANGED: Interface Loopback0, changed state to
administratively down
Nov 29 19:31:45.139: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed
state to down
R1(config-if)#no shutdown
R1(config-if)#end
R1#
Nov 29 19:31:54.735: %LINK-3-UPDOWN: Interface Loopback0, changed state to up
R1#
Nov 29 19:31:55.735: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed
state to up
Nov 29 19:31:55.895: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1#show run | include logging
logging trap warnings
logging host 10.0.100.5
 logging synchronous
 logging synchronous
R1#
```

Tabla 96 Configuración de Syslog en el Router R1

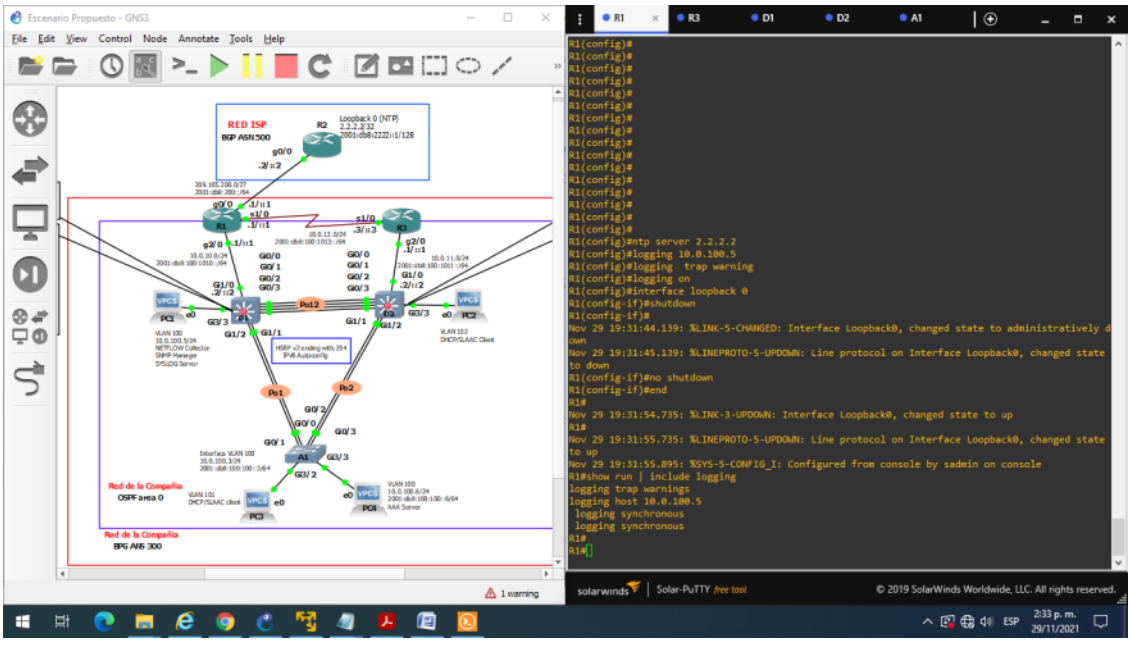

Figura 85 Configuración de Syslog en el Router R1

Configuración de Syslog en el Router R3

```
R3(config)#ntp server  10.0.10.1
R3(config)#logging  trap warning
R3(config)#logging on
R3(config)#interface loopback 0
R3(config-if)#shutdown
R3(config-if)#
.Nov 29 19:38:46.166: %LINK-5-CHANGED: Interface Loopback0, changed state to
administratively down
.Nov 29 19:38:47.166: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to down
R3(config-if)#no shutdown
R3(config-if)#
.Nov 29 19:38:52.906: %LINK-3-UPDOWN: Interface Loopback0, changed state to up
.Nov 29 19:38:53.906: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to up
R3(config-if)#end
R3#
.Nov 29 19:38:57.474: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R3#show run | include logging
logging trap warnings
logging host 10.0.100.5
 logging synchronous
 logging synchronous
R3#
```

Tabla 97 Configuración de Syslog en el Router R3

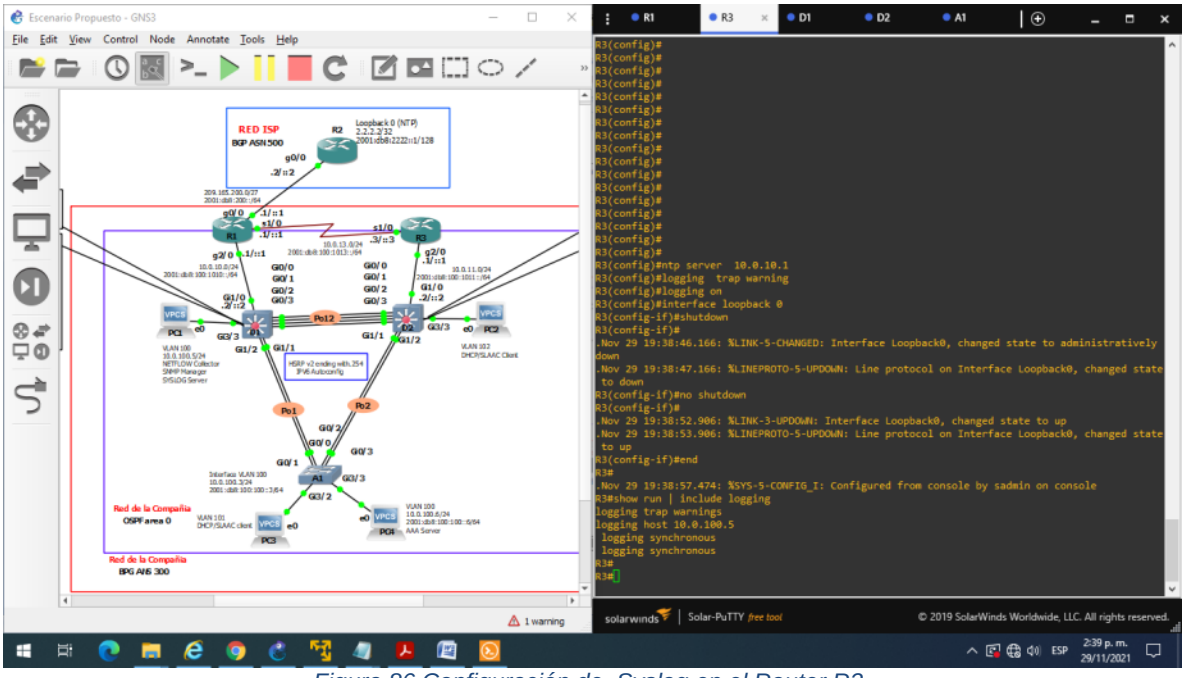

Figura 86 Configuración de Syslog en el Router R3

Configuración de Syslog en el Switch D1

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#ntp server  10.0.10.1
D1(config)#logging 10.0.100.5
D1(config)#logging  trap warning
D1(config)#logging on
D1(config)#interface loopback 0
D1(config-if)#shutdown
D1(config-if)#
.Nov 29 19:40:43.125: %LINK-5-CHANGED: Interface Loopback0, changed state to
administratively down
.Nov 29 19:40:44.126: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to down
D1(config-if)#no shutdown
D1(config-if)#
.Nov 29 19:40:48.724: %LINK-3-UPDOWN: Interface Loopback0, changed state to up
.Nov 29 19:40:49.743: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to up
D1(config-if)#end
D1#
.Nov 29 19:40:56.150: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D1#show run | include logging
logging trap warnings
logging host 10.0.100.5
 logging synchronous
D1#
```

Tabla 98 Configuración de Syslog en el Switch D1

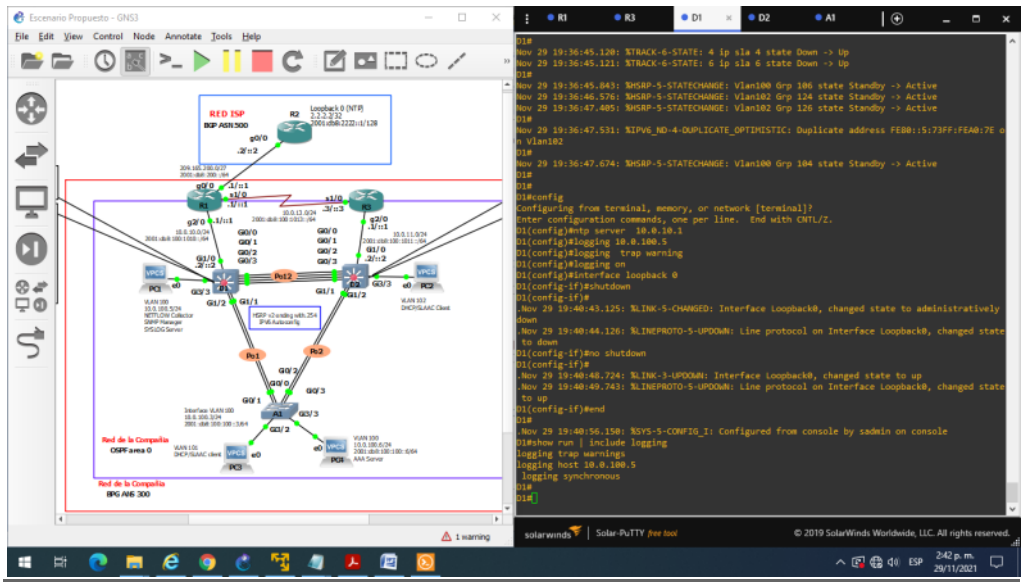

Figura 87 Configuración de Syslog en el Switch D1

Configuración de Syslog en el Switch D2

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#ntp server  10.0.10.1
D2(config)#logging 10.0.100.5
D2(config)#logging  trap warning
D2(config)#logging on
D2(config)#interface loopback 0
D2(config-if)#shutdown
D2(config-if)#
.Nov 29 19:43:50.027: %LINK-5-CHANGED: Interface Loopback0, changed state to
administratively down
.Nov 29 19:43:51.027: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to down
D2(config-if)#no shutdown
D2(config-if)#
.Nov 29 19:43:55.913: %LINK-3-UPDOWN: Interface Loopback0, changed state to up
.Nov 29 19:43:56.914: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to up
D2(config-if)#end
D2#
.Nov 29 19:43:59.465: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D2#show run | include logging
logging trap warnings
logging host 10.0.100.5
 logging synchronous
D2#
```

Tabla 99 Configuración de Syslog en el Switch D2

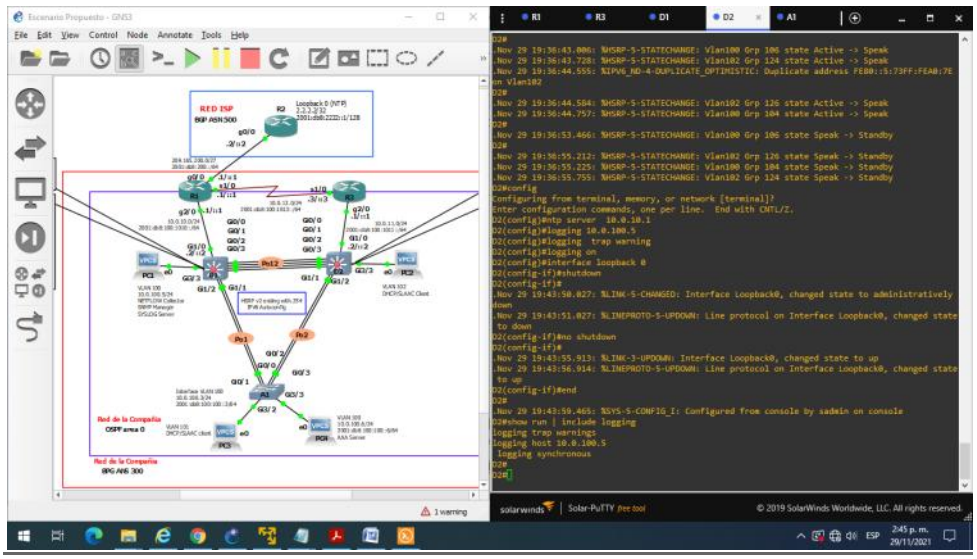

Figura 88 Configuración de Syslog en el Switch D2

Configuración de Syslog en el Switch A1

```
A1(config)#ntp server  10.0.10.1
A1(config)#logging 10.0.100.5
A1(config)#logging  trap warning
A1(config)#logging on
A1(config)#interface loopback 0
A1(config-if)#shutdown
A1(config-if)#
*Nov 29 19:41:59.562: %LINK-5-CHANGED: Interface Loopback0, changed state to
administratively down
*Nov 29 19:42:00.562: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to down
A1(config-if)#no shutdown
A1(config-if)#
*Nov 29 19:42:05.767: %LINK-3-UPDOWN: Interface Loopback0, changed state to up
*Nov 29 19:42:06.767: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to up
A1(config-if)#end
A1#
*Nov 29 19:42:13.758: %SYS-5-CONFIG_I: Configured from console by sadmin on console
A1#show run | include logging
logging trap warnings
logging host 10.0.100.5
 logging synchronous
A1#
```

Tabla 100 Configuración de Syslog en el Switch A1

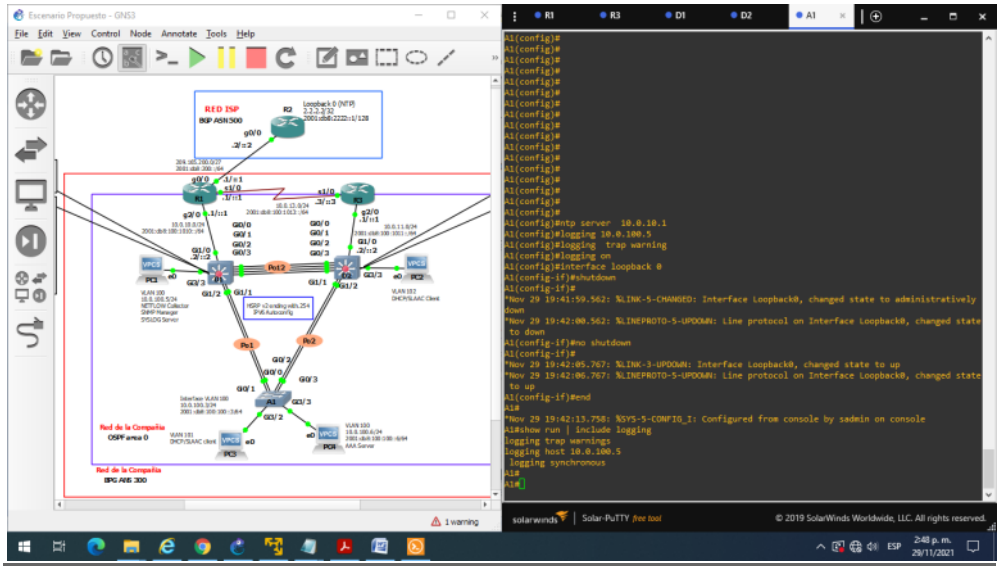

Tabla 101 Configuración de Syslog en el Switch A1

6.5 Configure SNMPv2c en todos los dispositivos excepto R2

A continuación, se muestra la configuración realizada de SNMPv2c en los dispositivos
De la red simulada:

Configuración de SNMPv2c en el Router R1

```
R1(config)#ip access-list standard SNMP-NMS
R1(config-std-nacl)#snmp-server community ENCORSA ro SNMP_ACL
R1(config)#ip access-list standard SNMP-NMS
R1(config-std-nacl)#permit host 10.0.100.5
R1(config-std-nacl)#snmp-server contac Luis Gabriel Martinez
R1(config)#snmp-server community ENCORSA ro SNMP-NMS
R1(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
R1(config)#snmp-server ifindex persist
R1(config)#snmp-server enable traps bgp
R1(config)#snmp-server enable traps config
R1(config)#snmp-server enable traps ospf
R1(config)#end
R1#
Nov 29 18:34:27.171: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R1##show ip access-list SNMP-NMS
R1##show run | include snmp
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
R1##show ip access-list SNMP-NMS
R1##show run | include snmp
R1#
R1#copy running-config startup-config
R1#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server ifindex persist
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps entity-sensor threshold
snmp-server enable traps bgp
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
R1#
```

Tabla 102 Configuración de SNMPv2c en el Router R1

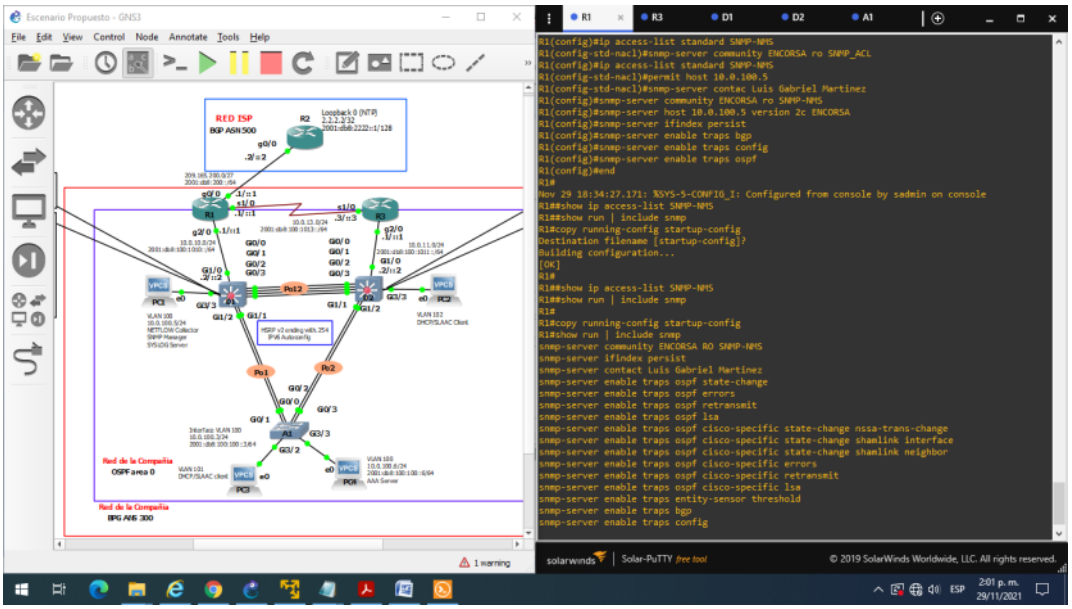

Figura 89 Configuración de SNMPv2c en el Router R1

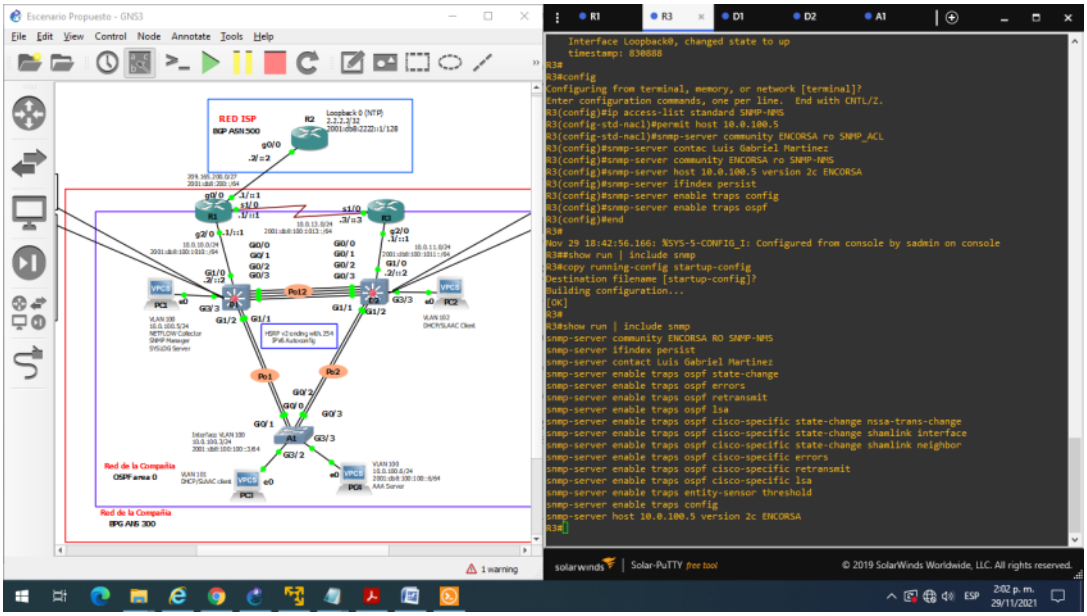

Figura 90 Configuración de SNMPv2c en el Router R3

Configuración de SNMPv2c en el Router R3

```
R3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip access-list standard SNMP-NMS
R3(config-std-nacl)#permit host 10.0.100.5
R3(config-std-nacl)#snmp-server community ENCORSA ro SNMP_ACL
R3(config)#snmp-server contac Luis Gabriel Martinez
R3(config)#snmp-server community ENCORSA ro SNMP-NMS
R3(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
R3(config)#snmp-server ifindex persist
R3(config)#snmp-server enable traps config
R3(config)#snmp-server enable traps ospf
R3(config)#end
R3#
Nov 29 18:42:56.166: %SYS-5-CONFIG_I: Configured from console by sadmin on console
R3##show run | include snmp
R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
R3#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server ifindex persist
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps entity-sensor threshold
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
R3#
```

Tabla 103 Configuración de SNMPv2c en el Router R3

Configuración de SNMPv2c en el Switch D1

```
D1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D1(config)#
D1(config)#
D1(config)#ip access-list standard SNMP-NMS
D1(config-std-nacl)#permit host 10.0.100.5
% % Duplicate permit statement ignored.
```

```
D1(config-std-nacl)#snmp-server community ENCORSA ro SNMP_ACL
D1(config)#snmp-server contac Luis Gabriel Martinez
D1(config)#snmp-server community ENCORSA ro SNMP-NMS
D1(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
D1(config)#snmp-server ifindex persist
D1(config)#snmp-server enable traps ospf
D1(config)#snmp-server enable traps c?
casa  cef

D1(config)#snmp-server enable traps co?
% Unrecognized command
D1(config)#snmp-server enable traps con?
% Unrecognized command
D1(config)#snmp-server enable traps config?
% Unrecognized command
D1(config)#snmp-server enable traps config
                           ^
% Invalid input detected at '^' marker.

D1(config)#snmp-server enable traps snmp
D1(config)#snmp-server enable traps ospf
D1(config)#
D1#
Nov 29 18:58:50.053: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D1#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps flowmon
snmp-server enable traps tty
snmp-server enable traps eigrp
snmp-server enable traps casa
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps ethernet cfm cc mep-up mep-down cross-connect loop config
snmp-server enable traps ethernet cfm crosscheck mep-missing mep-unknown service-up
snmp-server enable traps auth-framework sec-violation
snmp-server enable traps energywise
snmp-server enable traps pw vc
snmp-server enable traps l2tun session
snmp-server enable traps l2tun pseudowire status
snmp-server enable traps ether-oam
snmp-server enable traps lisp
snmp-server enable traps mpls rfc ldp
snmp-server enable traps mpls ldp
```

```
snmp-server enable traps mpls rfc traffic-eng
snmp-server enable traps mpls traffic-eng
snmp-server enable traps ethernet evc status create delete
snmp-server enable traps bridge newroot topologychange
snmp-server enable traps stpx inconsistency root-inconsistency loop-inconsistency
snmp-server enable traps vtp
snmp-server enable traps vlancreate
snmp-server enable traps vlandelete
snmp-server enable traps ike policy add
snmp-server enable traps ike policy delete
snmp-server enable traps ike tunnel start
snmp-server enable traps ike tunnel stop
snmp-server enable traps ipsec cryptomap add
snmp-server enable traps ipsec cryptomap delete
snmp-server enable traps ipsec cryptomap attach
snmp-server enable traps ipsec cryptomap detach
snmp-server enable traps ipsec tunnel start
snmp-server enable traps ipsec tunnel stop
snmp-server enable traps ipsec too-many-sas
snmp-server enable traps bfd
snmp-server enable traps bgp cbgp2
snmp-server enable traps cef resource-failure peer-state-change peer-fib-state-change
inconsistency
snmp-server enable traps dlsw
snmp-server enable traps frame-relay
snmp-server enable traps frame-relay subif
snmp-server enable traps hsrp
snmp-server enable traps ipmulticast
snmp-server enable traps isis
snmp-server enable traps msdp
snmp-server enable traps mvpn
snmp-server enable traps pim neighbor-change rp-mapping-change invalid-pim-message
snmp-server enable traps rsvp
snmp-server enable traps ipsla
snmp-server enable traps slb real virtual csrp
snmp-server enable traps syslog
snmp-server enable traps event-manager
snmp-server enable traps pki
snmp-server enable traps ethernet cfm alarm
snmp-server enable traps mpls vpn
snmp-server enable traps vrfmib vrf-up vrf-down vnet-trunk-up vnet-trunk-down
snmp-server host 10.0.100.5 version 2c ENCORSA
snmp ifmib ifindex persist
D1#
```

Tabla 104 Configuración de SNMPv2c en el Switch D1

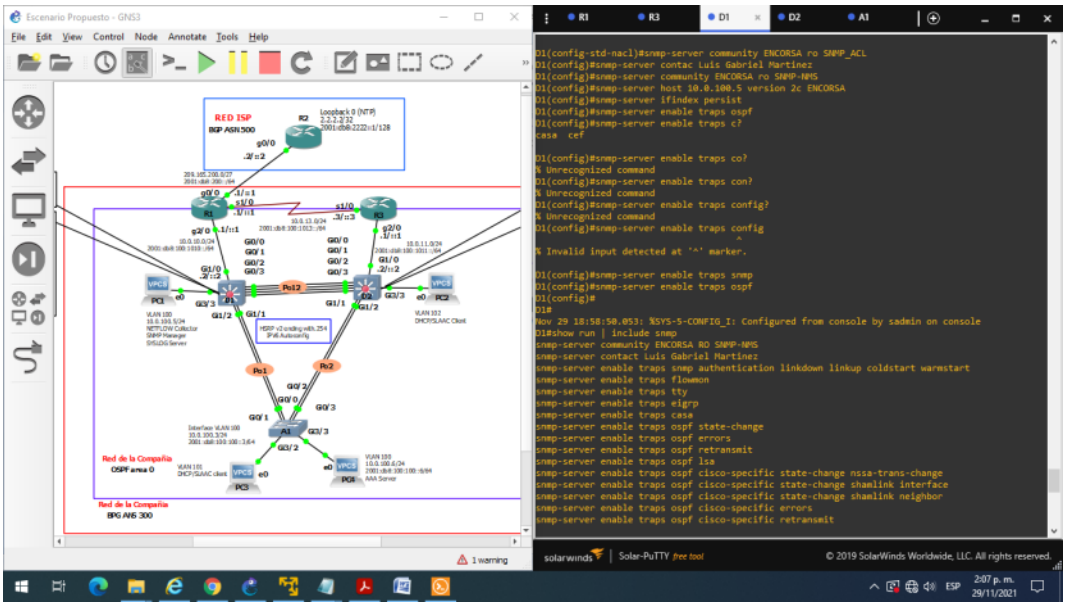

Figura 91 Configuración de SNMPv2c en el Switch D1

Configuración de SNMPv2c en el Switch D2

```
D2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
D2(config)#ip access-list standard SNMP-NMS
D2(config-std-nacl)#snmp-server community ENCORSA ro SNMP_ACL
D2(config)#ip access-list standard SNMP-NMS
D2(config-std-nacl)#permit host 10.0.100.5
D2(config-std-nacl)#snmp-server community ENCORSA ro SNMP-NMS
D2(config)#snmp-server contac Luis Gabriel Martinez
D2(config)#snmp-server community ENCORSA ro SNMP-NMS
D2(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
D2(config)#snmp-server ifindex persist
D2(config)#snmp-server enable traps ospf
D2(config)#snmp-server enable traps config
                                ^
% Invalid input detected at '^' marker.

D2(config)#snmp-server enable traps snmp
D2(config)#end
D2#
Nov 29 19:14:32.615: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D2#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
```

```
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
snmp ifmib ifindex persist
D2#
```

Tabla 105 Configuración de SNMPv2c en el Switch D2

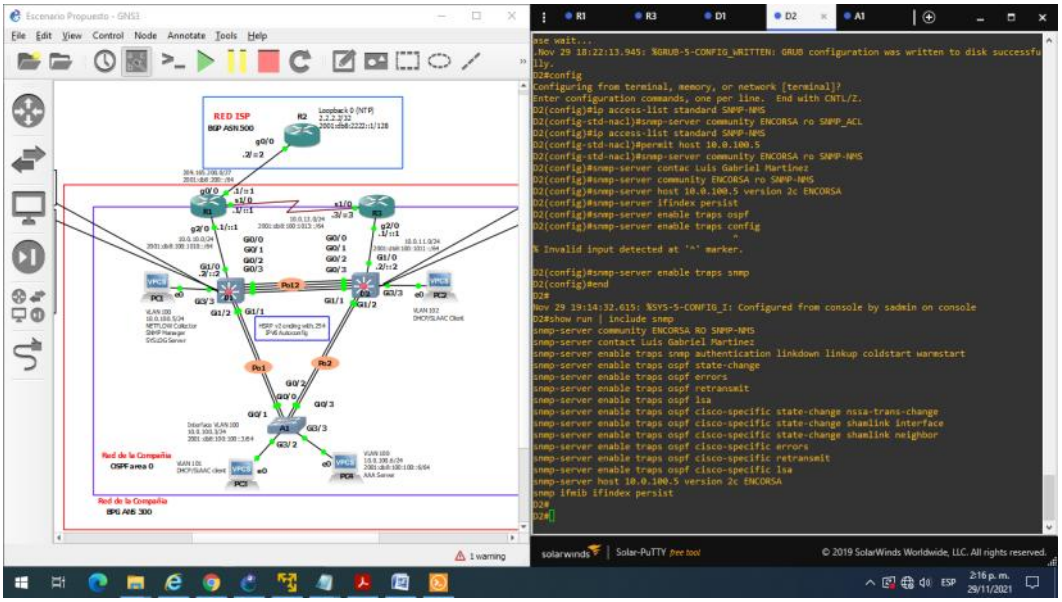

Figura 92 Configuración de SNMPv2c en el Switch D2

Configuración de SNMPv2c en el Switch A1

```
A1(config-if)#end
A1#
*Nov 29 18:20:07.338: %SYS-5-CONFIG_I: Configured from console by sadmin on console
A1#show logging history
Syslog History Table:1 maximum table entries,
saving level warnings or higher
 81 messages ignored, 0 dropped, 0 recursion drops
 11 table entries flushed
 SNMP notifications not enabled
   entry number 12 : LINK-3-UPDOWN
    Interface Loopback0, changed state to up
    timestamp: 862533
A1#
A1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
A1(config)#ip access-list standard SNMP-NMS
A1(config-std-nacl)#permit host 10.0.100.5
A1(config-std-nacl)#snmp-server community ENCORSA ro SNMP_ACL
```

```
A1(config)#snmp-server contac Luis Gabriel Martinez
A1(config)#snmp-server community ENCORSA ro SNMP-NMS
A1(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
A1(config)#snmp-server ifindex persist
A1(config)#snmp-server enable traps ospf
A1(config)#snmp-server enable traps config
                              ^
% Invalid input detected at '^' marker.

A1(config)#snmp-server enable traps snmp
A1(config)#end
A1#
```

Tabla 106 Configuración de SNMPv2c en el Switch A1

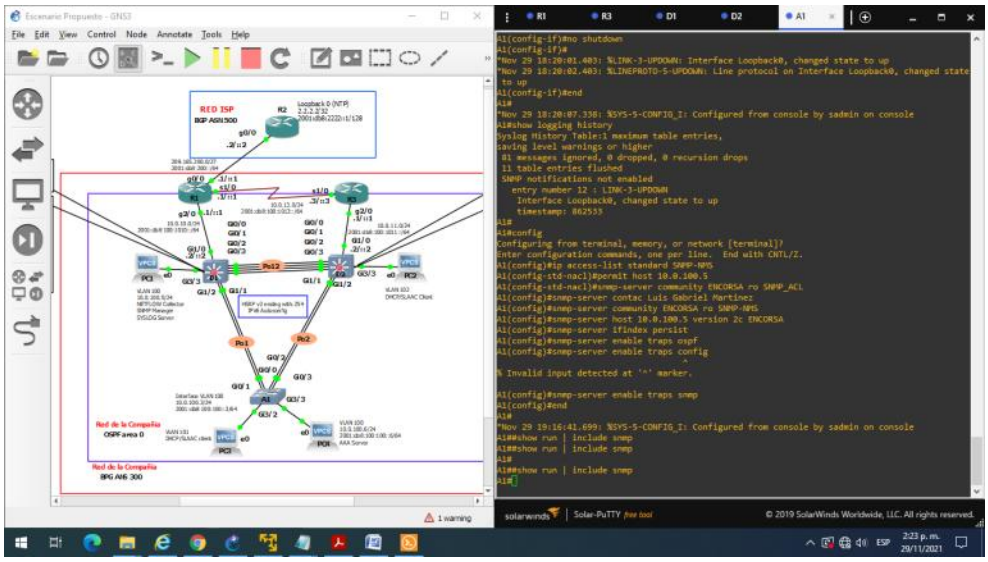

Figura 93 Configuración de SNMPv2c en el Switch A1

CONFIGURACION FINAL DE DISPOSTIVOS

Router R1

```
R1#show run
Building configuration...

Current configuration : 4038 bytes
!
! No configuration change since last restart
upgrade fpd auto
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname R1
```

```
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$svxk$Mbx.4Ofwk3FIqtKkiwT8n/
!
aaa new-model
!
!
aaa authentication login default group radius local
!
!
aaa session-id common
clock timezone UTC -5 0
no ip icmp rate-limit unreachable
!
!
no ip domain lookup
ip cef
ipv6 unicast-routing
ipv6 cef
!
multilink bundle-name authenticated
!
!
username sadmin password 7 045802150C2E1D1C5A4D50141B180F0B
!
redundancy
!
!
ip tcp synwait-time 5
!
!
interface Loopback0
 no ip address
!
interface Ethernet0/0
 no ip address
 shutdown
 duplex auto
!
interface GigabitEthernet0/0
 ip address 209.165.200.225 255.255.255.224
 duplex full
 speed 1000
 media-type gbic
 negotiation auto
 ipv6 address FE80::1:1 link-local
 ipv6 address 2001:DB8:200::1/64
!
interface Serial1/0
 ip address 10.0.13.1 255.255.255.0
```

```
 ipv6 address FE80::1:3 link-local
 ipv6 address 2001:DB8:100:1013::1/64
 ipv6 ospf 6 area 0
 serial restart-delay 0
!
interface Serial1/1
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/2
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/3
 no ip address
 shutdown
 serial restart-delay 0
!
interface GigabitEthernet2/0
 ip address 10.0.10.1 255.255.255.0
 negotiation auto
 ipv6 address FE80::1:2 link-local
 ipv6 address 2001:DB8:100:1010::1/64
 ipv6 eigrp 6
 ipv6 ospf 6 area 0
!
router ospf 4
 router-id 0.0.4.1
 network 10.0.10.0 0.0.0.255 area 0
 network 10.0.13.0 0.0.0.255 area 0
!
router bgp 300
 bgp router-id 1.1.1.1
 bgp log-neighbor-changes
 no bgp default ipv4-unicast
 neighbor 2001:DB8:200::2 remote-as 500
 neighbor 209.165.200.226 remote-as 500
 !
 address-family ipv4
  network 10.0.0.0
  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
!
ip forward-protocol nd
no ip http server
no ip http secure-server
```

```
!
!
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
ip route 0.0.0.0 0.0.0.0 209.165.200.226
ip route 10.0.0.0 255.0.0.0 209.165.200.226
!
ip access-list standard SNMP-NMS
 permit 10.0.100.5
!
logging trap warnings
logging host 10.0.100.5
no cdp log mismatch duplex
ipv6 route 2001:DB8:100::/48 2001:DB8:200::2
ipv6 route ::/0 2001:DB8:200::2
ipv6 router eigrp 6
 eigrp router-id 0.0.6.1
!
ipv6 router ospf 6
 router-id 0.0.6.1
!
!
snmp-server community ENCORSA RO SNMP-NMS
snmp-server ifindex persist
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps entity-sensor threshold
snmp-server enable traps bgp
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
!
!
radius-server host 10.0.100.6 auth-port 1812 key 7 06421B3343400E29040401
radius-server host 10.0.100.6 acct-port 1813 key 7 0865585C0617022713181F
!
!
control-plane
!
!
!
mgcp profile default
!
!
!
gatekeeper
```

```
 shutdown
!
banner motd ^C R1, ENCOR Skills Assessment, Scenario 1 ^C
!
line con 0
 exec-timeout 0 0
 privilege level 15
 password 7 00071A1507545A545C75194D000A0618
 logging synchronous
 stopbits 1
line aux 0
 exec-timeout 0 0
 privilege level 15
 logging synchronous
 stopbits 1
line vty 0 4
 password 7 14141B180F0B7B7977
 transport input all
!
ntp server 209.165.200.226
ntp peer 10.0.10.2
ntp server 2.2.2.2
ntp peer 10.0.13.3
ntp peer 10.0.100.3
!
end
```

Router R2

```
R2#show run
Building configuration...

Current configuration : 2181 bytes
!
! No configuration change since last restart
upgrade fpd auto
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname R2
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$4fDG$aw/gGJVBtianBJ3KUzn.P0
!
no aaa new-model
no ip icmp rate-limit unreachable
!
!
```

```
!
!
no ip domain lookup
ip cef
ipv6 unicast-routing
ipv6 cef
!
multilink bundle-name authenticated
!
!
username sadmin password 7 045802150C2E1D1C5A4D50141B180F0B
!
redundancy
!
!
ip tcp synwait-time 5
!
!
interface Loopback0
 ip address 2.2.2.2 255.255.255.255
 ipv6 address FE80::2:3 link-local
 ipv6 address 2001:DB8:2222::1/128
!
interface Ethernet0/0
 no ip address
 shutdown
 duplex auto
!
interface GigabitEthernet0/0
 ip address 209.165.200.226 255.255.255.224
 duplex full
 speed 1000
 media-type gbic
 negotiation auto
 ipv6 address FE80::2:1 link-local
 ipv6 address 2001:DB8:200::2/64
!
interface GigabitEthernet1/0
 no ip address
 shutdown
 negotiation auto
!
interface GigabitEthernet2/0
 no ip address
 shutdown
 negotiation auto
!
interface GigabitEthernet3/0
 no ip address
 shutdown
 negotiation auto
!
router bgp 500
```

```
 bgp router-id 2.2.2.2
 bgp log-neighbor-changes
 no bgp default ipv4-unicast
 neighbor 2001:DB8:200::1 remote-as 300
 neighbor 209.165.200.225 remote-as 300
 !
 address-family ipv4
  network 0.0.0.0
  neighbor 209.165.200.225 activate
 exit-address-family
 !
 address-family ipv6
  network ::/0
  neighbor 2001:DB8:200::1 activate
 exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
ip route 0.0.0.0 0.0.0.0 209.165.200.225
!
no cdp log mismatch duplex
ipv6 route ::/0 2001:DB8:200::1
!
!
control-plane
!
!
mgcp profile default
!
!
!
gatekeeper
 shutdown
!
banner motd ^C R2, ENCOR Skills Assessment, Scenario 1 ^C
!
line con 0
 exec-timeout 0 0
 privilege level 15
 password 7 045802150C2E1D1C5A4D50141B180F0B
 logging synchronous
 login
 stopbits 1
line aux 0
 exec-timeout 0 0
 privilege level 15
 logging synchronous
 stopbits 1
line vty 0 4
 password 7 094F471A1A0A464058
```

```
 login
 transport input all
!
ntp master 3
!
end
```

Router R3

```
R3#show run
Building configuration...

Current configuration : 3452 bytes
!
! Last configuration change at 14:38:57 UTC Mon Nov 29 2021 by sadmin
! NVRAM config last updated at 14:49:53 UTC Mon Nov 29 2021 by sadmin
! NVRAM config last updated at 14:49:53 UTC Mon Nov 29 2021 by sadmin
upgrade fpd auto
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname R3
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$bMHm$HzVErpqroX5ERJRo8TsMO0
!
aaa new-model
!
!
aaa authentication login default group radius local
!
!
!
aaa session-id common
clock timezone UTC -5 0
no ip icmp rate-limit unreachable
!
!
no ip domain lookup
ip cef
ipv6 unicast-routing
ipv6 cef
!
multilink bundle-name authenticated
!
!

username sadmin password 7 00071A1507545A545C75194D000A0618
```

```
!
redundancy
!
!
ip tcp synwait-time 5
!
!
interface Loopback0
 no ip address
!
interface Ethernet0/0
 no ip address
 shutdown
 duplex auto
!
interface GigabitEthernet0/0
 no ip address
 shutdown
 duplex full
 speed 1000
 media-type gbic
 negotiation auto
!
interface Serial1/0
 ip address 10.0.13.3 255.255.255.0
 ipv6 address FE80::3:3 link-local
 ipv6 address 2001:DB8:100:1013::3/64
 ipv6 ospf 6 area 0
 serial restart-delay 0
!
interface Serial1/1
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/2
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/3
 no ip address
 shutdown
 serial restart-delay 0
!
interface GigabitEthernet2/0
 ip address 10.0.11.1 255.255.255.0
 negotiation auto
 ipv6 address FE80::3:2 link-local
 ipv6 address 2001:DB8:100:1011::1/64
 ipv6 eigrp 6
 ipv6 ospf 6 area 0
!
```

```
router ospf 4
 router-id 0.0.4.3
 network 10.0.11.0 0.0.0.255 area 0
 network 10.0.13.0 0.0.0.255 area 0
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
ip access-list standard SNMP-NMS
 permit 10.0.100.5
!
logging trap warnings
logging host 10.0.100.5
no cdp log mismatch duplex
ipv6 router eigrp 6
 eigrp router-id 0.0.6.3
!
ipv6 router ospf 6
 router-id 0.0.6.3
!
!
snmp-server community ENCORSA RO SNMP-NMS
snmp-server ifindex persist
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps entity-sensor threshold
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
!
!
radius-server host 10.0.100.6 auth-port 1812 key 7 0865585C0617022713181F
radius-server host 10.0.100.6 acct-port 1813 key 7 015712165405013F205F5D
!
!
control-plane
!
!
!
mgcp profile default
!
!
```

```
!
gatekeeper
 shutdown
!
banner motd ^C R3, ENCOR Skills Assessment, Scenario 1 ^C
!
line con 0
 exec-timeout 0 0
 privilege level 15
 password 7 094F471A1A0A464058585129223728B3C
 logging synchronous
 stopbits 1
line aux 0
 exec-timeout 0 0
 privilege level 15
 logging synchronous
 stopbits 1
line vty 0 4
 password 7 0822455D0A16544541
 transport input all
!
ntp peer 10.0.13.1
ntp server 10.0.10.1
ntp peer 10.0.11.2
!
end
```

Switch D1

```
D1#show run
Building configuration...

Current configuration : 11703 bytes
!
! Last configuration change at 14:40:56 UTC Mon Nov 29 2021 by sadmin
! NVRAM config last updated at 14:49:33 UTC Mon Nov 29 2021 by sadmin
!
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
service compress-config
!
hostname D1
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$eun.$EO9KW2UXaLXdvQ3DxEDgl.
!
username sadmin password 7 05080F1C22431F5B4A514211021F0725
aaa new-model
```

```
!
!
aaa group server radius group-radius
 server 10.0.100.6 auth-port 1812
 server 10.0.100.6 acct-port 1813
!
aaa authentication login default group radius local
!
!
aaa session-id common
clock timezone UTC -5 0
!
!
ip dhcp excluded-address 10.0.101.1 10.0.101.109
ip dhcp excluded-address 10.0.101.141 10.0.101.254
ip dhcp excluded-address 10.0.102.1 10.0.102.109
ip dhcp excluded-address 10.0.102.141 10.0.102.254
!
ip dhcp pool VLAN-101
 network 10.0.101.0 255.255.255.0
 default-router 10.0.101.254
!
ip dhcp pool VLAN-102
 network 10.0.102.0 255.255.255.0
 default-router 10.0.102.254
!
!
no ip domain-lookup
ip cef
ipv6 unicast-routing
ipv6 cef
!
!
lacp system-priority 1
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
spanning-tree vlan 100-101 priority 4096
spanning-tree vlan 102 priority 8192
!
!
track 4 ip sla 4
 delay down 10 up 15
!
track 6 ip sla 6
 delay down 10 up 15
!
!
interface Loopback0
 no ip address
!
interface Port-channel1
 switchport trunk allowed vlan 100-102
```

```
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 lacp max-bundle 2
!
interface Port-channel12
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 lacp max-bundle 3
!
interface GigabitEthernet0/0
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 shutdown
 negotiation auto
 ipv6 eigrp 6
 lacp port-priority 1
 channel-group 12 mode active
!
interface GigabitEthernet0/1
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 shutdown
 negotiation auto
 ipv6 eigrp 6
 lacp port-priority 1
 channel-group 12 mode active
!
interface GigabitEthernet0/2
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 shutdown
 negotiation auto
 ipv6 eigrp 6
 lacp port-priority 1
 channel-group 12 mode active
!
interface GigabitEthernet0/3
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 shutdown
 negotiation auto
 ipv6 eigrp 6
```

```
 lacp port-priority 1
 channel-group 12 mode active
!
interface GigabitEthernet1/0
 no switchport
 ip address 10.0.10.2 255.255.255.0
 negotiation auto
 ipv6 address FE80::D1:1 link-local
 ipv6 address 2001:DB8:100:1010::2/64
 ipv6 eigrp 6
!
interface GigabitEthernet1/1
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 lacp port-priority 1
 channel-group 1 mode active
!
interface GigabitEthernet1/2
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 lacp port-priority 1
 channel-group 1 mode active
!
interface GigabitEthernet1/3
 negotiation auto
!
interface GigabitEthernet2/0
 shutdown
 negotiation auto
!
interface GigabitEthernet2/1
 shutdown
 negotiation auto
!
interface GigabitEthernet2/2
 shutdown
 negotiation auto
!
interface GigabitEthernet2/3
 shutdown
 negotiation auto
!
interface GigabitEthernet3/0
 switchport access vlan 100
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
```

```
!
interface GigabitEthernet3/1
 switchport access vlan 100
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface GigabitEthernet3/2
 switchport access vlan 100
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface GigabitEthernet3/3
 switchport access vlan 100
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface Vlan100
 ip address 10.0.100.1 255.255.255.0
 standby version 2
 standby 104 ip 10.0.100.254
 standby 104 priority 150
 standby 104 preempt
 standby 104 track 4 decrement 60
 standby 106 ipv6 autoconfig
 standby 106 priority 150
 standby 106 preempt
 standby 106 track 6 decrement 60
 ipv6 address FE80::D1:2 link-local
 ipv6 address 2001:DB8:100:100::1/64
!
interface Vlan101
 ip address 10.0.101.1 255.255.255.0
 standby version 2
 standby 114 ip 10.0.101.254
 standby 114 preempt
 standby 114 track 4 decrement 60
 standby 116 ipv6 autoconfig
 standby 116 preempt
 standby 116 track 6 decrement 60
 ipv6 address FE80::D1:3 link-local
 ipv6 address 2001:DB8:100:101::1/64
!
interface Vlan102
 ip address 10.0.102.1 255.255.255.0
 standby version 2
 standby 124 ip 10.0.102.254
 standby 124 priority 150
 standby 124 preempt
 standby 124 track 4 decrement 60
 standby 126 ipv6 autoconfig
```

```
 standby 126 priority 150
 standby 126 preempt
 standby 126 track 6 decrement 60
 ipv6 address FE80::D1:4 link-local
 ipv6 address 2001:DB8:100:102::1/64
!
router ospf 4
 router-id 0.0.4.131
 passive-interface GigabitEthernet1/1
 passive-interface GigabitEthernet1/2
 passive-interface GigabitEthernet3/3
 network 10.0.10.0 0.0.0.255 area 0
 network 10.0.100.0 0.0.0.255 area 0
 network 10.0.101.0 0.0.0.255 area 0
 network 10.0.102.0 0.0.0.255 area 0
!
ip forward-protocol nd
!
ip http server
ip http secure-server
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
ip access-list standard SNMP-NMS
 permit 10.0.100.5
!
!
ip sla 4
 icmp-echo 10.0.10.1
 frequency 5
ip sla schedule 4 life forever start-time now
ip sla 6
 icmp-echo 2001:DB8:100:1010::1
 frequency 5
ip sla schedule 6 life forever start-time now
logging trap warnings
logging host 10.0.100.5
ipv6 router eigrp 6
 passive-interface GigabitEthernet3/3
 passive-interface GigabitEthernet1/1
 passive-interface GigabitEthernet1/2
 eigrp router-id 0.0.6.131
!
!
!
!
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps flowmon
snmp-server enable traps tty
snmp-server enable traps eigrp
```

```
snmp-server enable traps casa
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps ethernet cfm cc mep-up mep-down cross-connect loop config
snmp-server enable traps ethernet cfm crosscheck mep-missing mep-unknown service-up
snmp-server enable traps auth-framework sec-violation
snmp-server enable traps energywise
snmp-server enable traps pw vc
snmp-server enable traps l2tun session
snmp-server enable traps l2tun pseudowire status
snmp-server enable traps ether-oam
snmp-server enable traps lisp
snmp-server enable traps mpls rfc ldp
snmp-server enable traps mpls ldp
snmp-server enable traps mpls rfc traffic-eng
snmp-server enable traps mpls traffic-eng
snmp-server enable traps ethernet evc status create delete
snmp-server enable traps bridge newroot topologychange
snmp-server enable traps stpx inconsistency root-inconsistency loop-inconsistency
snmp-server enable traps vtp
snmp-server enable traps vlancreate
snmp-server enable traps vlandelete
snmp-server enable traps ike policy add
snmp-server enable traps ike policy delete
snmp-server enable traps ike tunnel start
snmp-server enable traps ike tunnel stop
snmp-server enable traps ipsec cryptomap add
snmp-server enable traps ipsec cryptomap delete
snmp-server enable traps ipsec cryptomap attach
snmp-server enable traps ipsec cryptomap detach
snmp-server enable traps ipsec tunnel start
snmp-server enable traps ipsec tunnel stop
snmp-server enable traps ipsec too-many-sas
snmp-server enable traps bfd
snmp-server enable traps bgp cbgp2
snmp-server enable traps cef resource-failure peer-state-change peer-fib-state-change
inconsistency
snmp-server enable traps dlsw
snmp-server enable traps frame-relay
snmp-server enable traps frame-relay subif
snmp-server enable traps hsrp
snmp-server enable traps ipmulticast
snmp-server enable traps isis
snmp-server enable traps msdp
snmp-server enable traps mvpn
```

```
snmp-server enable traps pim neighbor-change rp-mapping-change invalid-pim-message
snmp-server enable traps rsvp
snmp-server enable traps ipsla
snmp-server enable traps slb real virtual csrp
snmp-server enable traps syslog
snmp-server enable traps event-manager
snmp-server enable traps pki
snmp-server enable traps ethernet cfm alarm
snmp-server enable traps mpls vpn
snmp-server enable traps vrfmib vrf-up vrf-down vnet-trunk-up vnet-trunk-down
snmp-server host 10.0.100.5 version 2c ENCORSA
snmp ifmib ifindex persist
!
radius-server key 7 004007140B550C360E325F
!
!
control-plane
!
banner exec ^C
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**************************************************************************^C
banner incoming ^C
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banner login ^C
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**************************************************************************^C
banner motd ^C D1, ENCOR Skills Assessment, Scenario 1 ^C
!
line con 0
 exec-timeout 0 0
 privilege level 15
 password 7 121A0C0411045D56797F712B3A26211C
 logging synchronous
line aux 0
```

```
line vty 0 4
 privilege level 15
 password 7 060506324F41584B56
!
ntp server 10.0.10.1
onep
!
end
```

Switch D2

```
D2#show run
Building configuration...

Current configuration : 9152 bytes
!
! Last configuration change at 14:43:59 UTC Mon Nov 29 2021 by sadmin
! NVRAM config last updated at 14:49:31 UTC Mon Nov 29 2021 by sadmin
!
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
service compress-config
!
hostname D2
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$LMDq$ANaf8CxZ/utok92vY9FZv0
!
username sadmin password 7 05080F1C22431F5B4A514211021F0725
aaa new-model
!
!
aaa group server radius group-radius
 server 10.0.100.6 auth-port 1812
 server 10.0.100.6 acct-port 1813
!
aaa authentication login default group radius local
!
!
aaa session-id common
clock timezone UTC -5 0
!
!
ip dhcp excluded-address 10.0.101.1 10.0.101.209
ip dhcp excluded-address 10.0.101.241 10.0.101.254
ip dhcp excluded-address 10.0.102.1 10.0.102.209
ip dhcp excluded-address 10.0.102.241 10.0.102.254
!
```

```
ip dhcp pool VLAN-101
 network 10.0.101.0 255.255.255.0
 default-router 10.0.101.254
!
ip dhcp pool VLAN-102
 network 10.0.102.0 255.255.255.0
 default-router 10.0.102.254
!
!
no ip domain-lookup
ip cef
ipv6 unicast-routing
ipv6 cef
!
!
lacp system-priority 1
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
spanning-tree vlan 100-101 priority 8192
spanning-tree vlan 102 priority 4096
!
!
track 4 ip sla 4
 delay down 10 up 15
!
track 6 ip sla 6
 delay down 10 up 15
!
!
interface Loopback0
 no ip address
!
interface Port-channel2
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 lacp max-bundle 2
!
interface Port-channel12
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 lacp max-bundle 3
!
interface GigabitEthernet0/0
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
```

```
 ipv6 eigrp 6
 channel-group 12 mode active
!
interface GigabitEthernet0/1
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 ipv6 eigrp 6
 channel-group 12 mode active
!
interface GigabitEthernet0/2
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 ipv6 eigrp 6
 channel-group 12 mode active
!
interface GigabitEthernet0/3
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 ipv6 eigrp 6
 channel-group 12 mode active
!
interface GigabitEthernet1/0
 no switchport
 ip address 10.0.11.2 255.255.255.0
 negotiation auto
 ipv6 address FE80::D2:1 link-local
 ipv6 address 2001:DB8:100:1011::2/64
 ipv6 eigrp 6
!
interface GigabitEthernet1/1
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 lacp port-priority 1
 channel-group 2 mode active
!
interface GigabitEthernet1/2
 switchport trunk allowed vlan 100-102
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
```

```
 lacp port-priority 1
 channel-group 2 mode active
!
interface GigabitEthernet1/3
 negotiation auto
!
interface GigabitEthernet2/0
 shutdown
 negotiation auto
!
interface GigabitEthernet2/1
 shutdown
 negotiation auto
!
interface GigabitEthernet2/2
 shutdown
 negotiation auto
!
interface GigabitEthernet2/3
 shutdown
 negotiation auto
!
interface GigabitEthernet3/0
 switchport access vlan 102
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface GigabitEthernet3/1
 switchport access vlan 102
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface GigabitEthernet3/2
 switchport access vlan 102
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface GigabitEthernet3/3
 switchport access vlan 102
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface Vlan100
 ip address 10.0.100.2 255.255.255.0
 standby version 2
 standby 104 ip 10.0.100.254
 standby 104 preempt
 standby 104 track 4 decrement 60
 standby 106 ipv6 autoconfig
```

```
 standby 106 preempt
 standby 106 track 6 decrement 60
 ipv6 address FE80::D2:2 link-local
 ipv6 address 2001:DB8:100:100::2/64
!
interface Vlan101
 ip address 10.0.101.2 255.255.255.0
 standby version 2
 standby 114 ip 10.0.101.254
 standby 114 priority 150
 standby 114 preempt
 standby 114 track 4 decrement 60
 standby 116 ipv6 autoconfig
 standby 116 priority 150
 standby 116 preempt
 standby 116 track 6 decrement 60
 ipv6 address FE80::D2:3 link-local
 ipv6 address 2001:DB8:100:101::2/64
!
interface Vlan102
 ip address 10.0.102.2 255.255.255.0
 standby version 2
 standby 124 ip 10.0.102.254
 standby 124 preempt
 standby 124 track 4 decrement 60
 standby 126 ipv6 autoconfig
 standby 126 preempt
 standby 126 track 6 decrement 60
 ipv6 address FE80::D2:4 link-local
 ipv6 address 2001:DB8:100:102::2/64
!
router ospf 4
 router-id 0.0.4.132
 passive-interface GigabitEthernet1/1
 passive-interface GigabitEthernet1/2
 passive-interface GigabitEthernet3/3
 network 10.0.11.0 0.0.0.255 area 0
 network 10.0.100.0 0.0.0.255 area 0
 network 10.0.101.0 0.0.0.255 area 0
 network 10.0.102.0 0.0.0.255 area 0
!
ip forward-protocol nd
!
ip http server
ip http secure-server
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
ip access-list standard SNMP-NMS
 permit 10.0.100.5
!
!
```

```
ip sla 4
 icmp-echo 10.0.11.1
 frequency 5
ip sla schedule 4 life forever start-time now
ip sla 6
 icmp-echo 2001:DB8:100:1011::1
 frequency 5
ip sla schedule 6 life forever start-time now
logging trap warnings
logging host 10.0.100.5
ipv6 router eigrp 6
 passive-interface GigabitEthernet3/3
 passive-interface GigabitEthernet1/1
 passive-interface GigabitEthernet1/2
 eigrp router-id 0.0.6.132
!
!
!
!
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
snmp ifmib ifindex persist
!
radius-server key 7 15561F1E0B242C14292026
!
!
control-plane
!
banner exec ^C
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**************************************************************************^C
banner incoming ^C
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**************************************************************************^C
banner login ^C
**************************************************************************
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* purposes is expressly prohibited except as otherwise authorized by     *
* Cisco in writing.                                                      *
**************************************************************************^C
banner motd ^C D2, ENCOR Skills Assessment, Scenario 1 ^C
!
line con 0
 exec-timeout 0 0
 privilege level 15
 password 7 01100F175804575D72181B0A1016141D
 logging synchronous
line aux 0
line vty 0 4
 privilege level 15
 password 7 14141B180F0B7B7977
!
ntp peer 10.0.11.1
ntp server 10.0.10.1
!
end
```

Switch A1

```
A1#show run
Building configuration...

Current configuration : 6156 bytes
!
! Last configuration change at 14:42:13 UTC Mon Nov 29 2021 by sadmin
!
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
service compress-config
!
hostname A1
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$iDgL$a/cTc8MJD/PPUlj5wJOIr.
```

```
!
username sadmin password 7 045802150C2E1D1C5A4D50141B180F0B
aaa new-model
!
!
aaa group server radius group-radius
 server 10.0.100.6 auth-port 1812
 server 10.0.100.6 acct-port 1813
!
aaa authentication login default group radius local
!
!
aaa session-id common
clock timezone UTC -5 0
!
!
no ip domain-lookup
ip cef
no ipv6 cef
!
!
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
!
interface Loopback0
 no ip address
!
interface Port-channel1
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 lacp max-bundle 2
!
interface Port-channel2
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 lacp max-bundle 2
!
interface GigabitEthernet0/0
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 channel-group 1 mode active
!
interface GigabitEthernet0/1
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
```

```
 channel-group 1 mode active
!
interface GigabitEthernet0/2
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 channel-group 2 mode active
!
interface GigabitEthernet0/3
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode trunk
 negotiation auto
 channel-group 2 mode active
!
interface GigabitEthernet1/0
 shutdown
 negotiation auto
!
interface GigabitEthernet1/1
 shutdown
 negotiation auto
!
interface GigabitEthernet1/2
 shutdown
 negotiation auto
!
interface GigabitEthernet1/3
 shutdown
 negotiation auto
!
interface GigabitEthernet2/0
 shutdown
 negotiation auto
!
interface GigabitEthernet2/1
 shutdown
 negotiation auto
!
interface GigabitEthernet2/2
 shutdown
 negotiation auto
!
interface GigabitEthernet2/3
 shutdown
 negotiation auto
!
interface GigabitEthernet3/0
 switchport trunk native vlan 999
 shutdown
 negotiation auto
!
```

```
interface GigabitEthernet3/1
 switchport trunk native vlan 999
 shutdown
 negotiation auto
!
interface GigabitEthernet3/2
 switchport access vlan 101
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface GigabitEthernet3/3
 switchport access vlan 100
 switchport trunk allowed vlan 100-102
 switchport trunk native vlan 999
 switchport mode access
 negotiation auto
!
interface Vlan100
 ip address 10.0.100.3 255.255.255.0
 ipv6 address FE80::A1:1 link-local
 ipv6 address 2001:DB8:100:100::3/64
!
ip forward-protocol nd
!
ip http server
ip http secure-server
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
ip access-list standard SNMP-NMS
 permit 10.0.100.5
!
!
logging trap warnings
logging host 10.0.100.5
!
!
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Luis Gabriel Martinez
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
```

```
snmp ifmib ifindex persist
!
radius-server key 7 054F121D2E424939181604
!
!
control-plane
!
banner exec ^C
**************************************************************************
* IOSv is strictly limited to use for evaluation, demonstration and IOS  *
* education. IOSv is provided as-is and is not supported by Cisco's      *
* Technical Advisory Center. Any use or disclosure, in whole or in part, *
* of the IOSv Software or Documentation to any third party for any       *
* purposes is expressly prohibited except as otherwise authorized by     *
* Cisco in writing.                                                      *
**************************************************************************^C
banner incoming ^C
**************************************************************************
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**************************************************************************^C
banner login ^C
**************************************************************************
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* of the IOSv Software or Documentation to any third party for any       *
* purposes is expressly prohibited except as otherwise authorized by     *
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**************************************************************************^C
banner motd ^C A1, ENCOR Skills Assessment, Scenario 1 ^C
!
line con 0
 exec-timeout 0 0
 privilege level 15
 password 7 0822455D0A165445415F590723382727
 logging synchronous
line aux 0
line vty 0 4
 privilege level 15
 password 7 030752180500701E1D
!
ntp server 10.0.10.1
!
end
```

Tabla 107 CONFIGURACION FINAL DE DISPOSTIVOS

CONCLUSIONES

Se concluye, que con esta actividad practica de configuracion del Escenario de red propuesto , se logran demostras las habilidades que se adquiridas en los procesos de configuracion y solucion de requerimientos relacionados con diversos aspectos de Networking desde la Configuracion basica de Dispostivos de Routing y switch, de Vlans, VTP y DTP, los cuales le permite a un administrador de red gestionar, de una manera fácil la negociación de enlaces troncales entre dispositivos, comprendiendo el funcionamiento y análisis del diseño redundante de la red del Escenario propuesto.

Se comprende, los posibles cambios de topología de STP, que se pueden presentar atraves de la gestion de la presencia de bucles, los cuales permite a los dispositivos de interconexión activar o desactivar automáticamente enlaces de conexión redundantes, garantizando que la topología esté siempre libre de bucles y optimizándose el tráfico de la red del Escenario Propuesto.

Se adquiren destrezas, como administradores de red en procesos a decuados de enrutamiento entre VLAN en la configuracion de plataformas de conmutación basadas en switches, mediante el uso de protocolos como STP y la configuración de VLANs en escenarios de red corporativos.

Se comprende, la importancia de realizar la Configuracion EtherChannel en el escenario de red propuesto , ofreciendole ventajas como varias conexiones entre dispositivos se convierten en un solo enlace troncal logico,aspecto ideal en cualquier red donde se generen cuellos de botella,facilitando el crecimiento escalable y a la medida, facilitando el balanceo de la carga entre los enlaces, redirigiendo el trafico de un enlace fallido a los otros enlaces restantes, siendo util para todas las velocidades de los enlaces Etherchannel configurados.

Se concluye, comprende el funcionamiento del protocolo Rapid Spanning-Tree (RSTP), en el Escenario de red propuesto, como un protocolo que le permite controlar los enlaces redundantes asegurando el rendimiento de la red, evitando los bucles, garantizando los enlaces de respaldo si falla un enlace activo. Por tanto, Spanning Tree MST, permite facilitar la configuración de diferentes VLANs,

permitiendo aprovechar al máximo los enlaces entre switches, donde ninguno quedará en estado bloqueado. Es decir, permitiendo una mejor utilización de todas las posibles rutas hacia un destino, habilitando árboles de expansión alternativos dependiendo de las VLANs que se tengan dadas de alta.

Se comprende, mediante la configuración del enrutamiento realizado bajo los protocolos OSPF y EIGRP para IPV4 e IPV6. Por tanto, se logró realizar la redistribución de las rutas EIGRP en OSPF y las rutas OSPF en EIGRP con las métricas necesarias, logrando la actualización de las tablas de enrutamiento en todos routers y switches sin importar que el ios iosvl2 de Switch multicapa para GNS3 de Cisco CCNP no contara con el protocolo OSPF para IPV6, garantizando la comunicación entre los hosts del protocolo OSPF y los hosts del protocolo EIGRP.

Se concluye, que con la configuración realizada entre los router R1 y R2 de BGP, se interpreta BGP como un protocolo de encaminamiento EGP muy utilizado en Internet. El cual, funciona sobre TCP por el puerto 179, permitiendo el encaminamiento de los paquetes IP que se intercambian entre los distintos AS. Donde, es necesario el intercambio de prefijos de rutas entre los diferentes AS de forma dinámica. Lo anterior, se ejecuta mediante el establecimiento de sesiones BGP inter-AS sobre conexiones TCP. Es e decir, que este tipo de operación proporciona comunicación fiable y esconde todos los detalles de la red por la que se pasa. En consecuencia, las tablas de encaminamiento de BGP almacenan rutas para alcanzar redes (indicadas mediante prefijos).Donde, se pueden agrupar los destinos en comunidades de destino (grupos de routers con unas mismas propiedades), esto facilita escalar la aplicación de decisiones de encaminamiento, permitiendo aceptar una ruta, preferir una ruta ante otra, redistribuir una ruta, etc. Cada destino puede ser miembro de varias comunidades. Es muy útil para Controlar la Política de Ruteo en la Red de Proveedor Ascendente.

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