

DIPLOMADO DE PROFUNDIZACION CISCO PRUEBA DE HABILIDADES
PRÁCTICAS CCNP

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA - ECBTI
INGENIERÍA ELECTRONICA
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Diplomado de opción de grado presentado para optar el
título de INGENIERO ELECTRONICO

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NOTA DE ACEPTACIÓN

Firma del Presidente del Jurado

Firma del Jurado

Firma del Jurado

Bogotá, 03 de Mayo de 2023

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Primero quiero expresar mi agradecimiento a Jacqueline por darme la vida y la oportunidad de experimentar lo maravillosa que es.

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GLOSARIO

- CISCO: Es una empresa líder en el campo de las tecnologías de la información y las comunicaciones (TIC), que fabrica y comercializa productos y soluciones de red, tales como routers, switches y firewalls, entre otros.
- CCNP: Es el acrónimo de Cisco Certified Network Professional, que es una certificación otorgada por Cisco a profesionales que demuestran tener un alto nivel de conocimientos y habilidades en redes de datos.
- Conmutación: Es una técnica utilizada en las redes de comunicación para establecer un canal de comunicación entre dos dispositivos. En las redes de datos, la conmutación se refiere a la capacidad de los dispositivos de red (como switches) para dirigir los paquetes de datos hacia su destino.
- Enrutamiento: Es la técnica utilizada en las redes de comunicación para seleccionar la mejor ruta para enviar los paquetes de datos desde el origen al destino. En las redes de datos, el enrutamiento se lleva a cabo mediante el uso de protocolos de enrutamiento, que permiten que los routers intercambien información sobre las redes disponibles y elijan la mejor ruta para enviar los paquetes.
- Redes: Es un conjunto de dispositivos de comunicación (como ordenadores, routers, switches, etc.) conectados entre sí para compartir información y recursos. Las redes pueden ser de diferentes tipos, tales como redes locales (LAN), redes de área amplia (WAN) y redes inalámbricas (WLAN), entre otras.
- Electrónica: Es la rama de la física que se ocupa del estudio de los dispositivos y sistemas electrónicos. En las redes de datos, la electrónica es fundamental para el diseño y la implementación de los dispositivos de red, como routers, switches y tarjetas de red.
- Routing: Es el proceso mediante el cual se selecciona la mejor ruta para enviar paquetes de datos desde el origen al destino en una red de datos.
- Switching: Es el proceso mediante el cual se dirigen los paquetes de datos desde el origen al destino en una red de datos. Los switches son dispositivos de red que se utilizan para llevar a cabo la conmutación de paquetes.
- Networking: Es el conjunto de actividades relacionadas con el diseño, implementación y mantenimiento de las redes de comunicación. El networking implica el conocimiento de diversas tecnologías, como enrutamiento, conmutación, seguridad, protocolos de red, entre otros.

RESUMEN

Este Diplomado es un programa de formación avanzado en el área de Redes, ofrecido por la prestigiosa empresa de electrónica de redes, Cisco. Este programa está diseñado para mejorar las habilidades en Enrutamiento y Conmutación de redes empresariales complejas. Durante el programa, se recibirá una formación rigurosa en tecnologías avanzadas de redes, incluyendo la implementación de soluciones de red escalables y la gestión de servicios de red de alta calidad.

El programa está dirigido a profesionales de TI que buscan mejorar sus habilidades en el diseño, implementación y mantenimiento de redes empresariales avanzadas y escalables. Los instructores altamente capacitados proporcionan una combinación de teoría y práctica para garantizar una experiencia de aprendizaje completa y efectiva.

En resumen, el Diplomado de Profundización Cisco CCNP es un programa esencial para los profesionales de TI que buscan mejorar sus habilidades en Redes y Electrónica. Este programa les permitirá enfrentar los desafíos actuales y futuros de la gestión de redes empresariales con confianza y habilidad.

ABSTRACT

The Cisco Certified Network Professional (CCNP) is an advanced training program in the area of Networking, offered by Cisco, a world leader in network electronics. This diploma focuses on improving skills in Routing and Switching of complex enterprise networks. The program provides rigorous training on advanced networking technologies and their implementation in enterprise LAN and WAN environments. Participants will acquire practical knowledge and technical skills to design, implement and maintain advanced and scalable enterprise networks. The program is taught by highly trained instructors with a combination of theory and practice to provide a complete and effective learning experience. Upon completion of the diploma, participants will earn the Cisco Certified Network Professional (CCNP) certification, enabling them to demonstrate advanced skills and knowledge in the design and management of complex enterprise networks. This program is essential for IT professionals who wish to improve their skills in Networking and Electronics, and face the current and future challenges of enterprise network management.

Keywords: CISCO, CCNP, Routing, Swicthing, Networking, Electronics.

INTRODUCCIÓN

El presente trabajo tiene como objetivo profundizar en el conocimiento de Inter VLAN Routing a través del uso de escenarios simulados proporcionados por PACKET TRACER CISCO. Estos escenarios han sido cuidadosamente diseñados para desarrollar conceptos clave en el área de redes y permitir la aplicación de soluciones escalables a través de la configuración básica y avanzada de protocolos de enrutamiento. Además, se buscará diseñar soluciones de red que garanticen la calidad de los servicios IP en ambientes empresariales LAN y WAN. A lo largo del trabajo, se trabajará en la configuración detallada de los diferentes elementos requeridos para alcanzar los objetivos planteados. Con esta investigación, se espera mejorar las habilidades y conocimientos en el campo de las redes, lo que permitirá a los profesionales de TI enfrentar los desafíos actuales y futuros de la gestión de redes empresariales con mayor eficacia.

DESARROLLO

Parte 1: construir la red y configurar los ajustes básicos del dispositivo y el direccionamiento de la interfaz (Realizado en el paso 6)

Figura 1. Escenario 1

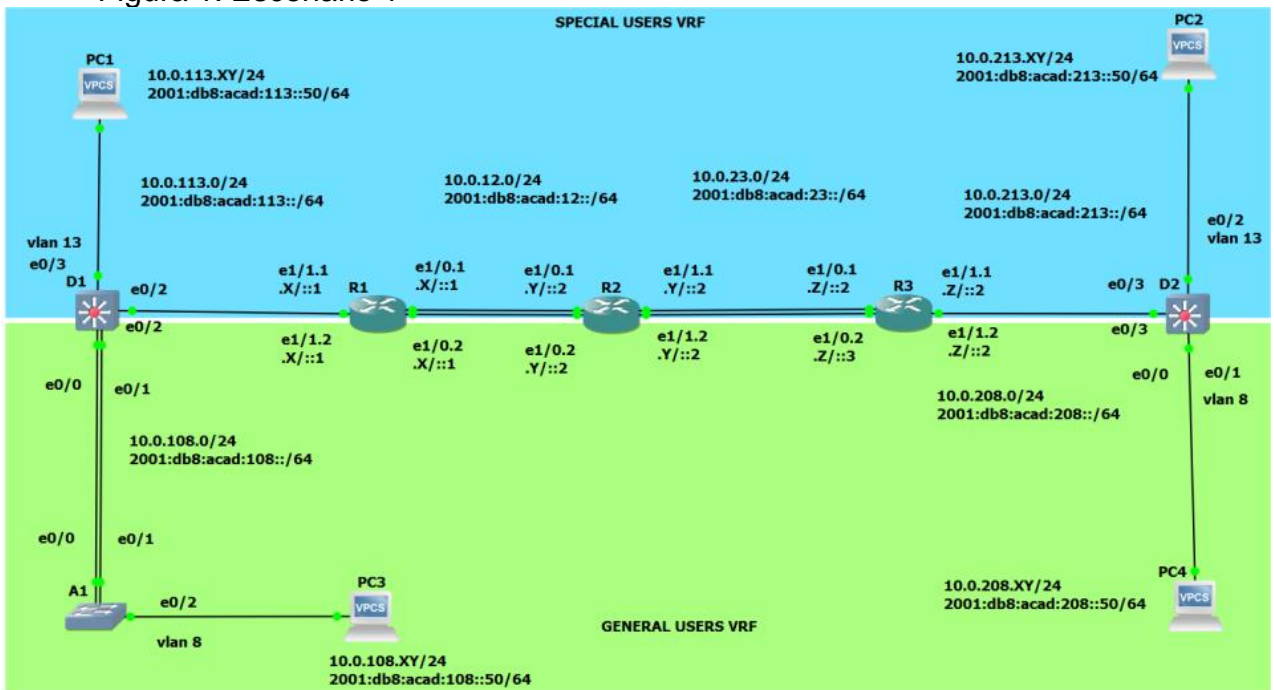


Figura 2. Simulación de escenario 1

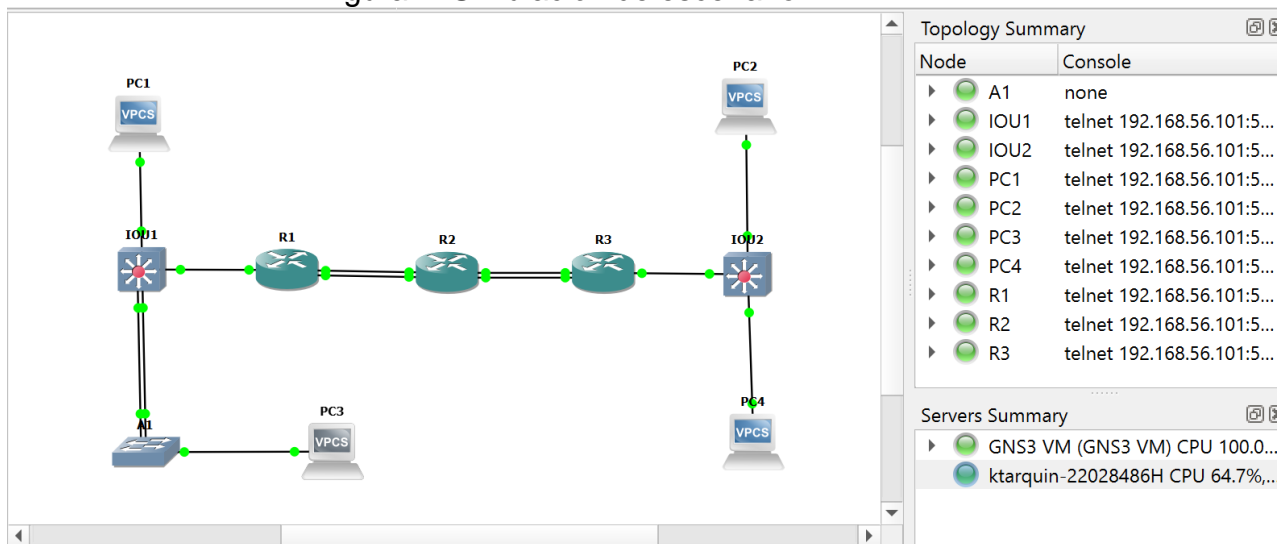


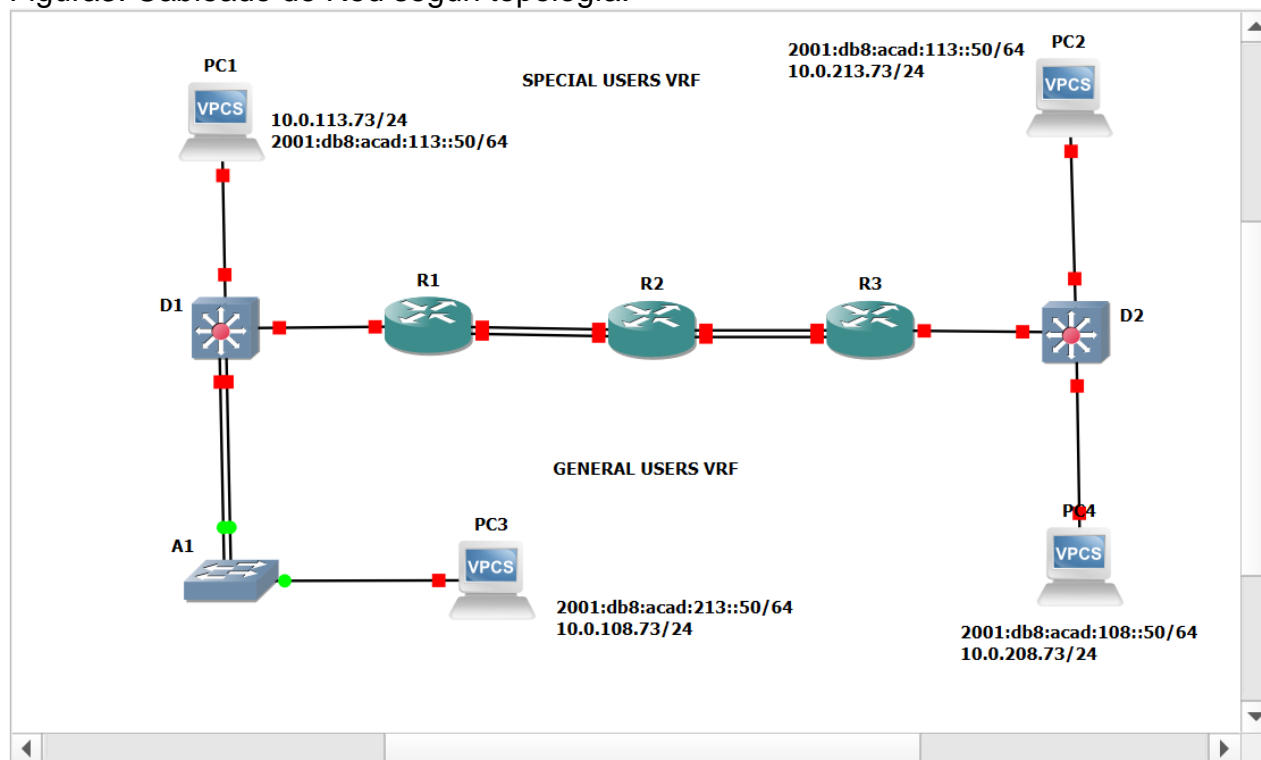
Tabla 1. Tabla de direccionamiento

Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local
R1	E1/0.1	10.0.12.7/24	2001:db8:acad:12::1/64	fe80::1:1
	E1/0.2	10.0.12.7/24	2001:db8:acad:12::1/64	fe80::1:2
	E1/1.1	10.0.113.7/24	2001:db8:acad:113::1/64	fe80::1:3
	E1/1.2	10.0.108.7/24	2001:db8:acad:108::1/64	fe80::1:4
R2	E1/0.1	10.0.12.3/24	2001:db8:acad:12::2/64	fe80::2:1
	E1/0.2	10.0.12.3/24	2001:db8:acad:12::2/64	fe80::2:2
	E1/1.1	10.0.23.3/24	2001:db8:acad:23::2/64	fe80::2:3
	E1/1.2	10.0.23.3/24	2001:db8:acad:23::2/64	fe80::2:4
R3	E1/0.1	10.0.23.1/24	2001:db8:acad:23::3/64	fe80::3:1
	E1/0.2	10.0.23.1/24	2001:db8:acad:23::3/64	fe80::3:2
	E1/1.1	10.0.213.1/24	2001:db8:acad:213::1/64	fe80::3:3
	E1/1.2	10.0.108.1/24	2001:db8:acad:208::1/64	fe80::3:4
PC1	NIC	10.0.113.73/24	2001:db8:acad:113::50/64	EUI-64
PC2	NIC	10.0.213.73/24	2001:db8:acad:213::50/64	EUI-64
PC3	NIC	10.0.108.73/24	2001:db8:acad:108::50/64	EUI-64
PC4	NIC	10.0.208.73/24	2001:db8:acad:208::50/64	EUI-64

Paso 1: Cablee la red como se muestra en la topología. Conecte los dispositivos como se

muestra en el diagrama de topología y cablee según sea necesario.

Figura3. Cableado de Red según topología.



Paso 2: Configure los ajustes básicos para cada dispositivo. a. Ingrese al modo de configuración global en cada uno de los dispositivos y aplique la configuración básica. Las configuraciones de inicio para cada dispositivo se proporcionan a continuación

Router R1

```
hostname R1 ipv6 unicast-routing
no ip domain lookup
banner motd # R1, ENCOR Skills Assessment, Scenario 2 #
line con 0
exec-timeout 0 0
logging synchronous
exit
```


- Para configurar la línea de consola, ingrese los siguientes comandos:
line con 0
exec-timeout 0 0
logging synchronous
exit
- Verifique que la configuración se ha aplicado correctamente ingresando el comando “show running-config” en la consola.

Router R3

```

hostname R3 ipv6
unicast-routing
no ip domain lookup
banner motd # R3, ENCOR Skills Assessment, Scenario 2 #
line con 0
exec-timeout 0 0
logging synchronous
exit

```

Figura 6. Configuración R3

```

R3
R3#enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#hostname R3
R3(config)#ipv6 unicast-routing
R3(config)#no ip domain lookup
R3(config)#banner motd # R3, ENCOR Skills Assessment, Scenario 2 #
R3(config)#line con 0
R3(config-line)#exec-timeout 0 0
R3(config-line)#logging synchronous
R3(config-line)#exit
R3(config)#exit
R3#
*Mar 30 03:33:35.763: XSYS-5-CONFIG_I: Configured from console by console
R3#show running-config
^
% Invalid input detected at '^' marker.

R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#show running-config
^
% Invalid input detected at '^' marker.

R3(config)#exit
R3#show running-config
*Mar 30 03:34:30.323: XSYS-5-CONFIG_I: Configured from console by console
R3#show running-config
Building configuration...

Current configuration : 1093 bytes
!
! Last configuration change at 03:34:30 UTC Thu Mar 30 2023
!
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname R3
!
boot-start-marker
boot-end-marker
!
!
no aaa new-model
no ip icmp rate-limit unreachable
ip cef

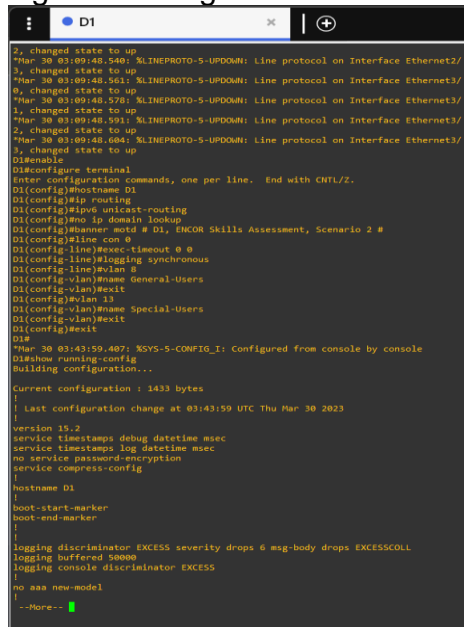
```

1. Para configurar el hostname, ingrese el comando "hostname R3" en la consola y presione Enter.
2. Para habilitar el enrutamiento IPv6, ingrese el comando "ipv6 unicast-routing" en la consola y presione Enter.
3. Para deshabilitar la búsqueda de dominio, ingrese el comando "no ip domain lookup" en la consola y presione Enter.
4. Para configurar el banner de inicio de sesión, ingrese el comando "banner motd # R3, ENCOR Skills Assessment, Scenario 2 #" en la consola y presione Enter.
5. Para configurar la línea de consola, ingrese los siguientes comandos:
line con 0
exec-timeout 0 0
logging synchronous
exit
6. Verifique que la configuración se ha aplicado correctamente ingresando el comando "show running-config" en la consola.

Switch D1

```
hostname D1
ip routing
ipv6 unicast-routing
no ip domain lookup
banner motd # D1, ENCOR Skills Assessment, Scenario 2 #
line con 0
exec-timeout 0 0
logging synchronous
exit
vlan 8
name General-Users
exit
vlan 13
name Special-Users
exit
```

Figura 7.configuración Switch D1



```
D1, changed state to up
*Mar 30 03:09:48.540: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/
3, changed state to up
*Mar 30 03:09:48.561: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
0, changed state to up
*Mar 30 03:09:48.578: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
1, changed state to up
*Mar 30 03:09:48.591: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
2, changed state to up
*Mar 30 03:09:48.604: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
3, changed state to up
D1#enable
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(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 2 #
D1(config)#line con 0
D1(config-line)#exec-timeout 0 0
D1(config-line)#logging synchronous
D1(config-line)#vlan 8
D1(config-vlan)#name General-Users
D1(config-vlan)#exit
D1(config-vlan 13)
D1(config-vlan)#name Special-Users
D1(config-vlan)#exit
D1(config)#exit
D1#
*Mar 30 03:43:59.487: %SYS-5-CONFIG_I: Configured from console by console
D1#show running-config
Building configuration...

Current configuration : 1433 bytes
!
Last configuration change at 03:43:59 UTC Thu Mar 30 2023
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service compress-config
!
hostname D1
boot-start-marker
boot-end-marker
!
logging discriminator EXCESS severity drops 6 msg-body drops EXCESSCOLL
logging buffered 50000
logging console discriminator EXCESS
no aaa new-model
--More--
```

Con estos comandos, se ha configurado el switch D1 con el nombre de host “D1”, la capacidad de enrutamiento IP y IPv6, la desactivación de la búsqueda de dominio, un banner de mensaje de bienvenida, un tiempo de espera de ejecución nulo y la sincronización de registro, junto con dos VLAN: una para usuarios generales (VLAN 8) y otra para usuarios especiales (VLAN 13).

Switch D2

```
hostname D2
ip routing ipv6 unicast-routing
no ip domain lookup
banner motd # D2, ENCOR Skills Assessment, Scenario 2 #
line con 0
exec-timeout 0 0
logging synchronous
exit
vlan 8
name General-Users
exit
vlan 13
name Special-Users
exit
```

Figura 8.configuración Switch D2

```
D2
2, changed state to up
*Mar 30 03:09:48.807: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/
3, changed state to up
*Mar 30 03:09:48.900: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
4, changed state to up
*Mar 30 03:09:48.999: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
1, changed state to up
*Mar 30 03:09:48.934: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
2, changed state to up
*Mar 30 03:09:48.951: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
3, changed state to up
D2#enable
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(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 2 #
D2(config)#line con 0
D2(config-line)#exec-timeout 0 0
D2(config-line)#logging synchronous
D2(config-line)#vlan 8
D2(config-vlan)#name General-Users
D2(config-vlan)#exit
D2(config)#vlan 13
D2(config-vlan)#name Special-Users
D2(config-vlan)#exit
D2(config)#exit
D2#
*Mar 30 03:51:10.519: %SYS-5-CONFIG_I: Configured from console by console
D2#show running-config
Building configuration...

Current configuration : 1433 bytes
!
! Last configuration change at 03:51:10 UTC Thu Mar 30 2023
!
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service compress-config
!
hostname D2
!
boot-start-marker
boot-end-marker
!
logging discriminator EXCESS severity drops 6 msg-body drops EXCESSCOLL
logging buffered 50000
logging console discriminator EXCESS
!
no aaa new-model
!
--More--
```

Con estos comandos, se ha configurado el switch D2 con el nombre de host "D2", la capacidad de enrutamiento IP y IPv6, la desactivación de la búsqueda de dominio, un banner de mensaje de bienvenida, un tiempo de espera de ejecución nulo y la sincronización de registro, junto con dos VLAN: una para usuarios generales (VLAN 8) y otra para usuarios especiales (VLAN 13).

Switch A1

```
hostname A1
ipv6 unicast-routing
no ip domain lookup
banner motd # A1, ENCOR Skills Assessment, Scenario 2 #
line con 0
exec-timeout 0 0
logging synchronous
exit
vlan 8
name General-Users
exit
```

Figura 9.configuración Switch A1

```

Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2015 by Cisco Systems, Inc.
Compiled Wed 04-Nov-15 02:31 by mmen
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/
0, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/
1, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/
2, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/
3, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
0, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
1, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
3, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/
0, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/
1, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/
2, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/
3, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
0, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
1, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
2, changed state to up
*Apr 3 00:13:09.340: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
3, changed state to up
*Apr 3 00:13:09.476: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, cha
nged state to down
*Apr 3 00:13:10.483: %LINK-5-CHANGED: Interface Vlan1, changed state to admini
stratively down
A1#configure terminal
A1(config)#hostname A1
A1(config)#ip v6 unicast-routing
A1(config)#no ip domain lookup
A1(config)#banner motd # A1, ENCOR Skills Assessment, Scenario 2 #
A1(config)#line con 0
A1(config-line)#exec-timeout 0 0
A1(config-line)#logging synchronous
A1(config-line)#exit
A1(config)#vlan 8
A1(config-vlan)#name General-Users
A1(config-vlan)#exit
A1(config)#
A1(config)#exit
A1#
*Apr 3 00:17:43.543: %SYS-5-CONFIG_I: Configured from console by console
A1#

```

Con estos comandos, se ha configurado el switch A1 con el nombre de host "A1", la capacidad de enrutamiento IPv6, la desactivación de la búsqueda de dominio, un banner de mensaje de bienvenida, un tiempo de espera de ejecución nulo y la sincronización de registro, junto con una VLAN para usuarios generales (VLAN 8).

- Configure los PC1, PC2, PC3 y PC4 de acuerdo con la tabla de direccionamiento.

Figura 10. Configuración PC1

```

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

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

Press '?' to get help.

Executing the startup file

PC1> ip 10.0.113.73/24 10.0.113.1
Checking for duplicate address...
PC1 : 10.0.113.73 255.255.255.0 gateway 10.0.113.1

PC1> ip 2001:db8:acad:113::50/64
PC1 : 2001:db8:acad:113::50/64

PC1> show ip
NAME       : PC1[1]
IP/MASK    : 10.0.113.73/24
GATEWAY    : 10.0.113.1
DNS        :
MAC        : 00:50:79:66:68:03
I/PORT     : 20050
RHOST:PORT : 127.0.0.1:20051
MTU        : 1500

```

Figura 11. Configuración PC2

```

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

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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC2> ip 10.0.213.73/24 10.0.213.1
Checking for duplicate address...
PC2 : 10.0.213.73 255.255.255.0 gateway 10.0.213.1

PC2> ip 2001:db8:acad:213::50/64
PC1 : 2001:db8:acad:213::50/64

PC2>
PC2> show ip
NAME       : PC2[1]
IP/MASK    : 10.0.213.73/24
GATEWAY    : 10.0.213.1
DNS        :
MAC        : 00:50:79:66:68:00
I/PORT     : 20044
RHOST:PORT : 127.0.0.1:20045
MTU        : 1500

```

Figura 12. Configuración PC3

```
PC3
Welcome to Virtual PC Simulator, version 0.8.2
Dedicated to Daling.
Build time: Aug 23 2021 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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

Press '?' to get help.

Executing the startup file

PC3> ip 10.0.108.73/24 10.0.108.1
Checking for duplicate address...
PC3 : 10.0.108.73 255.255.255.0 gateway 10.0.108.1

PC3> ip 2001:db8:acad:108::50/64
PC1 : 2001:db8:acad:108::50/64

PC3> show ip
NAME      : PC3[1]
IP/MASK   : 10.0.108.73/24
GATEWAY   : 10.0.108.1
DNS       :
MAC       : 00:50:79:66:68:01
LPORT    : 20046
RHOST:PORT : 127.0.0.1:20047
MTU       : 1500

PC3>
```

Figura 13. Configuración PC4

```
PC4
Welcome to Virtual PC Simulator, version 0.8.2
Dedicated to Daling.
Build time: Aug 23 2021 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC4> ip 10.0.208.73/24 10.0.208.1
Checking for duplicate address...
PC4 : 10.0.208.73 255.255.255.0 gateway 10.0.208.1

PC4> ip 2001:db8:acad:208::50/64
PC1 : 2001:db8:acad:208::50/64

PC4> show ip
NAME      : PC4[1]
IP/MASK   : 10.0.208.73/24
GATEWAY   : 10.0.208.1
DNS       :
MAC       : 00:50:79:66:68:02
LPORT    : 20048
RHOST:PORT : 127.0.0.1:20049
MTU       : 1500

PC4>
```

Parte 2: configurar VRF y enrutamiento estático

En esta parte de la evaluación de habilidades, configurará VRF-Lite en los tres enrutadores y las rutas estáticas adecuadas para admitir la accesibilidad de un extremo a otro. Al final de esta parte, R1 debería poder hacer ping a R3 en cada VRF.

Sus tareas de configuración son las siguientes:

Tabla 2. Especificaciones de configuración VRF.

Task#	Task	Specification
2.1	On R1, R2, and R3, configure VRFLite VRFs as shown in the topology diagram.	Configure two VRFs: <ul style="list-style-type: none"> • General-Users • Special-Users The VRFs must support IPv4 and IPv6.
2.2	On R1, R2, and R3, configure IPv4 and IPv6 interfaces on each VRF as detailed in the addressing table above.	All routers will use Router-On-A-Stick on their G0/0/1.x interfaces to support separation of the VRFs. Sub-interface 1: <ul style="list-style-type: none"> • In the Special Users VRF • Use dot1q encapsulation 13 • IPv4 and IPv6 GUA and link-local addresses • Enable the interfaces Sub-interface 2: <ul style="list-style-type: none"> • In the General Users VRF • Use dot1q encapsulation 8 • IPv4 and IPv6 GUA and link-local addresses • Enable the interfaces
2.3	On R1 and R3, configure default static routes pointing to R2.	Configure VRF static routes for both IPv4 and IPv6 in both VRFs.
2.4	Verify connectivity in each VRF.	From R1, verify connectivity to R3: <ul style="list-style-type: none"> • ping vrf General-Users 10.0.208.1 • ping vrf General-Users 2001:db8:acad:208::1 • ping vrf Special-Users 10.0.213.1 • ping vrf Special-Users 2001:db8:acad:213::1

2.1. On R1, R2, and R3, configure VRFLite VRFs as shown in the topology diagram.

Configure two VRFs:

- General-Users
- Special-Users

The VRFs must support IPv4 and IPv6.

R1

```
config t
vrf definition Special-Users
address-family ipv4
address-family ipv6
exit
vrf definition General-Users
address-family ipv4
address-family ipv6
exit
show ip vrf int
```

Figura 14. Verificación configuración R1

```
R1#
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#vrf definition Special-Users
R1(config-vrf)#address-family ipv4
R1(config-vrf-af)#address-family ipv6
R1(config-vrf-af)#exit
R1(config-vrf)#vrf definition General-Users
R1(config-vrf)#address-family ipv4
R1(config-vrf-af)#address-family ipv6
R1(config-vrf-af)#exit
R1(config-vrf)#wr
R1(config-vrf)#wr
^
% Invalid input detected at '^' marker.

R1(config-vrf)#wr
R1(config-vrf)#exit
R1(config)#exit
R1#
*Mar 31 03:05:26.831: %SYS-5-CONFIG_I: Configured from console by console
R1#show ip vrf int
Interface          IP-Address      VRF              Protocol
R1#
```

R2

```
config t
vrf definition Special-Users
address-family ipv4
address-family ipv6
exit
vrf definition General-Users
address-family ipv4
address-family ipv6
exit
show ip vrf int
```

Figura 15. Verificación configuración R2

```
R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#vrf definition Special-Users
R2(config-vrf)#address-family ipv4
R2(config-vrf-af)#address-family ipv6
R2(config-vrf-af)#exit
R2(config-vrf)#vrf definition General-Users
R2(config-vrf)#address-family ipv4
R2(config-vrf-af)#address-family ipv6
R2(config-vrf-af)#exit
R2(config-vrf)#exit
R2(config)#show ip vrf int
      ^
% Invalid input detected at '^' marker.

R2(config)#exit
R2#show ip vrf int
*Mar 31 03:13:59.083: %SYS-5-CONFIG_I: Configured from console by console
R2#show ip vrf int
Interface                IP-Address      VRF              Protocol
R2#
```

R3

```
config t
vrf definition Special-Users
address-family ipv4
address-family ipv6
exit
vrf definition General-Users
address-family ipv4
address-family ipv6
exit
show ip vrf int
```

Figura 16. Verificación configuración R3

```
R3#
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#vrf definition Special-Users
R3(config-vrf)#address-family ipv4
R3(config-vrf-af)#address-family ipv6
R3(config-vrf-af)#exit
R3(config-vrf)#vrf definition General-Users
R3(config-vrf)#address-family ipv4
R3(config-vrf-af)#address-family ipv6
R3(config-vrf-af)#exit
R3(config-vrf)#exit
R3(config)#exit
R3#
*Mar 31 03:20:13.111: %SYS-5-CONFIG_I: Configured from console by console
R3#show ip vrf int
Interface          IP-Address      VRF              Protocol
-----
R3#
```

2.2 On R1, R2, and R3, configure IPv4 and IPv6 interfaces on each VRF as detailed in the addressing table above.

All routers will use Router-On-A-Stick on their G0/0/1.x interfaces to support separation of the VRFs. Sub-interface 1:

- In the Special Users VRF
- Use dot1q encapsulation 13
- IPv4 and IPv6 GUA and link-local addresses
- Enable the interfaces

Sub-interface 2:

- In the General Users VRF
- Use dot1q encapsulation 8
- IPv4 and IPv6 GUA and link-local addresses
- Enable the interfaces

R1

```
interface f0/0
no shutdown
int e1/0.1
encapsulation dot1Q 13
vrf forwarding Special-Users
ip address 10.0.12.7 255.255.255.0
ipv6 address fe80::1:1 link-local
ipv6 address 2001:db8:acad:12::1/64
no shutdown
exit
int e1/0.2
encapsulation dot1Q 8
vrf forwarding General-Users
ip address 10.0.12.7 255.255.255.0
```

```

ipv6 address 2001:db8:acad:12::1/64
ipv6 address fe80::1:2 link-local
no shutdown
exit
int e1/0
no shutdown
int e1/1.1
encapsulation dot1Q 13
vrf forwarding Special-Users
ip address 10.0.113.7 255.255.255.0
ipv6 address 2001:db8:acad:113::1/64
ipv6 address fe80::1:3 link-local
no shutdown
exit
int e1/1.2
encapsulation dot1Q 8
vrf forward General-Users
ip address 10.0.108.7 255.255.255.0
ipv6 address 2001:db8:acad:108::1/64
ipv6 address fe80::1:4 link-local
no shutdown
exit

```

Figura 17. Configuración de interfaces R1

```

R1
R1#show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
FastEthernet0/0 unassigned      YES NVRAM  administratively down down
Ethernet1/0     unassigned      YES NVRAM  administratively down down
Ethernet1/1     unassigned      YES NVRAM  administratively down down
Ethernet1/2     unassigned      YES NVRAM  administratively down down
Ethernet1/3     unassigned      YES NVRAM  administratively down down
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface fa0/0
R1(config-if)#no shutdown
R1(config-if)#
Mar 31 19:31:49.279: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R1(config-if)#int e1/0.1
R1(config-subif)#encapsulation dot1Q 13
R1(config-subif)#vrf forwarding Special-Users
R1(config-subif)#ip address 10.0.113.7 255.255.255.0
R1(config-subif)#ipv6 address fe80::1:1 link-local
R1(config-subif)#ipv6 address 2001:db8:acad:12::1/64
R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config)#
R1(config)#
R1(config)#int e1/0.2
R1(config-subif)#encapsulation dot1Q 8
R1(config-subif)#vrf forwarding General-Users
R1(config-subif)#ip address 10.0.108.7 255.255.255.0
R1(config-subif)#ipv6 address 2001:db8:acad:108::1/64
R1(config-subif)#ipv6 address fe80::1:2 link-local
R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config)#int e1/0
R1(config-if)#no shutdown
R1(config-if)#
Mar 31 20:04:00.290: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
Mar 31 20:04:00.267: %INEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R1(config-if)#int e1/1.1
R1(config-subif)#encapsulation dot1Q 13
R1(config-subif)#vrf forwarding Special-Users
R1(config-subif)#ip address 10.0.113.7 255.255.255.0
R1(config-subif)#ipv6 address 2001:db8:acad:113::1/64
R1(config-subif)#ipv6 address fe80::1:3 link-local
R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config)#int e1/1.2
R1(config-subif)#encapsulation dot1Q 8
R1(config-subif)#vrf forward General-Users
R1(config-subif)#
R1(config-subif)#ip address 10.0.108.7 255.255.255.0
R1(config-subif)#ipv6 address 2001:db8:acad:108::1/64
R1(config-subif)#ipv6 address fe80::1:4 link-local
R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config)#exit
R1#

```

R2

```
interface f0/0
no shutdown
int e1/0.1
encapsulation dot1Q 13
vrf forwarding Special-Users
ip address 10.0.12.3 255.255.255.0
ipv6 address fe80::2:1 link-local
ipv6 address 2001:db8:acad:12::2/64
no shutdown
exit
int e1/0.2
encapsulation dot1Q 8
vrf forwarding General-Users
ip address 10.0.12.3 255.255.255.0
ipv6 address 2001:db8:acad:12::2/64
ipv6 address fe80::2:2 link-local
no shutdown
exit
int e1/0
no shutdown
int e1/1.1
encapsulation dot1Q 13
vrf forwarding Special-Users
ip address 10.0.23.3 255.255.255.0
ipv6 address 2001:db8:acad:23::2/64
ipv6 address fe80::2:3 link-local
no shutdown
exit
int e1/1.2
encapsulation dot1Q 8
vrf forward General-Users
ip address 10.0.23.3 255.255.255.0
ipv6 address 2001:db8:acad:23::2/64
ipv6 address fe80::2:4 link-local
no shutdown
exit
```

Figura 18. Configuración de interfaces R2

```
R2
Ethernet1/1      unassigned    YES INVRAM  administratively down down
Ethernet1/2      unassigned    YES INVRAM  administratively down down
Ethernet1/3      unassigned    YES INVRAM  administratively down down
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
R2(config)#interface f0/0
R2(config-if)#no shutdown
R2(config-if)#
*Mar 31 20:11:50.291: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R2(config-if)#int e1/0.1
R2(config-subif)#encapsulation dot1Q 13
R2(config-subif)#vrf forwarding Special-Users
R2(config-subif)#ip address 10.0.12.3 255.255.255.0
R2(config-subif)#ipv6 address fe80::2:1 link-local
R2(config-subif)#ipv6 address 2001:db8:acad:12::2/64
R2(config-subif)#no shutdown
R2(config-subif)#exit
R2(config)#
R2(config)#int e1/0.2
R2(config-subif)#encapsulation dot1Q 8
R2(config-subif)#vrf forwarding General-Users
R2(config-subif)#ip address 10.0.12.3 255.255.255.0
R2(config-subif)#ipv6 address 2001:db8:acad:12::2/64
R2(config-subif)#ipv6 address fe80::2:2 link-local
R2(config-subif)#no shutdown
R2(config-subif)#exit
R2(config)#int e1/0
R2(config-if)#no shutdown
R2(config-if)#
*Mar 31 20:23:46.363: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Mar 31 20:23:47.363: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R2(config-if)#int e1/1.1
R2(config-subif)#encapsulation dot1Q 13
R2(config-subif)#vrf forwarding Special-Users
R2(config-subif)#ip address 10.0.23.3 255.255.255.0
R2(config-subif)#ipv6 address 2001:db8:acad:23::2/64
R2(config-subif)#ipv6 address fe80::3 link-local
R2(config-subif)#no shutdown
R2(config-subif)#exit
R2(config)#int e1/1.2
R2(config-subif)#encapsulation dot1Q 8
R2(config-subif)#sulation dot1Q 8
^
% Invalid input detected at '^' marker.
R2(config-subif)#R2(config-subif)#
^
% Invalid input detected at '^' marker.
R2(config-subif)#vrf forward General-Users
R2(config-subif)#ip address 10.0.23.3 255.255.255.0
R2(config-subif)#ipv6 address 2001:db8:acad:23::3/64
R2(config-subif)#ipv6 address fe80::2:4 link-local
R2(config-subif)#no shutdown
R2(config-subif)#exit
R2(config)#
```

R3

```
interface f0/0
no shutdown
int e1/0.1
encapsulation dot1Q 13
vrf forwarding Special-Users
ip address 10.0.23.1 255.255.255.0
ipv6 address fe80::3:1 link-local
ipv6 address 2001:db8:acad:23::3/64
no shutdown
exit
int e1/0.2
encapsulation dot1Q 8
vrf forwarding General-Users
ip address 10.0.23.1 255.255.255.0
ipv6 address 2001:db8:acad:23::3/64
ipv6 address fe80::3:2 link-local
no shutdown
exit
```

```

int e1/0
no shutdown
int e1/1.1
encapsulation dot1Q 13
vrf forwarding Special-Users
ip address 10.0.213.1 255.255.255.0
ipv6 address 2001:db8:acad:213::1/64
ipv6 address fe80::3:3 link-local
no shutdown
exit
int e1/1.2
encapsulation dot1Q 8
vrf forward General-Users
ip address 10.0.108.1 255.255.255.0
ipv6 address 2001:db8:acad:208::1/64
ipv6 address fe80::3:4 link-local
no shutdown
exit

```

Figura 19. Configuración de interfaces R3

```

R3
*Mar 31 19:08:50.215: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to down
*Mar 31 19:08:50.223: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to dow R3, ENCOR Skills Assessment, Scenario 2
R3#
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface f0/0
R3(config-if)#no shutdown
R3(config-if)#
*Mar 31 20:36:37.703: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R3(config-if)#int e1/0.1
R3(config-subif)#encapsulation dot1Q 13
R3(config-subif)#vrf forwarding Special-Users
R3(config-subif)#ip address 10.0.23.1 255.255.255.0
R3(config-subif)#
R3(config-subif)#ipv6 address fe80::3:1 link-local
R3(config-subif)#ipv6 address 2001:db8:acad:23::3/64
R3(config-subif)#no shutdown
R3(config-subif)#exit
R3(config)#int e1/0.2
R3(config-subif)#encapsulation dot1Q 8
R3(config-subif)#
R3(config-subif)#vrf forwarding General-Users
R3(config-subif)#ip address 10.0.23.1 255.255.255.0
R3(config-subif)#ipv6 address 2001:db8:acad:23::3/64
R3(config-subif)#ipv6 address fe80::3:2 link-local
R3(config-subif)#no shutdown
R3(config-subif)#exit
R3(config)#int e1/0
R3(config-if)#no shutdown
R3(config-if)#
*Mar 31 20:39:55.519: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Mar 31 20:39:56.519: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R3(config-if)#int e1/1.1
R3(config-subif)#encapsulation dot1Q 13
R3(config-subif)#
R3(config-subif)#
R3(config-subif)#vrf forwarding Special-Users
R3(config-subif)#ip address 10.0.213.1 255.255.255.
% Incomplete command.
R3(config-subif)#ip address 10.0.213.1 255.255.255.0
R3(config-subif)#ipv6 address 2001:db8:acad:213::1/64
R3(config-subif)#
R3(config-subif)#ipv6 address fe80::3:3 link-local
R3(config-subif)#no shutdown
R3(config-subif)#exit
R3(config)#int e1/1.2
R3(config-subif)#encapsulation dot1Q 8
R3(config-subif)#vrf forward General-Users
R3(config-subif)#ip address 10.0.108.1 255.255.255.0
R3(config-subif)#ipv6 address 2001:db8:acad:208::1/64
R3(config-subif)#ipv6 address fe80::3:4 link-local
R3(config-subif)#no shutdown
R3(config-subif)#exit
R3(config)#

```

2.3 On R1 and R3, configure default static routes pointing to R2.

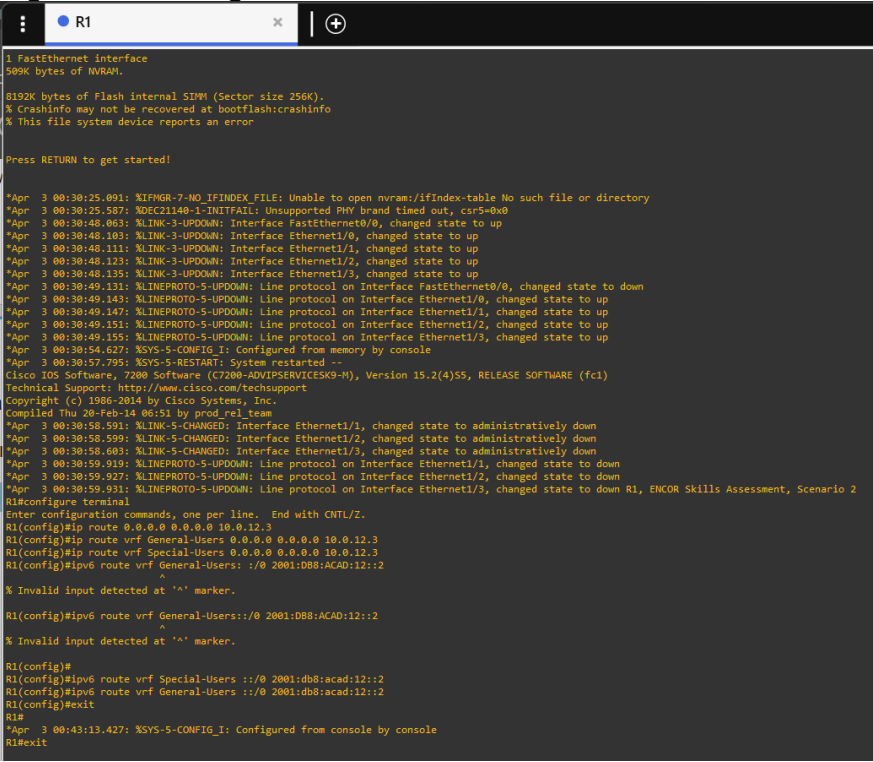
- Configure VRF static routes for both IPv4 and IPv6 in both VRFs.

R1

config t

```
ip route 0.0.0.0 0.0.0.0 10.0.12.3
ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.12.3
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.12.3
ipv6 route vrf General-Users::/0 2001:DB8:ACAD:12::2
ipv6 route vrf Special-Users::/0 2001:DB8:ACAD:12::2
exit
```

Figura 20. Configuración de rutas estáticas R1.



```
1 FastEthernet interface
509K bytes of NVRAM.

8192K bytes of Flash internal SIMM (Sector size 256K).
X Crashinfo may not be recovered at bootflash:crashinfo
X This file system device reports an error

Press RETURN to get started!

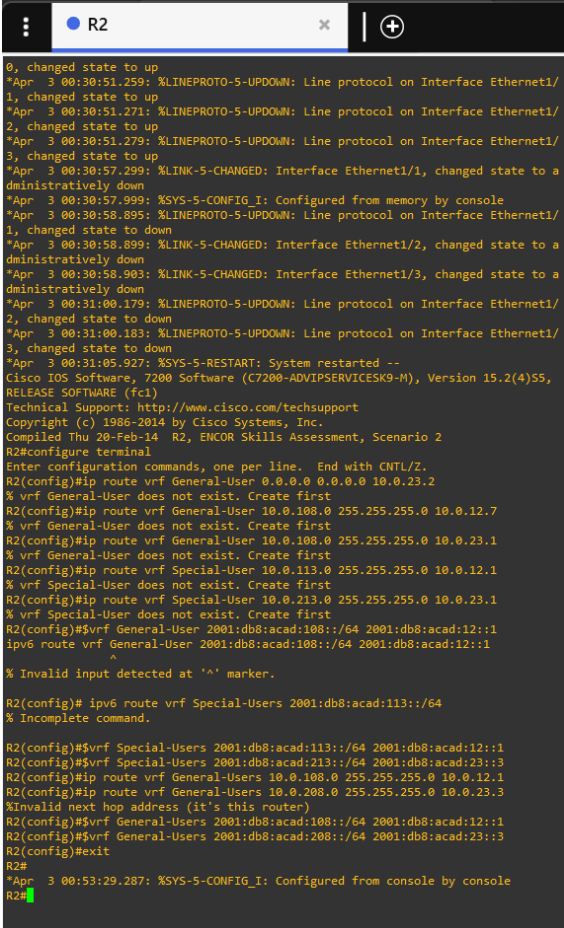
*Apr 3 00:30:25.507: %NOC21140-1-INITFAIL: Unsupported PHY brand timed out, cs:5=0x0
*Apr 3 00:30:48.063: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Apr 3 00:30:48.103: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Apr 3 00:30:48.111: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
*Apr 3 00:30:48.123: %LINK-3-UPDOWN: Interface Ethernet1/2, changed state to up
*Apr 3 00:30:48.133: %LINK-3-UPDOWN: Interface Ethernet1/3, changed state to up
*Apr 3 00:30:49.131: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down
*Apr 3 00:30:49.143: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
*Apr 3 00:30:49.147: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
*Apr 3 00:30:49.151: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to up
*Apr 3 00:30:49.155: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to up
*Apr 3 00:30:54.627: %SYS-5-CONFIG_I: Configured from memory by console
*Apr 3 00:30:57.795: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)5S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 20-Feb-14 06:51 by prod_rel_team
*Apr 3 00:30:58.591: %LINK-5-CHANGED: Interface Ethernet1/1, changed state to administratively down
*Apr 3 00:30:58.599: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to administratively down
*Apr 3 00:30:59.603: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to administratively down
*Apr 3 00:30:59.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to down
*Apr 3 00:30:59.927: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to down
*Apr 3 00:30:59.931: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to down R1
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip route 0.0.0.0 0.0.0.0 10.0.12.3
R1(config)#ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.12.3
R1(config)#ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.12.3
R1(config)#ipv6 route vrf General-Users ::/0 2001:DB8:ACAD:12::2
R1(config)#
% Invalid input detected at '^' marker.
R1(config)#ipv6 route vrf General-Users ::/0 2001:DB8:ACAD:12::2
R1(config)#
% Invalid input detected at '^' marker.
R1(config)#
R1(config)#ipv6 route vrf Special-Users ::/0 2001:db8:acad:12::2
R1(config)#ipv6 route vrf General-Users ::/0 2001:db8:acad:12::2
R1(config)#exit
R1#
*Apr 3 00:43:13.427: %SYS-5-CONFIG_I: Configured from console by console
R1#exit
```

R2

config t

```
ip route vrf General-User 10.0.108.0 255.255.255.0 10.0.12.7
ip route vrf General-User 10.0.108.0 255.255.255.0 10.0.23.1
ip route vrf Special-User 10.0.113.0 255.255.255.0 10.0.12.1
ip route vrf Special-User 10.0.213.0 255.255.255.0 10.0.23.1
ipv6 route vrf General-User 2001:db8:acad:108::/64 2001:db8:acad:12::1
ipv6 route vrf General-User 2001:db8:acad:208::/64 2001:db8:acad:23::3
ipv6 route vrf Special-User 2001:db8:acad:113::/64 2001:db8:acad:12::1
ipv6 route vrf Special-User 2001:db8:acad:213::/64 2001:db8:acad:23::3
exit
```

Figura 21. Configuración de rutas estáticas R2.



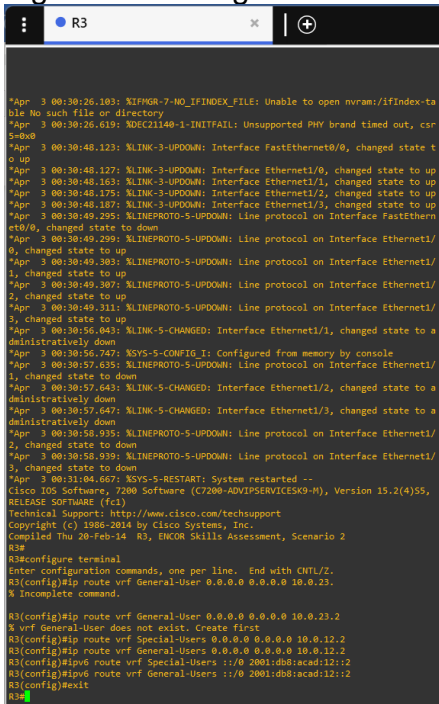
```
R2
0, changed state to up
*Apr 3 00:30:51.259: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
1, changed state to up
*Apr 3 00:30:51.271: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to up
*Apr 3 00:30:51.279: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
3, changed state to up
*Apr 3 00:30:57.299: %LINK-5-CHANGED: Interface Ethernet1/1, changed state to a
dministratively down
*Apr 3 00:30:57.999: %SYS-5-CONFIG_I: Configured from memory by console
*Apr 3 00:30:58.895: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
1, changed state to down
*Apr 3 00:30:58.899: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to a
dministratively down
*Apr 3 00:30:58.903: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to a
dministratively down
*Apr 3 00:31:00.179: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to down
*Apr 3 00:31:00.183: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
3, changed state to down
*Apr 3 00:31:05.927: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)5S,
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
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Compiled Thu 20-Feb-14 R2, ENCOR Skills Assessment, Scenario 2
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip route vrf General-User 0.0.0.0 0.0.0.0 10.0.23.2
% vrf General-User does not exist. Create first
R2(config)#ip route vrf General-User 10.0.108.0 255.255.255.0 10.0.12.7
% vrf General-User does not exist. Create first
R2(config)#ip route vrf General-User 10.0.108.0 255.255.255.0 10.0.23.1
% vrf General-User does not exist. Create first
R2(config)#ip route vrf Special-User 10.0.113.0 255.255.255.0 10.0.12.1
% vrf Special-User does not exist. Create first
R2(config)#ip route vrf Special-User 10.0.213.0 255.255.255.0 10.0.23.1
% vrf Special-User does not exist. Create first
R2(config)#%vrf General-User 2001:db8:acad:108::/64 2001:db8:acad:12::1
ipv6 route vrf General-User 2001:db8:acad:108::/64 2001:db8:acad:12::1
^
% Invalid input detected at '^' marker.
R2(config)# ipv6 route vrf Special-Users 2001:db8:acad:113::/64
% Incomplete command.
R2(config)#%vrf Special-Users 2001:db8:acad:113::/64 2001:db8:acad:12::1
R2(config)#%vrf Special-Users 2001:db8:acad:213::/64 2001:db8:acad:23::3
R2(config)#ip route vrf General-Users 10.0.108.0 255.255.255.0 10.0.12.1
R2(config)#ip route vrf General-Users 10.0.208.0 255.255.255.0 10.0.23.3
%Invalid next hop address (it's this router)
R2(config)#%vrf General-Users 2001:db8:acad:108::/64 2001:db8:acad:12::1
R2(config)#%vrf General-Users 2001:db8:acad:208::/64 2001:db8:acad:23::3
R2(config)#exit
R2#
*Apr 3 00:53:29.287: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

R3

config t

```
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.12.2
ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.12.2
ipv6 route vrf Special-Users ::/0 2001:db8:acad:12::2
ipv6 route vrf General-Users ::/0 2001:db8:acad:12::2
exit
```

Figura 22. Configuración de rutas estáticas R3.

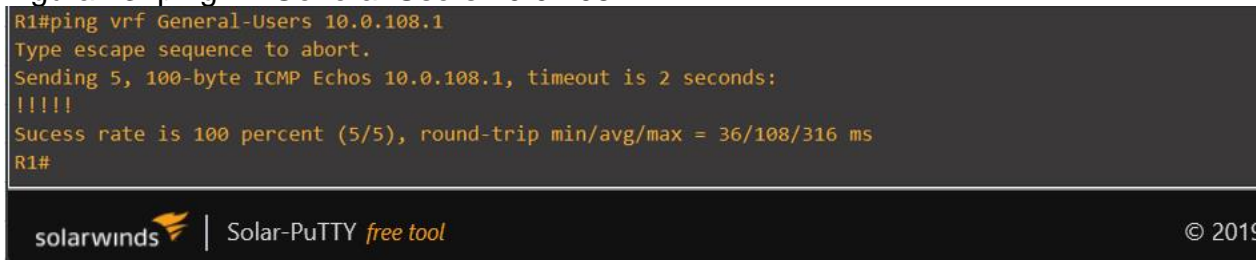


```
R3
*Apr  3 00:30:26.103: XIFMGR-7-NO_IFINDEX_FILE: Unable to open nvram:/ifIndex-ta
ble No such file or directory
*Apr  3 00:30:26.619: MDCC1140-1-INITFAIL: Unsupported PHY brand timed out, csr
5=0x8
*Apr  3 00:30:48.123: XLINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Apr  3 00:30:48.127: XLINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Apr  3 00:30:48.163: XLINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
*Apr  3 00:30:48.175: XLINK-3-UPDOWN: Interface Ethernet1/2, changed state to up
*Apr  3 00:30:48.187: XLINK-3-UPDOWN: Interface Ethernet1/3, changed state to up
*Apr  3 00:30:49.295: XLINEPROTO-5-UPDOWN: Line protocol on Interface Fastthern
et0/0, changed state to down
*Apr  3 00:30:49.299: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
0, changed state to up
*Apr  3 00:30:49.303: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
1, changed state to up
*Apr  3 00:30:49.307: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to up
*Apr  3 00:30:49.311: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
3, changed state to up
*Apr  3 00:30:56.043: XLINK-5-CHANGED: Interface Ethernet1/1, changed state to a
dministratively down
*Apr  3 00:30:56.747: XSYS-5-CONFIG_I: Configured from memory by console
*Apr  3 00:30:57.635: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
1, changed state to down
*Apr  3 00:30:57.643: XLINK-5-CHANGED: Interface Ethernet1/2, changed state to a
dministratively down
*Apr  3 00:30:57.647: XLINK-5-CHANGED: Interface Ethernet1/3, changed state to a
dministratively down
*Apr  3 00:30:58.935: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to down
*Apr  3 00:30:58.939: XLINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
3, changed state to down
*Apr  3 00:31:04.057: XSYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)5S,
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
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Compiled Thu 20-Feb-14  R3, ENCOR Skills Assessment, Scenario 2
R3#
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip route vrf General-User 0.0.0.0 0.0.0.0 10.0.23.2
% Incomplete command.
R3(config)#ip route vrf General-User 0.0.0.0 0.0.0.0 10.0.23.2
% vrf General-User does not exist. Create first
R3(config)#ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.12.2
R3(config)#ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.12.2
R3(config)#ipv6 route vrf Special-Users ::/0 2001:db8:acad:12::2
R3(config)#ipv6 route vrf General-Users ::/0 2001:db8:acad:12::2
R3(config)#exit
R3#
```

2.4 Verify connectivity in each VRF

From R1, verify connectivity to R3:

Figura 23. ping vrf General-Users 10.0.108.1



```
R1#ping vrf General-Users 10.0.108.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.108.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/108/316 ms
R1#
```

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Figura 24. ping vrf General-Users 2001:db8:acad:208::1

```
R1#ping vrf General-Users 2001:db8:acad:208::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos 2001:db8:acad:208::1, timeout is 2 seconds:
!!!!
Sucess rate is 100 percent (5/5), round-trip min/avg/max = 56/57/64 ms
R1#
```

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Figura 25. ping vrf Special-Users 10.0.23.1

```
R1#ping vrf Special-Users 10.0.23.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos 10.0.23.1, timeout is 2 seconds:
!!!!
Sucess rate is 100 percent (5/5), round-trip min/avg/max = 56/59/64 ms
R1#
```

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Figura 26. ping vrf Special-Users 2001:db8:acad:213::1

```
R1#ping vrf Special-Users 2001:db8:acad:213::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos 2001:db8:acad:213::1, timeout is 2 seconds:
!!!!
Sucess rate is 100 percent (5/5), round-trip min/avg/max = 48/53/56 ms
R1#
```

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Parte 3. Configurar Capa 2

En esta parte, tendrá que configurar los Switches para soportar la conectividad con los dispositivos finales. Las tareas de configuración, son las siguientes:

Tabla 3. Especificaciones configuración capa 2.

TASK #	TASK	SPECIFICATION
3.1	On D1, D2, and A1, disable all interfaces.	On D1 and D2, shutdown G1/0/1 to G1/0/24. On A1, shutdown F0/1 – F0/24, G0/1 – G0/2.
3.2	On D1 and D2, configure the trunk links to R1 and R3.	Configure and enable the G1/0/11 link as a trunk link.
3.3	On D1 and A1, configure the EtherChannel.	On D1, configure and enable: <ul style="list-style-type: none"> • Interface G1/0/5 and G1/0/6 • Port Channel 1 using PAgP On A1, configure enable: <ul style="list-style-type: none"> • Interface F0/1 and F0/2 • Port Channel 1 using PAgP
3.4	On D1, D2, and A1, configure access ports for PC1, PC2, PC3, and PC4.	Configure and enable the access ports as follows: <ul style="list-style-type: none"> • On D1, configure interface G1/0/23 as an access port in VLAN 13 and enable Portfast. • On D2, configure interface G1/0/23 as an access port in VLAN 13 and enable Portfast. • On D2, configure interface G1/0/24 as an access port in VLAN 8 and enable Portfast. • On A1, configure interface F0/23 as an access port in VLAN 8 and enable Portfast.
3.5	Verify PC to PC connectivity.	From PC1, verify IPv4 and IPv6 connectivity to PC2. From PC3, verify IPv4 and IPv6 connectivity to PC4.

3.1. En D1, D2 y A1, desactive todas las interfaces.

La tarea 3.1 indica que se debe deshabilitar las interfaces en los switch D1, D2 y A1.

SWITCH D1

Configure terminal

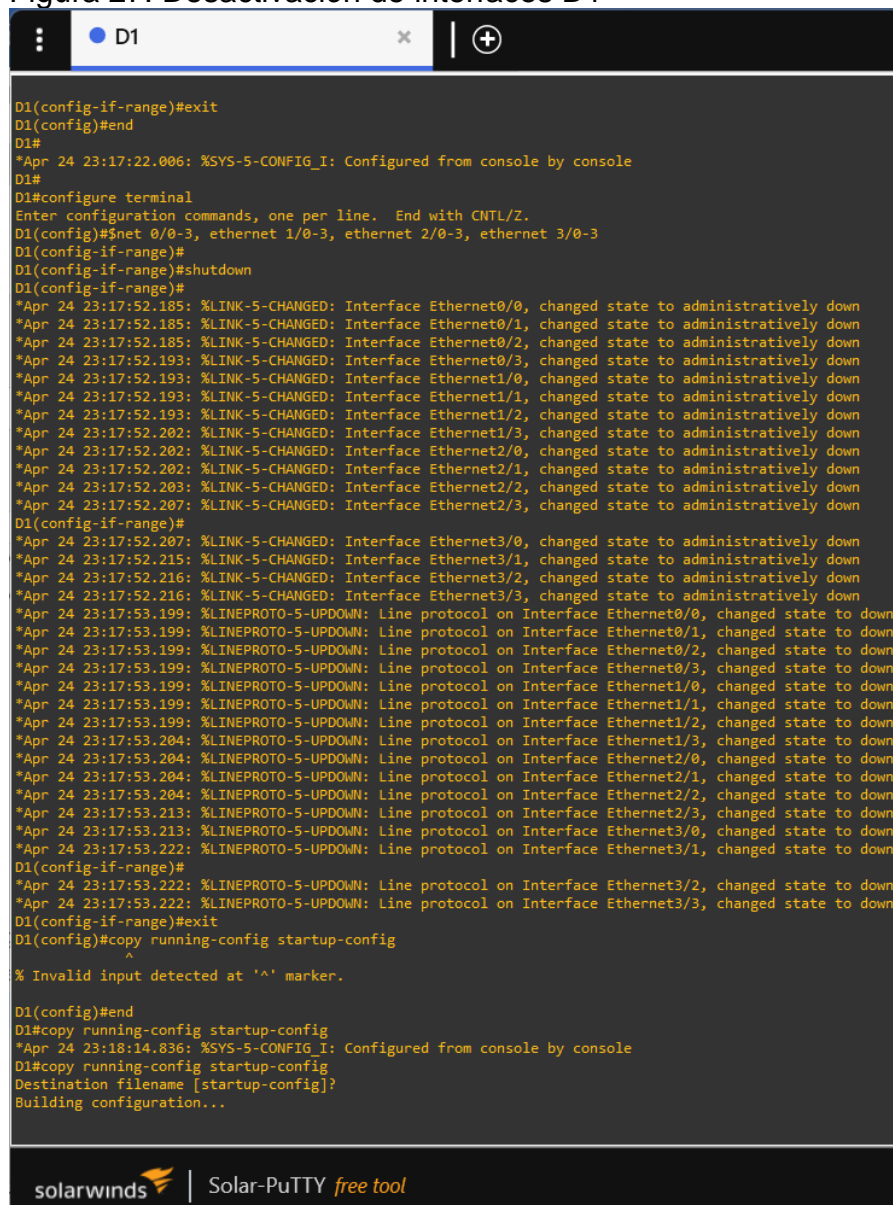
interface range ethernet 0/0-3, ethernet 1/0-3, ethernet 2/0-3, ethernet 3/0-3

shutdown

exit

copy running-config startup-config

Figura 27. Desactivación de interfaces D1



```
D1(config-if-range)#exit
D1(config)#end
D1#
*Apr 24 23:17:22.006: %SYS-5-CONFIG_I: Configured from console by console
D1#
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#$net 0/0-3, ethernet 1/0-3, ethernet 2/0-3, ethernet 3/0-3
D1(config-if-range)#
D1(config-if-range)#shutdown
D1(config-if-range)#
*Apr 24 23:17:52.185: %LINK-5-CHANGED: Interface Ethernet0/0, changed state to administratively down
*Apr 24 23:17:52.185: %LINK-5-CHANGED: Interface Ethernet0/1, changed state to administratively down
*Apr 24 23:17:52.185: %LINK-5-CHANGED: Interface Ethernet0/2, changed state to administratively down
*Apr 24 23:17:52.193: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to administratively down
*Apr 24 23:17:52.193: %LINK-5-CHANGED: Interface Ethernet1/0, changed state to administratively down
*Apr 24 23:17:52.193: %LINK-5-CHANGED: Interface Ethernet1/1, changed state to administratively down
*Apr 24 23:17:52.193: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to administratively down
*Apr 24 23:17:52.202: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to administratively down
*Apr 24 23:17:52.202: %LINK-5-CHANGED: Interface Ethernet2/0, changed state to administratively down
*Apr 24 23:17:52.202: %LINK-5-CHANGED: Interface Ethernet2/1, changed state to administratively down
*Apr 24 23:17:52.203: %LINK-5-CHANGED: Interface Ethernet2/2, changed state to administratively down
*Apr 24 23:17:52.207: %LINK-5-CHANGED: Interface Ethernet2/3, changed state to administratively down
D1(config-if-range)#
*Apr 24 23:17:52.207: %LINK-5-CHANGED: Interface Ethernet3/0, changed state to administratively down
*Apr 24 23:17:52.215: %LINK-5-CHANGED: Interface Ethernet3/1, changed state to administratively down
*Apr 24 23:17:52.216: %LINK-5-CHANGED: Interface Ethernet3/2, changed state to administratively down
*Apr 24 23:17:52.216: %LINK-5-CHANGED: Interface Ethernet3/3, changed state to administratively down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to down
*Apr 24 23:17:53.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to down
*Apr 24 23:17:53.204: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to down
*Apr 24 23:17:53.204: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/0, changed state to down
*Apr 24 23:17:53.204: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/1, changed state to down
*Apr 24 23:17:53.204: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/2, changed state to down
*Apr 24 23:17:53.213: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/3, changed state to down
*Apr 24 23:17:53.213: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/0, changed state to down
*Apr 24 23:17:53.222: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/1, changed state to down
D1(config-if-range)#
*Apr 24 23:17:53.222: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/2, changed state to down
*Apr 24 23:17:53.222: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/3, changed state to down
D1(config-if-range)#exit
D1(config)#copy running-config startup-config
^
% Invalid input detected at '^' marker.
D1(config)#end
D1#copy running-config startup-config
*Apr 24 23:18:14.836: %SYS-5-CONFIG_I: Configured from console by console
D1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
```

SWITCH D2

Configure terminal

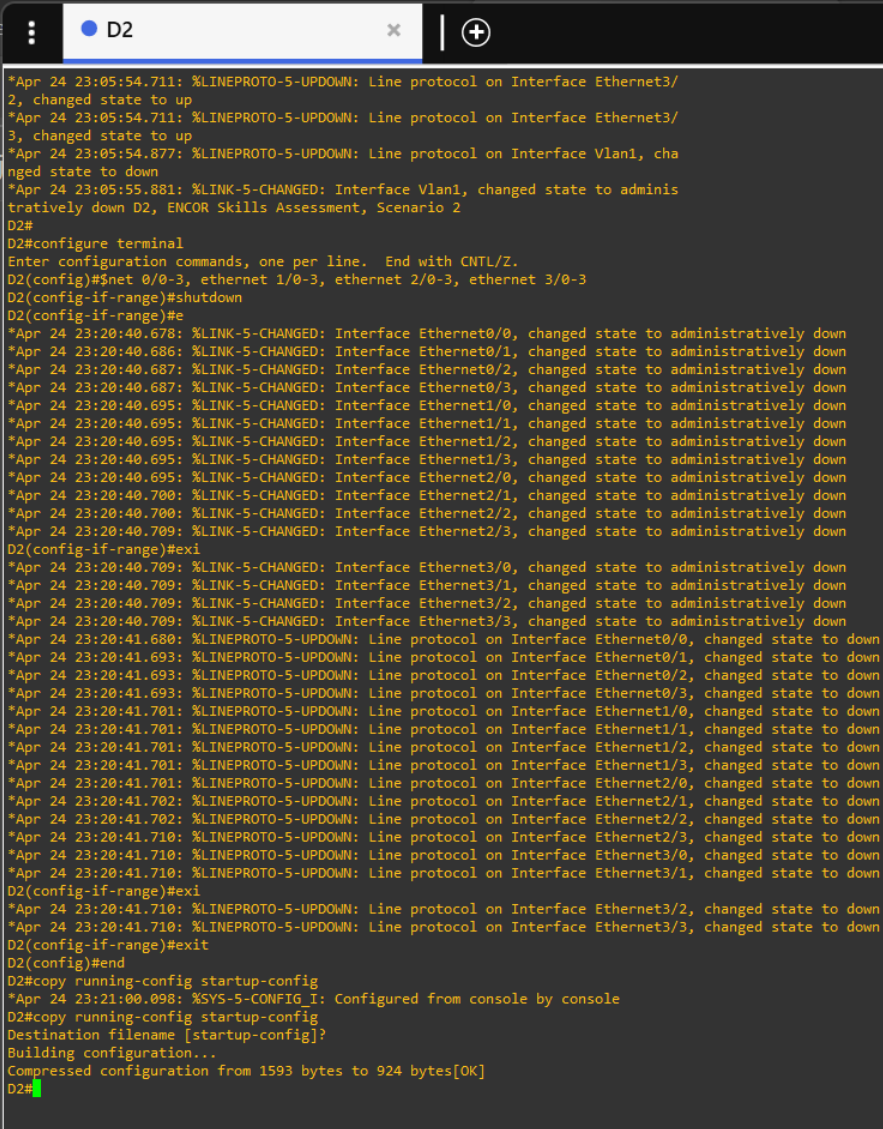
interface range ethernet 0/0-3, ethernet 1/0-3, ethernet 2/0-3, ethernet 3/0-3

shutdown

exit

copy running-config startup-config

Figura 28. Desactivación de interfaces D2



```
D2
*Apr 24 23:05:54.711: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/2, changed state to up
*Apr 24 23:05:54.711: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/3, changed state to up
*Apr 24 23:05:54.877: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down
*Apr 24 23:05:55.881: %LINK-5-CHANGED: Interface Vlan1, changed state to administratively down D2, ENCOR Skills Assessment, Scenario 2
D2#
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#int 0/0-3, ethernet 1/0-3, ethernet 2/0-3, ethernet 3/0-3
D2(config-if-range)#shutdown
D2(config-if-range)#e
*Apr 24 23:20:40.678: %LINK-5-CHANGED: Interface Ethernet0/0, changed state to administratively down
*Apr 24 23:20:40.686: %LINK-5-CHANGED: Interface Ethernet0/1, changed state to administratively down
*Apr 24 23:20:40.687: %LINK-5-CHANGED: Interface Ethernet0/2, changed state to administratively down
*Apr 24 23:20:40.687: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to administratively down
*Apr 24 23:20:40.695: %LINK-5-CHANGED: Interface Ethernet1/0, changed state to administratively down
*Apr 24 23:20:40.695: %LINK-5-CHANGED: Interface Ethernet1/1, changed state to administratively down
*Apr 24 23:20:40.695: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to administratively down
*Apr 24 23:20:40.695: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to administratively down
*Apr 24 23:20:40.695: %LINK-5-CHANGED: Interface Ethernet2/0, changed state to administratively down
*Apr 24 23:20:40.700: %LINK-5-CHANGED: Interface Ethernet2/1, changed state to administratively down
*Apr 24 23:20:40.700: %LINK-5-CHANGED: Interface Ethernet2/2, changed state to administratively down
*Apr 24 23:20:40.709: %LINK-5-CHANGED: Interface Ethernet2/3, changed state to administratively down
D2(config-if-range)#exi
*Apr 24 23:20:40.709: %LINK-5-CHANGED: Interface Ethernet3/0, changed state to administratively down
*Apr 24 23:20:40.709: %LINK-5-CHANGED: Interface Ethernet3/1, changed state to administratively down
*Apr 24 23:20:40.709: %LINK-5-CHANGED: Interface Ethernet3/2, changed state to administratively down
*Apr 24 23:20:40.709: %LINK-5-CHANGED: Interface Ethernet3/3, changed state to administratively down
*Apr 24 23:20:41.680: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to down
*Apr 24 23:20:41.693: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to down
*Apr 24 23:20:41.693: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to down
*Apr 24 23:20:41.693: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to down
*Apr 24 23:20:41.701: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to down
*Apr 24 23:20:41.701: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to down
*Apr 24 23:20:41.701: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to down
*Apr 24 23:20:41.701: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to down
*Apr 24 23:20:41.701: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/0, changed state to down
*Apr 24 23:20:41.702: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/1, changed state to down
*Apr 24 23:20:41.702: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/2, changed state to down
*Apr 24 23:20:41.710: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/3, changed state to down
*Apr 24 23:20:41.710: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/0, changed state to down
*Apr 24 23:20:41.710: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/1, changed state to down
D2(config-if-range)#exi
*Apr 24 23:20:41.710: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/2, changed state to down
*Apr 24 23:20:41.710: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/3, changed state to down
D2(config-if-range)#exit
D2(config)#end
D2#copy running-config startup-config
*Apr 24 23:21:00.098: %SYS-5-CONFIG_I: Configured from console by console
D2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 1593 bytes to 924 bytes[OK]
D2#
```

SWITCH A1

Configure terminal

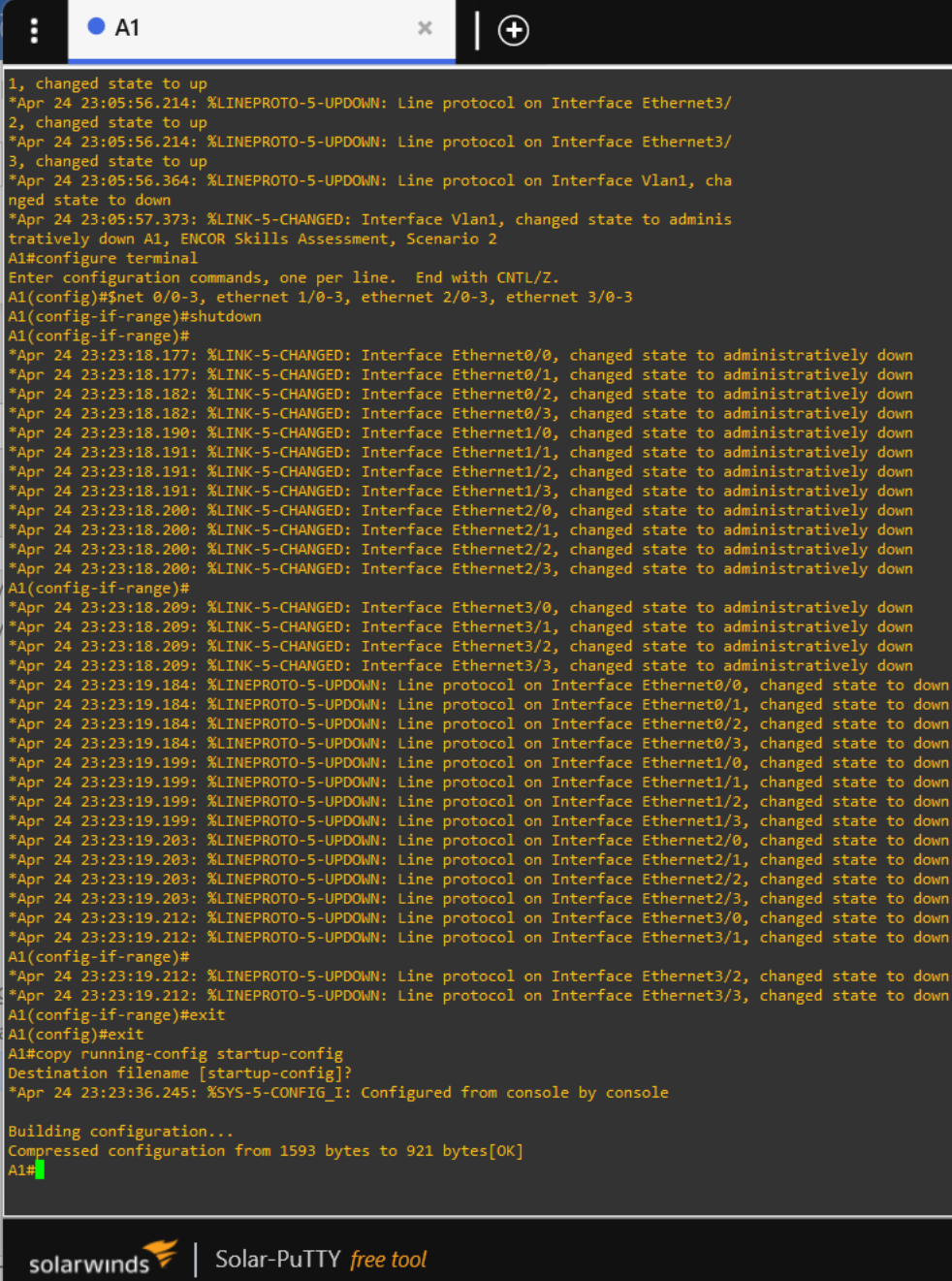
interface range ethernet 0/0-3, ethernet 1/0-3, ethernet 2/0-3, ethernet 3/0-3

shutdown

exit

copy running-config startup-config

Figura 29. Desactivación de interfaces A1



```
A1
1, changed state to up
*Apr 24 23:05:56.214: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
2, changed state to up
*Apr 24 23:05:56.214: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/
3, changed state to up
*Apr 24 23:05:56.364: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, cha
nged state to down
*Apr 24 23:05:57.373: %LINK-5-CHANGED: Interface Vlan1, changed state to adminis
tratively down A1, ENCOR Skills Assessment, Scenario 2
A1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
A1(config)#interface range 0/0-3, ethernet 1/0-3, ethernet 2/0-3, ethernet 3/0-3
A1(config-if-range)#shutdown
A1(config-if-range)#
*Apr 24 23:23:18.177: %LINK-5-CHANGED: Interface Ethernet0/0, changed state to administratively down
*Apr 24 23:23:18.177: %LINK-5-CHANGED: Interface Ethernet0/1, changed state to administratively down
*Apr 24 23:23:18.182: %LINK-5-CHANGED: Interface Ethernet0/2, changed state to administratively down
*Apr 24 23:23:18.182: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to administratively down
*Apr 24 23:23:18.190: %LINK-5-CHANGED: Interface Ethernet1/0, changed state to administratively down
*Apr 24 23:23:18.191: %LINK-5-CHANGED: Interface Ethernet1/1, changed state to administratively down
*Apr 24 23:23:18.191: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to administratively down
*Apr 24 23:23:18.191: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to administratively down
*Apr 24 23:23:18.200: %LINK-5-CHANGED: Interface Ethernet2/0, changed state to administratively down
*Apr 24 23:23:18.200: %LINK-5-CHANGED: Interface Ethernet2/1, changed state to administratively down
*Apr 24 23:23:18.200: %LINK-5-CHANGED: Interface Ethernet2/2, changed state to administratively down
*Apr 24 23:23:18.200: %LINK-5-CHANGED: Interface Ethernet2/3, changed state to administratively down
A1(config-if-range)#
*Apr 24 23:23:18.209: %LINK-5-CHANGED: Interface Ethernet3/0, changed state to administratively down
*Apr 24 23:23:18.209: %LINK-5-CHANGED: Interface Ethernet3/1, changed state to administratively down
*Apr 24 23:23:18.209: %LINK-5-CHANGED: Interface Ethernet3/2, changed state to administratively down
*Apr 24 23:23:18.209: %LINK-5-CHANGED: Interface Ethernet3/3, changed state to administratively down
*Apr 24 23:23:19.184: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to down
*Apr 24 23:23:19.184: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to down
*Apr 24 23:23:19.184: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to down
*Apr 24 23:23:19.184: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to down
*Apr 24 23:23:19.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to down
*Apr 24 23:23:19.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to down
*Apr 24 23:23:19.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to down
*Apr 24 23:23:19.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to down
*Apr 24 23:23:19.203: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/0, changed state to down
*Apr 24 23:23:19.203: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/1, changed state to down
*Apr 24 23:23:19.203: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/2, changed state to down
*Apr 24 23:23:19.203: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/3, changed state to down
*Apr 24 23:23:19.212: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/0, changed state to down
*Apr 24 23:23:19.212: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/1, changed state to down
A1(config-if-range)#
*Apr 24 23:23:19.212: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/2, changed state to down
*Apr 24 23:23:19.212: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/3, changed state to down
A1(config-if-range)#exit
A1(config)#exit
A1#copy running-config startup-config
Destination filename [startup-config]?
*Apr 24 23:23:36.245: %SYS-5-CONFIG_I: Configured from console by console

Building configuration...
Compressed configuration from 1593 bytes to 921 bytes[OK]
A1#
```

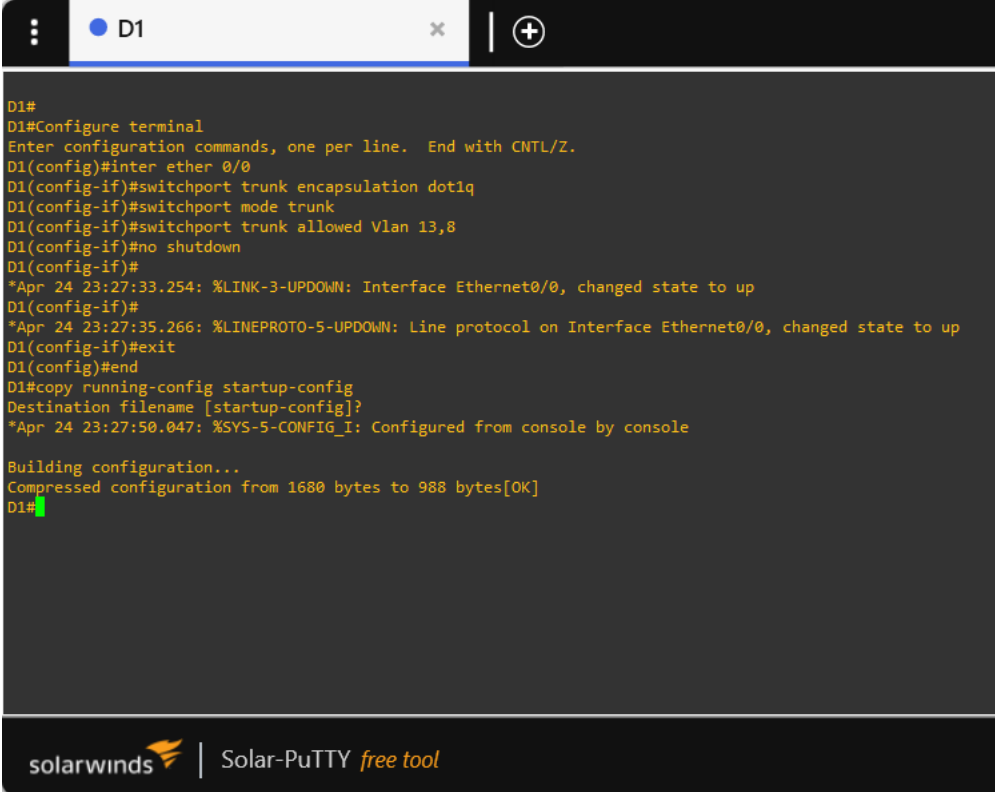
3.2. En D1 y D2, configure los enlaces troncales a R1 y R3.

La tarea 3.2 indica la configuración en D1 y D2 del truncamiento.

SWITCH D1

```
Configure terminal
inter ether 0/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk allowed Vlan 13,8
no shutdown
exit
copy running-config startup-config
```

Figura 30. Configuración enlaces troncales D1



```
D1#
D1#Configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#inter ether 0/0
D1(config-if)#switchport trunk encapsulation dot1q
D1(config-if)#switchport mode trunk
D1(config-if)#switchport trunk allowed Vlan 13,8
D1(config-if)#no shutdown
D1(config-if)#
*Apr 24 23:27:33.254: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
D1(config-if)#
*Apr 24 23:27:35.266: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
D1(config-if)#exit
D1(config)#end
D1#copy running-config startup-config
Destination filename [startup-config]?
*Apr 24 23:27:50.047: %SYS-5-CONFIG_I: Configured from console by console


Building configuration...
Compressed configuration from 1680 bytes to 988 bytes[OK]
D1#
```

solarwinds | Solar-PuTTY free tool

SWITCH D2

```
Configure terminal
inter ether 0/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk allowed Vlan 13,8
no shutdown
exit
copy running-config startup-config
```

Figura 31. Configuración enlaces troncales D2.



```
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#inter ether 0/0
D2(config-if)#switchport trunk encapsulation dot1q
D2(config-if)#switchport mode trunk
D2(config-if)#switchport trunk allowed Vlan 13,8
D2(config-if)#no shutdown
D2(config-if)#
*Apr 24 23:30:55.254: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
D2(config-if)#
*Apr 24 23:30:57.259: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
D2(config-if)#exit
D2(config)#end
D2#copy running-config startup-config
*Apr 24 23:31:14.258: %SYS-5-CONFIG_I: Configured from console by console
D2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 1680 bytes to 991 bytes[OK]
D2#
```

3.3. En D1 y A1, configure el EtherChannel.


Con la tarea 3.3 se realiza el Port-Channel por medio del PAgP en los switch D1 y A1.

SWITCH D1

```
Configure terminal
inter range e1/0-1
switchport trunk encapsulation dot1q
switchport mode trunk
```

```
channel-group 1 mode desirable
no shutdown
exit
copy running-config startup-config
```

Figura 32. Configuración Port-Channel D1



```
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#inter range e1/0-1
D1(config-if-range)#switchport trunk encapsulation dot1q
D1(config-if-range)#switchport mode trunk
D1(config-if-range)#channel-group 1 mode desirable
Creating a port-channel interface Port-channel 1

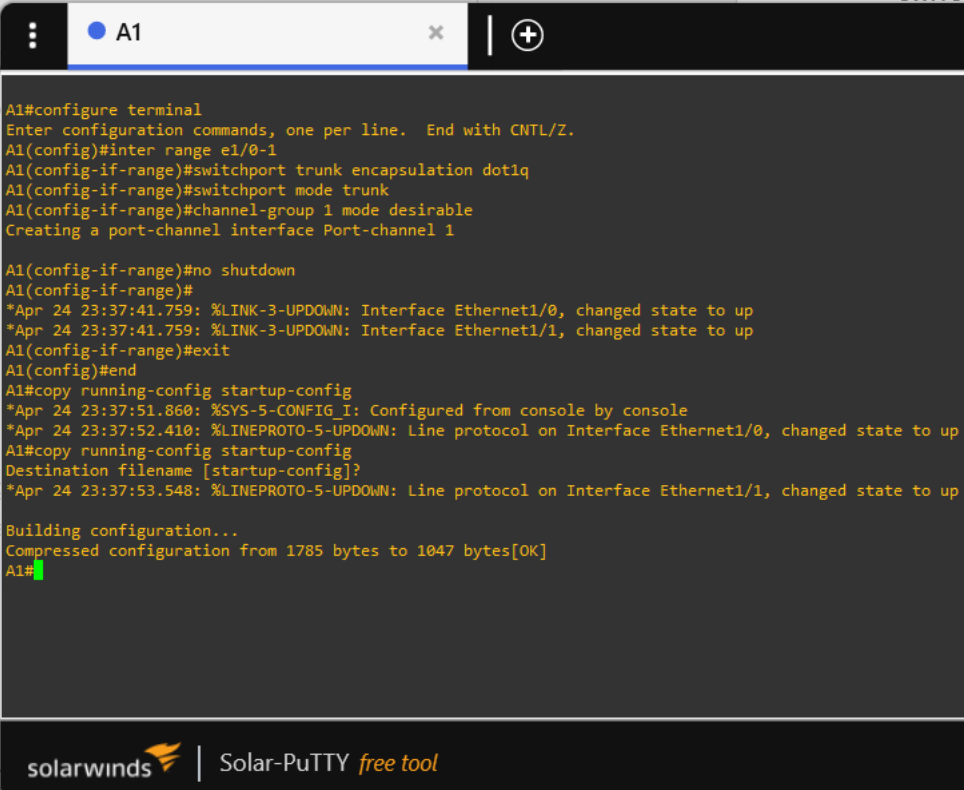
D1(config-if-range)#no shutdown
D1(config-if-range)#
*Apr 24 23:34:57.098: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Apr 24 23:34:57.098: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
D1(config-if-range)#exit
D1(config)#
*Apr 24 23:35:08.089: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
*Apr 24 23:35:08.469: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
D1(config)#copy running-config startup-config
^
% Invalid input detected at '^' marker.

D1(config)#end
D1#copy running-config startup-config
*Apr 24 23:35:15.528: %SYS-5-CONFIG_I: Configured from console by console
D1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 1872 bytes to 1092 bytes[OK]
D1#
```

SWITCH A1

```
Configure terminal
inter range e1/0-1
switchport trunk encapsulation dot1q
switchport mode trunk
channel-group 1 mode desirable
no shutdown
exit
copy running-config startup-confi
```

Figura 33. Configuración Port-Channel A1.



```
A1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
A1(config)#inter range e1/0-1
A1(config-if-range)#switchport trunk encapsulation dot1q
A1(config-if-range)#switchport mode trunk
A1(config-if-range)#channel-group 1 mode desirable
Creating a port-channel interface Port-channel 1

A1(config-if-range)#no shutdown
A1(config-if-range)#
*Apr 24 23:37:41.759: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Apr 24 23:37:41.759: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
A1(config-if-range)#exit
A1(config)#end
A1#copy running-config startup-config
*Apr 24 23:37:51.860: %SYS-5-CONFIG I: Configured from console by console
*Apr 24 23:37:52.410: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
A1#copy running-config startup-config
Destination filename [startup-config]?
*Apr 24 23:37:53.548: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up

Building configuration...
Compressed configuration from 1785 bytes to 1047 bytes[OK]
A1#
```

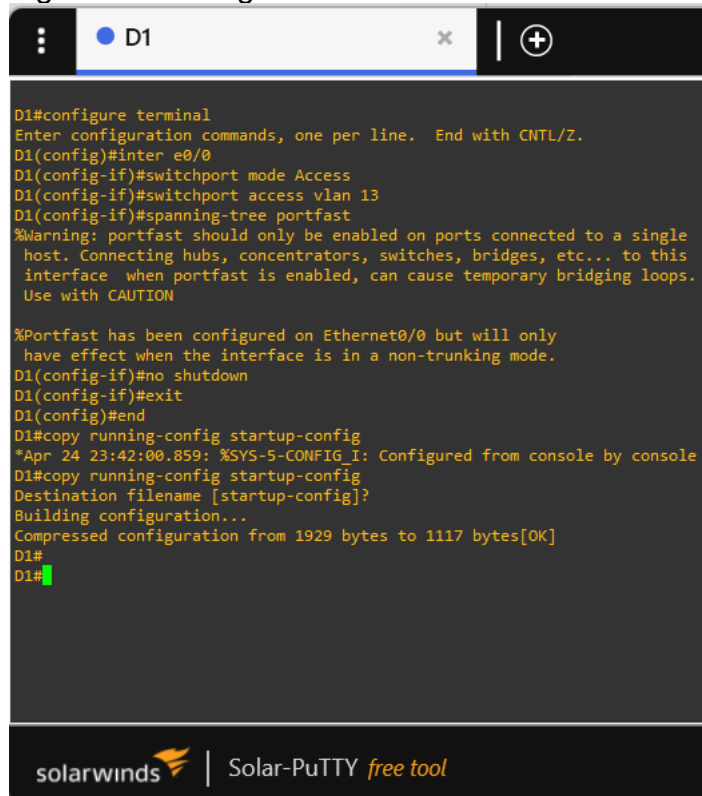
3.4. En D1, D2 y A1, configure los puertos de acceso para PC1, PC2, PC3 y PC4

En la tarea 3.4 se organizan los accesos a las VLAN 8 y VLAN 13, donde el switch D1 y A1 se configuran con los mismos comandos, mientras que el switch D2 se debe agregar ambas VLAN.

SWITCH D1

```
Configure terminal
inter e0/0
switchport mode Access
switchport access vlan 13
spanning-tree portfast
no shutdown
exit
copy running-config startup-config
```

Figura 34. Configuración Puertos de acceso D1.



```
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#inter e0/0
D1(config-if)#switchport mode Access
D1(config-if)#switchport access vlan 13
D1(config-if)#spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when portfast is enabled, can cause temporary bridging loops.
Use with CAUTION

%Portfast has been configured on Ethernet0/0 but will only
have effect when the interface is in a non-trunking mode.
D1(config-if)#no shutdown
D1(config-if)#exit
D1(config)#end
D1#copy running-config startup-config
*Apr 24 23:42:00.859: %SYS-5-CONFIG_I: Configured from console by console
D1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 1929 bytes to 1117 bytes[OK]
D1#
D1#
```

solarwinds | Solar-PuTTY *free tool*

SWITCH A1

Configure terminal

inter e0/0

switchport mode Access

switchport access vlan 13


spanning-tree portfast

no shutdown

exit

copy running-config startup-config

Figura 35. Configuración Puertos de acceso A1.



```
A1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
A1(config)#inter e0/0
A1(config-if)#switchport mode Access
A1(config-if)#switchport access vlan 13
% Access VLAN does not exist. Creating vlan 13
A1(config-if)#spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when portfast is enabled, can cause temporary bridging loops.
Use with CAUTION

%Portfast has been configured on Ethernet0/0 but will only
have effect when the interface is in a non-trunking mode.
A1(config-if)#no shutdown
A1(config-if)#
*Apr 24 23:45:23.081: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
*Apr 24 23:45:24.089: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
A1(config-if)#exit
A1(config)#end
A1#copy running-config startup-config
*Apr 24 23:45:40.531: %SYS-5-CONFIG_I: Configured from console by console
A1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 1855 bytes to 1079 bytes[OK]
A1#
```

solarwinds | Solar-PuTTY free tool

SWITCH D2

```
Configure terminal
inter e0/0
switchport mode Access
switchport access vlan 13
spanning-tree portfast
no shutdown
exit
inter e1/0
switchport mode Access
switchport access vlan 8
spanning-tree portfast
no shutdown
exit
copy running-config startup-config
```

Figura 36. Configuración Puertos de acceso D2.

```
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#inter e0/0
D2(config-if)#switchport mode Access
D2(config-if)#switchport access vlan 13
D2(config-if)#spanning-tree portfast
%%Warning: portfast should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when portfast is enabled, can cause temporary bridging loops.
Use with CAUTION

%Portfast has been configured on Ethernet0/0 but will only
have effect when the interface is in a non-trunking mode.
D2(config-if)#no shutdown
D2(config-if)#exit
D2(config)#inter e1/0
D2(config-if)#switchport mode Access
D2(config-if)#switchport access vlan 8
D2(config-if)#spanning-tree portfast
%%Warning: portfast should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when portfast is enabled, can cause temporary bridging loops.
Use with CAUTION

%Portfast has been configured on Ethernet1/0 but will only
have effect when the interface is in a non-trunking mode.
D2(config-if)#no shutdown
D2(config-if)#
*Apr 24 23:49:41.801: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Apr 24 23:49:42.809: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
D2(config-if)#exit
D2(config)#end
D2#copy running-config startup-config
*Apr 24 23:49:50.996: %SYS-5-CONFIG I: Configured from console by console
D2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 1806 bytes to 1051 bytes[OK]
D2#
```

3.5. Verify PC to PC connectivity.

Se realiza ping entre PC's para validar que haya comunicación.

Figura 37. Ping PC1 -PC2

```
PC1> ping 10.0.213.73
84 bytes from 10.0.213.73 icmp_seq=1 ttl=61 time=75.493 ms
84 bytes from 10.0.213.73 icmp_seq=2 ttl=61 time=62.967 ms
84 bytes from 10.0.213.73 icmp_seq=3 ttl=61 time=60.762 ms
84 bytes from 10.0.213.73 icmp_seq=4 ttl=61 time=68.345 ms
84 bytes from 10.0.213.73 icmp_seq=5 ttl=61 time=53.073 ms

PC1> ping 2001:db8:acad:213::50/64
2001:db8:acad:213::50/64 icmp6_seq=1 ttl=58 time=276.958 ms
2001:db8:acad:213::50/64 icmp6_seq=2 ttl=58 time=78.503 ms
2001:db8:acad:213::50/64 icmp6_seq=3 ttl=58 time=51.052 ms
2001:db8:acad:213::50/64 icmp6_seq=4 ttl=58 time=69.229 ms
2001:db8:acad:213::50/64 icmp6_seq=5 ttl=58 time=66.100 ms

PC1>
```

Figura 38. Ping PC3 -PC4

```
PC3> ping 10.0.208.73
84 bytes from 10.0.208.73 icmp_seq=1 ttl=61 time=57.259 ms
84 bytes from 10.0.208.73 icmp_seq=2 ttl=61 time=55.112ms
84 bytes from 10.0.208.73 icmp_seq=3 ttl=61 time=59.701 ms
84 bytes from 10.0.208.73 icmp_seq=4 ttl=61 time=70.294 ms
84 bytes from 10.0.208.73 icmp_seq=5 ttl=61 time=63.589 ms

PC3> ping 2001:db8:acad:208::50/64
2001:db8:acad:208::50/64 icmp6_seq=1 ttl=58 time=97.595 ms
2001:db8:acad:208::50/64 icmp6_seq=2 ttl=58 time=65.484 ms
2001:db8:acad:208::50/64 icmp6_seq=3 ttl=58 time=69.276 ms
2001:db8:acad:208::50/64 icmp6_seq=4 ttl=58 time=61.814 ms
2001:db8:acad:208::50/64 icmp6_seq=5 ttl=58 time=106.588 ms

PC3>
```



Parte 4 configure Security

En esta parte debe configurar varios mecanismos de seguridad en los dispositivos de la topología. Las tareas de configuración son las siguientes:

Tabla 4. Configuración mecanismos de seguridad.

TASK #	TASK	SPECIFICATION
4.1	On all devices, secure privileged EXE mode.	Configure an enable secret as follows: <ul style="list-style-type: none">• Algorithm type: SCRYPT• Password: cisco12345cisco.
4.2	On all devices, create a local user account.	Configure a local user: <ul style="list-style-type: none">• Name: admin• Privilege level: 15• Algorithm type: SCRYPT• Password: cisco12345cisco.
4.3	On all devices, enable AAA and enable AAA authentication.	Enable AAA authentication using the local database on all lines.

4.1 On all devices, secure privileged EXE mode.

CONFIGURACIÓN PARA R1, R2, R3, D1, D2 Y A1.

```
configure terminal
service password-encryption
enable secret cisco12345cisco
exit
copy running-config startup-config
```

4.2 On all devices, create a local user account.

CONFIGURACIÓN PARA R1, R2, R3, D1, D2 Y A1.

```
configure terminal
username admin secret 0 cisco12345cisco
username admin privilege 15 secret cisco12345cisco
exit
copy running-config startup-config
```

4.3 On all devices, enable AAA and enable AAA authentication

CONFIGURACIÓN PARA R1, R2, R3, D1, D2 Y A1.

Configure terminal

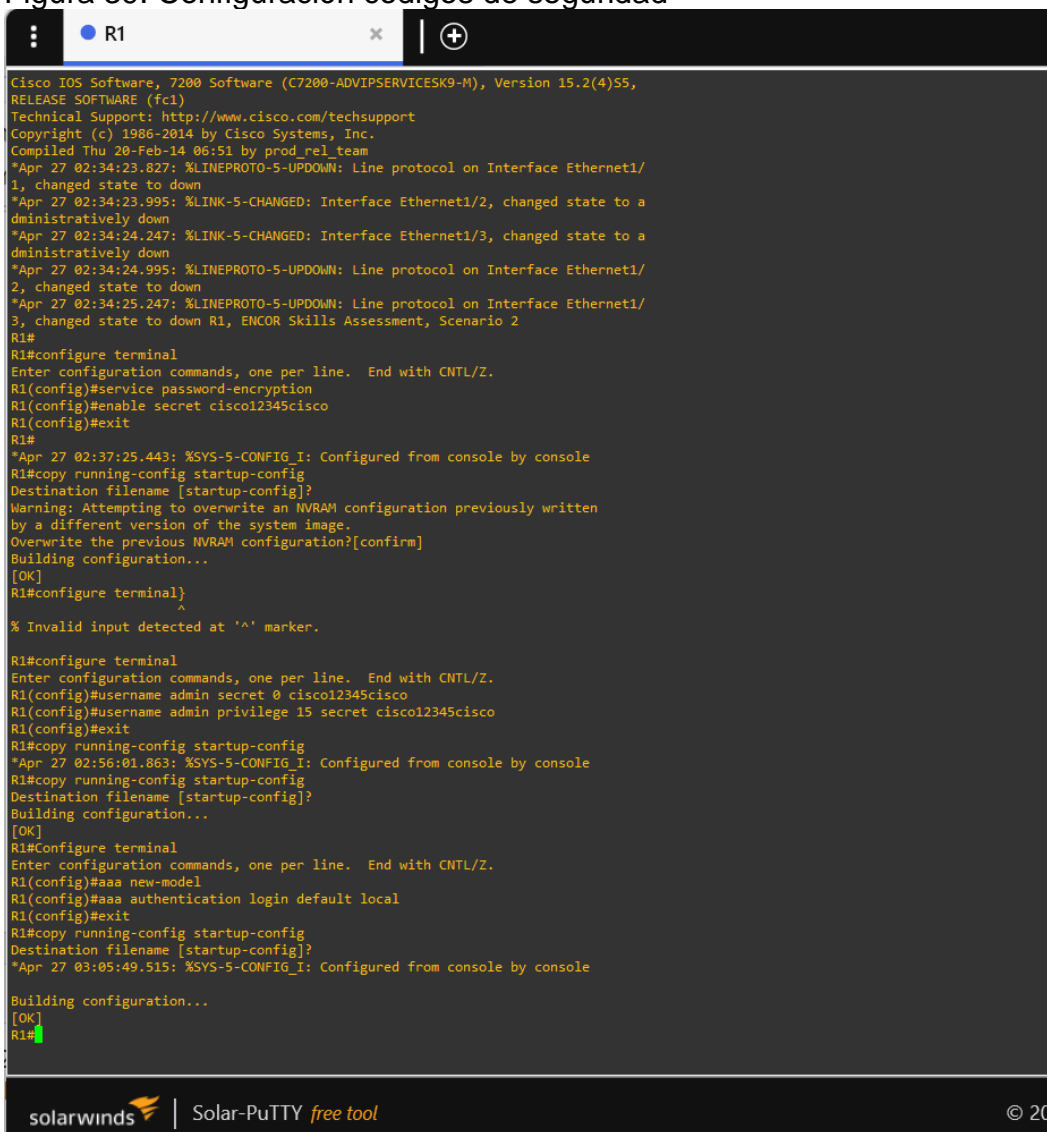
aaa new-model

aaa authentication login default local

exit

copy running-config startup-config

Figura 39. Configuración códigos de seguridad



```
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)5S,
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 20-Feb-14 06:51 by prod_rel_team
*Apr 27 02:34:23.827: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
1, changed state to down
*Apr 27 02:34:23.995: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to a
dministratively down
*Apr 27 02:34:24.247: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to a
dministratively down
*Apr 27 02:34:24.995: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
2, changed state to down
*Apr 27 02:34:25.247: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/
3, changed state to down R1, ENCOR Skills Assessment, Scenario 2
R1#
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#service password-encryption
R1(config)#enable secret cisco12345cisco
R1(config)#exit
R1#
*Apr 27 02:37:25.443: %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#configure terminal
^
% Invalid input detected at '^' marker.

R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#username admin secret 0 cisco12345cisco
R1(config)#username admin privilege 15 secret cisco12345cisco
R1(config)#exit
R1#copy running-config startup-config
*Apr 27 02:56:01.863: %SYS-5-CONFIG_I: Configured from console by console
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#Configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#aaa new-model
R1(config)#aaa authentication login default local
R1(config)#exit
R1#copy running-config startup-config
Destination filename [startup-config]?
*Apr 27 03:05:49.515: %SYS-5-CONFIG_I: Configured from console by console
Building configuration...
[OK]
R1#
```

CONCLUSIONES

Se logró configurar los equipos según lo planeado para crear una red, utilizando una lógica de programación y algoritmos apropiados para garantizar que la red funcione adecuadamente. Además, se crearon interfaces y comandos que permiten conexiones entre dispositivos mediante protocolos y puertos específicos, lo que permite la comunicación y el flujo de información en toda la red.

La correcta configuración de la red y la implementación de protocolos específicos permiten no solo una comunicación fluida entre dispositivos, sino también un mejor rendimiento y eficiencia en el uso de los recursos. Esto puede traducirse en una mejora en la productividad y en la reducción de costos en el largo plazo.

La planificación y ejecución adecuadas de la creación de una red no solo son importantes para su funcionamiento actual, sino también para su mantenimiento y escalabilidad futuros. Una buena planificación y documentación puede facilitar la identificación y solución de problemas, así como también la adición de nuevos dispositivos y funcionalidades en el futuro.

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