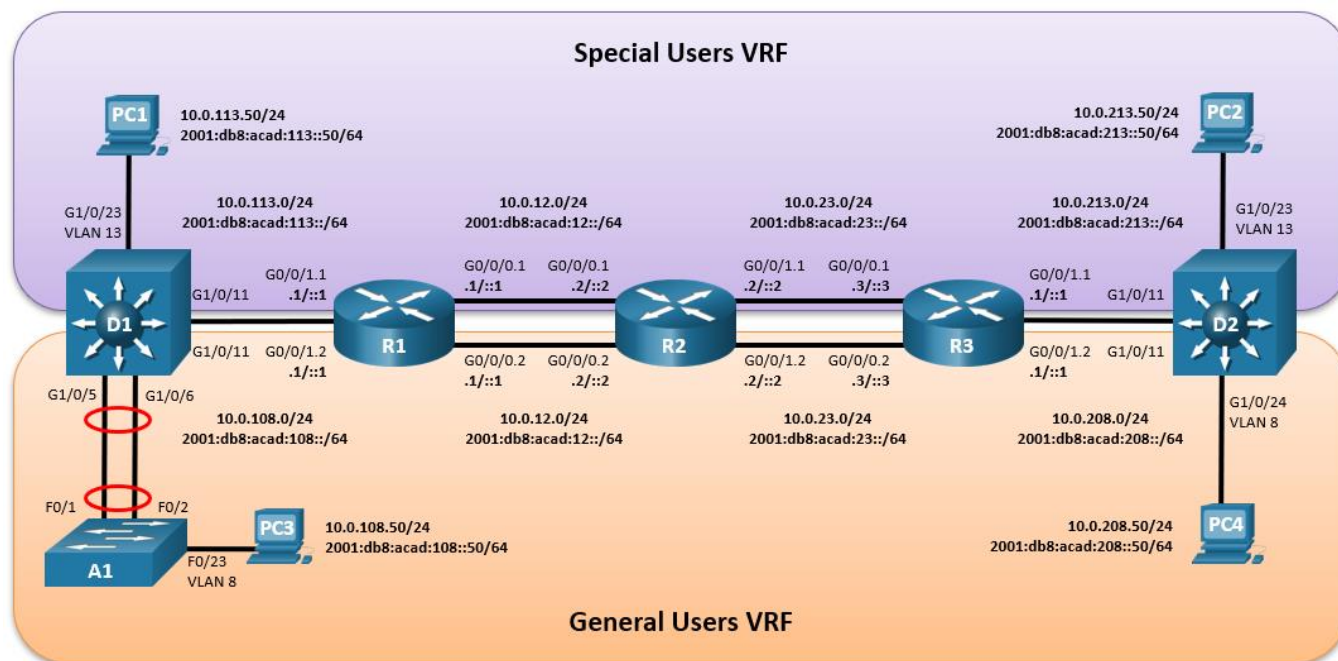


ENCOR Skills Assessment (Scenario 2)

Topology



Addressing Table

Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local
R1	G0/0/0.1	10.0.12.1/24	2001:db8:acad:12::1/64	fe80::1:1
	G0/0/0.2	10.0.12.1/24	2001:db8:acad:12::1/64	fe80::1:2
	G0/0/1.1	10.0.113.1/24	2001:db8:acad:113::1/64	fe80::1:3
	G0/0/1.2	10.0.108.1/24	2001:db8:acad:108::1/64	fe80::1:4
R2	G0/0/0.1	10.0.12.2/24	2001:db8:acad:12::2/64	fe80::2:1
	G0/0/0.2	10.0.12.2/24	2001:db8:acad:12::2/64	fe80::2:2
	G0/0/1.1	10.0.23.2/24	2001:db8:acad:23::2/64	fe80::2:3
	G0/0/1.2	10.0.23.2/24	2001:db8:acad:23::2/64	fe80::2:4
R3	G0/0/0.1	10.0.23.3/24	2001:db8:acad:23::3/64	fe80::3:1
	G0/0/0.2	10.0.23.3/24	2001:db8:acad:23::3/64	fe80::3:2
	G0/0/1.1	10.0.213.1/24	2001:db8:acad:213::1/64	fe80::3:3
	G0/0/1.2	10.0.208.1/24	2001:db8:acad:208::1/64	fe80::3:4
PC1	NIC	10.0.113.50/24	2001:db8:acad:113::50/64	EUI-64

Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local
PC2	NIC	10.0.213.50/24	2001:db8:acad:213::50/64	EUI-64
PC3	NIC	10.0.108.50/24	2001:db8:acad:108::50/64	EUI-64
PC4	NIC	10.0.208.50/24	2001:db8:acad:208::50/64	EUI-64

Objectives

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

Part 2: Configure VRF and Static Routing

Part 3: Configure L2 Network

Part 4: Configure Security

Part 5: Cleanup

Background / Scenario

In this skills assessment, you are responsible for completing the multi-VRF configuration of the network supporting “General Users” and “Special Users”. Upon completion, there should be full end-to-end reachability and the two groups should not be able to communicate with each other. Be sure to verify that your configurations meet the provided specifications and that the devices perform as required.

Note: The routers used with CCNP hands-on labs are Cisco 4221s with Cisco IOS XE Release 16.9.4 (universalk9 image). The switches used in the labs are Cisco Catalyst 3650s with Cisco IOS XE Release 16.9.4 (universalk9 image) and Cisco Catalyst 2960s with Cisco IOS Release 15.2(2) (lanbasek9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs.

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

Note: The default Switch Database Manager (SDM) template on a Catalyst 2960 does not support IPv6. You must change the default SDM template to the dual-ipv4-and-ipv6 default template using the **sdm prefer dual-ipv4-and-ipv6 default** global configuration command. Changing the template will require a reboot.

Required Resources

- 3 Routers (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 2 Switches (Cisco 3650 with Cisco IOS XE release 16.9.4 universal image or comparable)
- 1 Switch (Cisco 2960 with Cisco IOS release 15.2 lanbase image or comparable)
- 4 PCs (Choice of operating system with a terminal emulation program)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Instructions

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

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

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

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

Step 2: Configure basic settings for each device.

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

Router R1

```
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
```

Router R2

```
hostname R2
ipv6 unicast-routing
no ip domain lookup
banner motd # R2, ENCOR Skills Assessment, Scenario 2 #
line con 0
  exec-timeout 0 0
  logging synchronous
exit
```

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
```

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
```

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
```

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
```

- b. Save the running configuration to startup-config on all devices.
- c. Configure PC1, PC2, PC3, and PC4 host addressing as shown in the addressing table.

Part 2: Configure VRF and Static Routing

In this part of the Skills Assessment, you will configure VRF-Lite on all three routers and the appropriate static routes to support end-to-end reachability. At the end of this part, R1 should be able to ping R3 in each VRF.

Your configuration tasks are as follows:

Task#	Task	Specification	Points
2.1	On R1, R2, and R3, configure VRF-Lite 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.	12
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 	12
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.	8
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 	4

Note: R1 will not be able to ping PC2 or PC 4 yet.

Part 3: Configure L2 Network

In this part, you will configure the switches to support host connectivity.

Your configuration tasks are as follows:

Task#	Task	Specification	Points
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.	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.	4
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 	8

Task#	Task	Specification	Points
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. 	6
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.	4

Part 4: Configure Security

In this part you will configure various security mechanisms on the devices in the topology.

Your configuration tasks are as follows:

Task#	Task	Specification	Points
5.1	On all devices, secure privileged EXEC mode.	Configure an enable secret as follows: <ul style="list-style-type: none"> Algorithm type: SCRYPT Password: cisco12345cisco. 	6
5.2	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. 	6
5.3	On all devices, enable AAA and enable AAA authentication.	Enable AAA authentication using the local database on all lines.	2

Part 5: Cleanup

NOTE: DO NOT PROCEED WITH CLEANUP UNTIL YOUR INSTRUCTOR HAS GRADED YOUR SKILLS ASSESSMENT AND HAS INFORMED YOU THAT YOU MAY BEGIN CLEANUP.

Unless directed otherwise by the instructor, restore host computer network connectivity, and then turn off power to the host computers.

Remove NVRAM configuration files (if saved) and vlan databases from all devices before turning them off or reloading them.