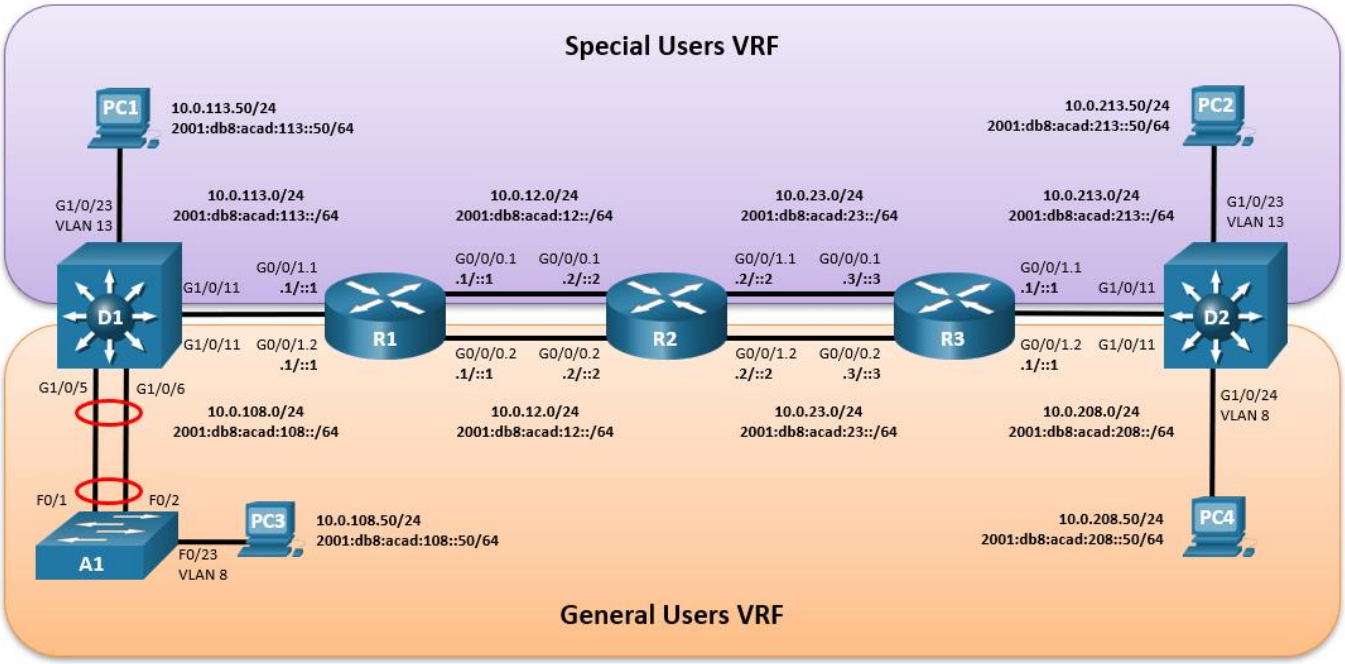
ENCOR Skills Assessment (Scenario 2) (Instructor Version)

Instructor Note: Red font color or gray highlights indicate text that appears in the instructor copy only.

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

Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local
PC1	NIC	10.0.113.50/24	2001:db8:acad:113::50/64	EUI-64
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.

Instructor Note: Refer to the Instructor Lab Manual for the procedures to initialize and reload devices.

Instructor Note: This skills assessment presumes that Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing is not a graded or timed component of the exercise.

Instructor Note: In the interest of time, it may be appropriate to modify some of the requirements from “all devices” to a select device.

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: • 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: • 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	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: • 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.

Instructor Verification:

Verify VRF configuration and address assignment using the **show ip vrf interfaces** command. (Tasks 2.1 and 2.2)

```
R1# show ip vrf interfaces
Interface              IP-Address      VRF                              Protocol
Gi0/0/0.2              10.0.12.1       General-Users                    up
Gi0/0/1.2              10.0.108.1      General-Users                    up
Gi0/0/0.1              10.0.12.1       Special-Users                    up
Gi0/0/1.1              10.0.113.1      Special-Users                    up

R2# show ip vrf interfaces
Interface              IP-Address      VRF                              Protocol
Gi0/0/1.2              10.0.23.2       General-Users                    up
```

```
Gi0/0/0.2              10.0.12.2       General-Users                  up
Gi0/0/1.1              10.0.23.2       Special-Users                  up
Gi0/0/0.1              10.0.12.2       Special-Users                  up

R3# show ip vrf interfaces
Interface              IP-Address      VRF                            Protocol
Gi0/0/0.2              10.0.23.3       General-Users                  up
Gi0/0/1.2              10.0.208.1      General-Users                  up
Gi0/0/0.1              10.0.23.3       Special-Users                  up
Gi0/0/1.1              10.0.213.1      Special-Users                  up
```

Verify the static routes (Task 2.3)

```
R1# show run | inc route
ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.12.2
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.12.2
ipv6 route vrf General-Users ::/0 2001:DB8:ACAD:12::2
ipv6 route vrf Special-Users ::/0 2001:DB8:ACAD:12::2

R2# show run | inc route
ip route vrf General-Users 10.0.108.0 255.255.255.0 10.0.12.1
ip route vrf General-Users 10.0.208.0 255.255.255.0 10.0.23.3
ip route vrf Special-Users 10.0.113.0 255.255.255.0 10.0.12.1
ip route vrf Special-Users 10.0.213.0 255.255.255.0 10.0.23.3
ipv6 route vrf General-Users 2001:DB8:ACAD:108::/64 2001:DB8:ACAD:12::1
ipv6 route vrf Special-Users 2001:DB8:ACAD:113::/64 2001:DB8:ACAD:12::1
ipv6 route vrf General-Users 2001:DB8:ACAD:208::/64 2001:DB8:ACAD:23::3
ipv6 route vrf Special-Users 2001:DB8:ACAD:213::/64 2001:DB8:ACAD:23::3

R3# show run | inc route
ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.23.2
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.23.2
ipv6 route vrf Special-Users ::/0 2001:DB8:ACAD:23::2
ipv6 route vrf General-Users ::/0 2001:DB8:ACAD:23::2
```

Verify IPv4 and IPv6 pings of R3 from R1; all pings should be successful. (Task 2.4)

```
R1# ping vrf General-Users 10.0.208.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.208.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms

R1# ping vrf General-Users 2001:db8:acad:208::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:208::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms

R1# ping vrf Special-Users 10.0.213.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.213.1, timeout is 2 seconds:
```

```
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms

R1# ping vrf Special-Users 2001:db8:acad:213::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:213::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

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: • Interface G1/0/5 and G1/0/6 • Port Channel 1 using PAgP On A1, configure enable: • Interface F0/1 and F0/2 • Port Channel 1 using PAgP	8
3.4	On D1, D2, and A1, configure access ports for PC1, PC2, PC3, and PC4.	Configure and enable the access ports as follows: • 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

Instructor Verification:

Issue the command **show interfaces trunk** to verify trunk connectivity and settings.

```
D1# show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Gi1/0/11    on               802.1q         trunking      1
Po1         on               802.1q         trunking      1
```

```
Port        Vlans allowed on trunk
Gi1/0/11    1-4094
Po1         1-4094

Port        Vlans allowed and active in management domain
Gi1/0/11    1,8,13
Po1         1,8,13

Port        Vlans in spanning tree forwarding state and not pruned
Gi1/0/11    1,8,13
Po1         1,8,13
```

Issue the command **show etherchannel summary** to verify the etherchannel settings.

```
D1# show etherchannel summary
Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator

        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port

        A - formed by Auto LAG


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         PAgP        Gi1/0/5(P)    Gi1/0/6(P)
```

Issue the command **show run interface g1/0/23** or **show run interface f0/23** to validate host port settings.

```
D1# show run interface g1/0/23
Building configuration...

Current configuration : 114 bytes
!
interface GigabitEthernet1/0/23
 switchport access vlan 13
 switchport mode access
 spanning-tree portfast
```

Verify that PC1 can reach PC2. IPv4 and IPv6 pings from PC1 to PC2 are successful.

Verify that PC3 can reach PC4. IPv4 and IPv6 pings from PC3 to PC4 are successful.

Note: PC1 and PC2 cannot ping PC3 or PC4.

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 EXE mode.	Configure an enable secret as follows: • Algorithm type: **SCRYPT** • Password: **cisco12345cisco**.	6
5.2	On all devices, create a local user account.	Configure a local user: • 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

Instructor Verification:

Issue the command **show run | include aaa|username** to verify that the AAA settings are configured.

```
D2# show run | include aaa|username
aaa new-model
aaa authentication login default local
aaa session-id common
username admin privilege 15 secret 9
$9$XjgowiPNCh.RRk$CwCEW/a6DqO12aRmLFaBfhhJPW.V/7KuJaqHS5m4RmU
```

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.

Device Configurations (Answers)

Listed below are the configuration commands used to create the skills assessment

Part 2: VRF and Static Routing (student configures)

Router R1

```
vrf definition General-Users
 address-family ipv4
 address-family ipv6
 exit
 vrf definition Special-Users
```

```
 address-family ipv4
 address-family ipv6
 exit
 interface g0/0/0.1
  encapsulation dot1q 13
  vrf forwarding Special-Users
  ip address 10.0.12.1 255.255.255.0
  ipv6 address fe80::1:1 link-local
  ipv6 address 2001:db8:acad:12::1/64
  no shutdown
  exit
 interface g0/0/0.2
  encapsulation dot1q 8
  vrf forwarding General-Users
  ip address 10.0.12.1 255.255.255.0
  ipv6 address fe80::1:2 link-local
  ipv6 address 2001:db8:acad:12::1/64
  no shutdown
  exit
 interface g0/0/0
  no ip address
  no shutdown
  exit
 interface g0/0/1.1
  encapsulation dot1q 13
  vrf forwarding Special-Users
  ip address 10.0.113.1 255.255.255.0
  ipv6 address fe80::1:3 link-local
  ipv6 address 2001:db8:acad:113::1/64
  no shutdown
  exit
 interface g0/0/1.2
  encapsulation dot1q 8
  vrf forward General-Users
  ip address 10.0.108.1 255.255.255.0
  ipv6 address fe80::1:4 link-local
  ipv6 address 2001:db8:acad:108::1/64
  no shutdown
  exit
 interface g0/0/1
  no ip address
  no shutdown
  exit
 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
 end
```

Router R2

```
vrf definition General-Users
 address-family ipv4
 address-family ipv6
 exit
 vrf definition Special-Users
 address-family ipv4
 address-family ipv6
 exit
 interface g0/0/0.1
  encapsulation dot1q 13
  vrf forwarding Special-Users
  ip address 10.0.12.2 255.255.255.0
  ipv6 address fe80::2:1 link-local
  ipv6 address 2001:db8:acad:12::2/64
  no shutdown
  exit
 interface g0/0/0.2
  encapsulation dot1q 8
  vrf forwarding General-Users
  ip address 10.0.12.2 255.255.255.0
  ipv6 address fe80::2:2 link-local
  ipv6 address 2001:db8:acad:12::2/64
  no shutdown
  exit
 interface g0/0/0
  no ip address
  no shutdown
  exit
 interface g0/0/1.1
  encapsulation dot1q 13
  vrf forwarding Special-Users
  ip address 10.0.23.2 255.255.255.0
  ipv6 address fe80::2:3 link-local
  ipv6 address 2001:db8:acad:23::2/64
  no shutdown
  exit
 interface g0/0/1.2
  encapsulation dot1q 8
  vrf forwarding General-Users
  ip address 10.0.23.2 255.255.255.0
  ipv6 address fe80::2:4 link-local
  ipv6 address 2001:db8:acad:23::2/64
  no shutdown
  exit
 interface g0/0/1
  no ip address
  no shutdown
  exit
 ip route vrf Special-Users 10.0.113.0 255.255.255.0 10.0.12.1
```

```
 ip route vrf Special-Users 10.0.213.0 255.255.255.0 10.0.23.3
 ipv6 route vrf Special-Users 2001:db8:acad:113::/64 2001:db8:acad:12::1
 ipv6 route vrf Special-Users 2001:db8:acad:213::/64 2001:db8:acad:23::3
 ip route vrf General-Users 10.0.108.0 255.255.255.0 10.0.12.1
 ip route vrf General-Users 10.0.208.0 255.255.255.0 10.0.23.3
 ipv6 route vrf General-Users 2001:db8:acad:108::/64 2001:db8:acad:12::1
 ipv6 route vrf General-Users 2001:db8:acad:208::/64 2001:db8:acad:23::3
 end
```

Router R3

```
vrf definition General-Users
 address-family ipv4
 address-family ipv6
 exit
 vrf definition Special-Users
 address-family ipv4
 address-family ipv6
 exit
interface g0/0/0.1
  encapsulation dot1q 13
  vrf forwarding Special-Users
  ip address 10.0.23.3 255.255.255.0
  ipv6 address fe80::3:1 link-local
  ipv6 address 2001:db8:acad:23::3/64
  no shutdown
  exit
 interface g0/0/0.2
  encapsulation dot1q 8
  vrf forwarding General-Users
  ip address 10.0.23.3 255.255.255.0
  ipv6 address fe80::3:2 link-local
  ipv6 address 2001:db8:acad:23::3/64
  no shutdown
  exit
 interface g0/0/0
  no ip address
  no shutdown
  exit
 interface g0/0/1.1
  encapsulation dot1q 13
  vrf forwarding Special-Users
  ip address 10.0.213.1 255.255.255.0
  ipv6 address fe80::3:3 link-local
  ipv6 address 2001:db8:acad:213::1/64
  no shutdown
  exit
 interface g0/0/1.2
  encapsulation dot1q 8
  vrf forward General-Users
  ip address 10.0.208.1 255.255.255.0
```

```
  ipv6 address fe80::3:4 link-local
  ipv6 address 2001:db8:acad:208::1/64
  no shutdown
  exit
interface g0/0/1
  no ip address
  no shutdown
  exit
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.23.2
 ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.23.2
 ipv6 route vrf Special-Users ::/0 2001:db8:acad:23::2
 ipv6 route vrf General-Users ::/0 2001:db8:acad:23::2
```

Part 3 Switching (student configures)

Switch D1

```
interface range g1/0/1-24
 shutdown
 exit
interface g1/0/11
 switchport mode trunk
 no shutdown
 exit
!
interface g1/0/23
 switchport mode access
 switchport access vlan 13
 spanning-tree portfast
 no shutdown
 exit
interface range g1/0/5-6
 switchport mode trunk
 channel-group 1 mode desirable
 no shutdown
 exit
```

Switch D2

```
interface range g1/0/1-24
 shutdown
 exit
interface g1/0/11
 switchport mode trunk
 no shutdown
 exit
!
interface g1/0/23
 switchport mode access
 switchport access vlan 13
 spanning-tree portfast
```

```
 no shutdown
 exit
interface g1/0/24
 switchport mode access
 switchport access vlan 8
 spanning-tree portfast
 no shutdown
 exit
```

Switch A1

```
interface range f0/1-24, g0/1-2
 shutdown
 exit
interface f0/23
 switchport mode access
 switchport access vlan 8
 spanning-tree portfast
 no shutdown
 exit
interface range f0/1-2
 switchport mode trunk
 channel-group 1 mode desirable
 no shutdown
 exit
```

Part 4: Security (Student configures)

```
-------------------------------------
All devices:
enable algorithm-type scrypt secret cisco12345cisco
username admin privilege 15 algorithm-type scrypt secret cisco12345cisco
aaa new-model
aaa authentication login default local
end
```

Device Configurations (Final)

Router R1

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


Current configuration : 2434 bytes
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
```

```
hostname R1
!
boot-start-marker
boot-end-marker
!
!
vrf definition General-Users
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
vrf definition Special-Users
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 9 $9$zoLy2xVn9zcnb.$CFCHOBcQkjBm2C8a7VzDkhM2DCYnF9/aSc4B/FRXO2k
!
aaa new-model
!
aaa authentication login default local
!
aaa session-id common
!
no ip domain lookup
!
login on-success log
!
subscriber templating
!
ipv6 unicast-routing
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
username admin privilege 15 secret 9
$9$5N85J1uzgRjVpE$z4mPVfXwPae5qgqpwIC6UgVMGb8Ryf1h9oNg79qhLDc
!
redundancy
 mode none
!
interface GigabitEthernet0/0/0
 no ip address
 negotiation auto
```

```
!
interface GigabitEthernet0/0/0.1
 encapsulation dot1Q 13
 vrf forwarding Special-Users
 ip address 10.0.12.1 255.255.255.0
 ipv6 address FE80::1:1 link-local
 ipv6 address 2001:DB8:ACAD:12::1/64
!
interface GigabitEthernet0/0/0.2
 encapsulation dot1Q 8
 vrf forwarding General-Users
 ip address 10.0.12.1 255.255.255.0
 ipv6 address FE80::1:2 link-local
 ipv6 address 2001:DB8:ACAD:12::1/64
!
interface GigabitEthernet0/0/1
 no ip address
 negotiation auto
!
interface GigabitEthernet0/0/1.1
 encapsulation dot1Q 13
 vrf forwarding Special-Users
 ip address 10.0.113.1 255.255.255.0
 ipv6 address FE80::1:3 link-local
 ipv6 address 2001:DB8:ACAD:113::1/64
!
interface GigabitEthernet0/0/1.2
 encapsulation dot1Q 8
 vrf forwarding General-Users
 ip address 10.0.108.1 255.255.255.0
 ipv6 address FE80::1:4 link-local
 ipv6 address 2001:DB8:ACAD:108::1/64
!
interface Serial0/1/0
 no ip address
!
interface Serial0/1/1
 no ip address
!
ip forward-protocol nd
no ip http server
ip http secure-server
ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.12.2
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.12.2
!
ipv6 route vrf General-Users ::/0 2001:DB8:ACAD:12::2
ipv6 route vrf Special-Users ::/0 2001:DB8:ACAD:12::2
!
control-plane
!
```

```
banner motd ^C R1, ENCOR Skills Assessment, Scenario 2 ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login
!
end
```

Router R2

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


Current configuration : 2674 bytes
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname R2
!
boot-start-marker
boot-end-marker
!
!
vrf definition General-Users
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 9 $9$zoLy2xVn9zcnb.$CFCHOBcQkjBm2C8a7VzDkhM2DCYnF9/aSc4B/FRXO2k
!
vrf definition Special-Users
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
```

```
!
aaa new-model
!
aaa authentication login default local
!
aaa session-id common
!
no ip domain lookup
!
login on-success log
!
subscriber templating
!
ipv6 unicast-routing
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
username admin privilege 15 secret 9
$9$5N85J1uzgRjVpE$z4mPVfXwPae5qgqpwIC6UgVMGb8Ryf1h9oNg79qhLDc
!
redundancy
 mode none
!
interface GigabitEthernet0/0/0
 no ip address
 negotiation auto
!
interface GigabitEthernet0/0/0.1
 encapsulation dot1Q 13
 vrf forwarding Special-Users
 ip address 10.0.12.2 255.255.255.0
 ipv6 address FE80::2:1 link-local
 ipv6 address 2001:DB8:ACAD:12::2/64
!
interface GigabitEthernet0/0/0.2
 encapsulation dot1Q 8
 vrf forwarding General-Users
 ip address 10.0.12.2 255.255.255.0
 ipv6 address FE80::2:2 link-local
 ipv6 address 2001:DB8:ACAD:12::2/64
!
interface GigabitEthernet0/0/1
 no ip address
 negotiation auto
!
interface GigabitEthernet0/0/1.1
 encapsulation dot1Q 13
 vrf forwarding Special-Users
 ip address 10.0.23.2 255.255.255.0
```

```
 ipv6 address FE80::2:3 link-local
 ipv6 address 2001:DB8:ACAD:23::2/64
!
interface GigabitEthernet0/0/1.2
 encapsulation dot1Q 8
 vrf forwarding General-Users
 ip address 10.0.23.2 255.255.255.0
 ipv6 address FE80::2:4 link-local
 ipv6 address 2001:DB8:ACAD:23::2/64
!
ip forward-protocol nd
no ip http server
ip http secure-server
ip route vrf General-Users 10.0.108.0 255.255.255.0 10.0.12.1
ip route vrf General-Users 10.0.208.0 255.255.255.0 10.0.23.3
ip route vrf Special-Users 10.0.113.0 255.255.255.0 10.0.12.1
ip route vrf Special-Users 10.0.213.0 255.255.255.0 10.0.23.3
!
ipv6 route vrf General-Users 2001:DB8:ACAD:108::/64 2001:DB8:ACAD:12::1
ipv6 route vrf Special-Users 2001:DB8:ACAD:113::/64 2001:DB8:ACAD:12::1
ipv6 route vrf General-Users 2001:DB8:ACAD:208::/64 2001:DB8:ACAD:23::3
ipv6 route vrf Special-Users 2001:DB8:ACAD:213::/64 2001:DB8:ACAD:23::3
!
control-plane
!
banner motd ^C R2, ENCOR Skills Assessment, Scenario 2 ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login
!
end
```

Router R3

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


Current configuration : 2434 bytes
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
```

```
no platform punt-keepalive disable-kernel-core
!
hostname R3
!
boot-start-marker
boot-end-marker
!
vrf definition General-Users
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
vrf definition Special-Users
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 9 $9$PwSQjbwwojphpx$kxgrCz2K13dVjqVMGVfM1OkVGxXrjPNlKnV1o3abOTM
!
aaa new-model
!
aaa authentication login default local
!
aaa session-id common
!
no ip domain lookup
!
login on-success log
!
subscriber templating
!
ipv6 unicast-routing
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
username admin privilege 15 secret 9
$9$ILYL84y3fxGxkx$WJfkbltPJt6.SeJjc6/VqwkVwTimtfdZX6qMMZOh0TI
!
redundancy
 mode none
!
interface GigabitEthernet0/0/0
 no ip address
```

```
 negotiation auto
!
interface GigabitEthernet0/0/0.1
 encapsulation dot1Q 13
 vrf forwarding Special-Users
 ip address 10.0.23.3 255.255.255.0
 ipv6 address FE80::3:1 link-local
 ipv6 address 2001:DB8:ACAD:23::3/64
!
interface GigabitEthernet0/0/0.2
 encapsulation dot1Q 8
 vrf forwarding General-Users
 ip address 10.0.23.3 255.255.255.0
 ipv6 address FE80::3:2 link-local
 ipv6 address 2001:DB8:ACAD:23::3/64
!
interface GigabitEthernet0/0/1
 no ip address
 negotiation auto
!
interface GigabitEthernet0/0/1.1
 encapsulation dot1Q 13
 vrf forwarding Special-Users
 ip address 10.0.213.1 255.255.255.0
 ipv6 address FE80::3:3 link-local
 ipv6 address 2001:DB8:ACAD:213::1/64
!
interface GigabitEthernet0/0/1.2
 encapsulation dot1Q 8
 vrf forwarding General-Users
 ip address 10.0.208.1 255.255.255.0
 ipv6 address FE80::3:4 link-local
 ipv6 address 2001:DB8:ACAD:208::1/64
!
interface Serial0/1/0
 no ip address
!
interface Serial0/1/1
 no ip address
!
ip forward-protocol nd
no ip http server
ip http secure-server
ip route vrf General-Users 0.0.0.0 0.0.0.0 10.0.23.2
ip route vrf Special-Users 0.0.0.0 0.0.0.0 10.0.23.2
!
ipv6 route vrf General-Users ::/0 2001:DB8:ACAD:23::2
ipv6 route vrf Special-Users ::/0 2001:DB8:ACAD:23::2
!
control-plane
```

```
!
banner motd ^C R3, ENCOR Skills Assessment, Scenario 2 ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login
!
end
```

Switch D1

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

Current configuration : 6728 bytes
!
version 16.9
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
! Call-home is enabled by Smart-Licensing.
service call-home
no platform punt-keepalive disable-kernel-core
!
hostname D1
!
vrf definition Mgmt-vrf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 9 $9$KO1AyAeTmlkCWU$BjMAxCL19u6FHKKf/81lRNmFhlBHC.rR0Bbw7.i9iNA
!
aaa new-model
!
aaa authentication login default local
!
aaa session-id common
switch 1 provision ws-c3650-24ps
!
ip routing
!
```

```
no ip domain lookup
!
login on-success log
ipv6 unicast-routing
!
license boot level ipservicesk9
!
diagnostic bootup level minimal
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
username admin privilege 15 secret 9
$9$x8R/b5GOdIKyqU$ewYxQctKHyXyOSHvPXM6.WvzvhfrIkCoxPygXDmyTxQ
!
redundancy
 mode sso
!
transceiver type all
 monitoring
!
class-map match-any system-cpp-police-topology-control
  description Topology control
class-map match-any system-cpp-police-sw-forward
  description Sw forwarding, L2 LVX data, LOGGING
class-map match-any system-cpp-default
  description Inter FED, EWLC control, EWLC data
class-map match-any system-cpp-police-sys-data
  description Learning cache ovfl, High Rate App, Exception, EGR Exception,
NFLSAMPLED DATA, RPF Failed
class-map match-any system-cpp-police-punt-webauth
  description Punt Webauth
class-map match-any system-cpp-police-l2lvx-control
  description L2 LVX control packets
class-map match-any system-cpp-police-forus
  description Forus Address resolution and Forus traffic
class-map match-any system-cpp-police-multicast-end-station
  description MCAST END STATION
class-map match-any system-cpp-police-multicast
  description Transit Traffic and MCAST Data
class-map match-any system-cpp-police-l2-control
  description L2 control
class-map match-any system-cpp-police-dot1x-auth
  description DOT1X Auth
class-map match-any system-cpp-police-data
  description ICMP redirect, ICMP_GEN and BROADCAST
class-map match-any system-cpp-police-stackwise-virt-control
  description Stackwise Virtual
class-map match-any non-client-nrt-class
class-map match-any system-cpp-police-routing-control
```

```
  description Routing control and Low Latency
class-map match-any system-cpp-police-protocol-snooping
  description Protocol snooping
class-map match-any system-cpp-police-dhcp-snooping
  description DHCP snooping
class-map match-any system-cpp-police-system-critical
  description System Critical and Gold Pkt
!
policy-map system-cpp-policy
!
interface Port-channel1
 switchport mode trunk
!
interface GigabitEthernet0/0
 vrf forwarding Mgmt-vrf
 no ip address
 negotiation auto
!
interface GigabitEthernet1/0/1
 shutdown
!
interface GigabitEthernet1/0/2
 shutdown
!
interface GigabitEthernet1/0/3
 shutdown
!
interface GigabitEthernet1/0/4
 shutdown
!
interface GigabitEthernet1/0/5
 switchport mode trunk
 channel-group 1 mode desirable
!
interface GigabitEthernet1/0/6
 switchport mode trunk
 channel-group 1 mode desirable
!
interface GigabitEthernet1/0/7
 shutdown
!
interface GigabitEthernet1/0/8
 shutdown
!
interface GigabitEthernet1/0/9
 shutdown
!
interface GigabitEthernet1/0/10
 shutdown
!
```

```
interface GigabitEthernet1/0/11
 switchport mode trunk
!
interface GigabitEthernet1/0/12
 shutdown
!
interface GigabitEthernet1/0/13
 shutdown
!
interface GigabitEthernet1/0/14
 shutdown
!
interface GigabitEthernet1/0/15
 shutdown
!
interface GigabitEthernet1/0/16
 shutdown
!
interface GigabitEthernet1/0/17
 shutdown
!
interface GigabitEthernet1/0/18
 shutdown
!
interface GigabitEthernet1/0/19
 shutdown
!
interface GigabitEthernet1/0/20
 shutdown
!
interface GigabitEthernet1/0/21
 shutdown
!
interface GigabitEthernet1/0/22
 shutdown
!
interface GigabitEthernet1/0/23
 switchport access vlan 13
 switchport mode access
 spanning-tree portfast
!
interface GigabitEthernet1/0/24
 shutdown
!
interface GigabitEthernet1/1/1
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3
!
```

```
interface GigabitEthernet1/1/4
!
interface Vlan1
 no ip address
!
ip forward-protocol nd
ip http server
ip http secure-server
!
control-plane
 service-policy input system-cpp-policy
!
banner motd ^C D1, ENCOR Skills Assessment, Scenario 2 ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login
line vty 5 15
 login
!
end
```

Switch D2

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

Current configuration : 6653 bytes
!
version 16.9
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
! Call-home is enabled by Smart-Licensing.
service call-home
no platform punt-keepalive disable-kernel-core
!
hostname D2
!
!
vrf definition Mgmt-vrf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
```

```
 exit-address-family
!
enable secret 9 $9$wOqJe6W8Yasi9k$7Mq8sTne4AGIivudnv6v4G.e30OcRAuXoSGcAa0DohY
!
aaa new-model
!
aaa authentication login default local
!
aaa session-id common
switch 1 provision ws-c3650-24ps
!
ip routing
!
no ip domain lookup
!
login on-success log
ipv6 unicast-routing
!
license boot level ipservicesk9!
!
diagnostic bootup level minimal
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
username admin privilege 15 secret 9
$9$1q0osHH4lstBHU$1DhwuWo4f1j.rLppTRRsOB86WpZaJIHSeukQ1a4uPA6
!
redundancy
 mode sso
!
transceiver type all
 monitoring
!
class-map match-any system-cpp-police-topology-control
  description Topology control
class-map match-any system-cpp-police-sw-forward
  description Sw forwarding, L2 LVX data, LOGGING
class-map match-any system-cpp-default
  description Inter FED, EWLC control, EWLC data
class-map match-any system-cpp-police-sys-data
  description Learning cache ovfl, High Rate App, Exception, EGR Exception,
NFLSAMPLED DATA, RPF Failed
class-map match-any system-cpp-police-punt-webauth
  description Punt Webauth
class-map match-any system-cpp-police-l2lvx-control
  description L2 LVX control packets
class-map match-any system-cpp-police-forus
  description Forus Address resolution and Forus traffic
class-map match-any system-cpp-police-multicast-end-station
```

```
  description MCAST END STATION
class-map match-any system-cpp-police-multicast
  description Transit Traffic and MCAST Data
class-map match-any system-cpp-police-l2-control
  description L2 control
class-map match-any system-cpp-police-dot1x-auth
  description DOT1X Auth
class-map match-any system-cpp-police-data
  description ICMP redirect, ICMP_GEN and BROADCAST
class-map match-any system-cpp-police-stackwise-virt-control
  description Stackwise Virtual
class-map match-any non-client-nrt-class
class-map match-any system-cpp-police-routing-control
  description Routing control and Low Latency
class-map match-any system-cpp-police-protocol-snooping
  description Protocol snooping
class-map match-any system-cpp-police-dhcp-snooping
  description DHCP snooping
class-map match-any system-cpp-police-system-critical
  description System Critical and Gold Pkt
!
policy-map system-cpp-policy
!
interface GigabitEthernet0/0
 vrf forwarding Mgmt-vrf
 no ip address
 negotiation auto
!
interface GigabitEthernet1/0/1
 shutdown
!
interface GigabitEthernet1/0/2
 shutdown
!
interface GigabitEthernet1/0/3
 shutdown
!
interface GigabitEthernet1/0/4
 shutdown
!
interface GigabitEthernet1/0/5
 shutdown
!
interface GigabitEthernet1/0/6
 shutdown
!
interface GigabitEthernet1/0/7
 shutdown
!
interface GigabitEthernet1/0/8
```

```
 shutdown
!
interface GigabitEthernet1/0/9
 shutdown
!
interface GigabitEthernet1/0/10
 shutdown
!
interface GigabitEthernet1/0/11
 switchport mode trunk
!
interface GigabitEthernet1/0/12
 shutdown
!
interface GigabitEthernet1/0/13
 shutdown
!
interface GigabitEthernet1/0/14
 shutdown
!
interface GigabitEthernet1/0/15
 shutdown
!
interface GigabitEthernet1/0/16
 shutdown
!
interface GigabitEthernet1/0/17
 shutdown
!
interface GigabitEthernet1/0/18
 shutdown
!
interface GigabitEthernet1/0/19
 shutdown
!
interface GigabitEthernet1/0/20
 shutdown
!
interface GigabitEthernet1/0/21
 shutdown
!
interface GigabitEthernet1/0/22
 shutdown
!
interface GigabitEthernet1/0/23
 switchport access vlan 13
 switchport mode access
 spanning-tree portfast
!
interface GigabitEthernet1/0/24
```

```
 switchport access vlan 8
 switchport mode access
 spanning-tree portfast
!
interface GigabitEthernet1/1/1
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3
!
interface GigabitEthernet1/1/4
!
interface Vlan1
 no ip address
!
ip forward-protocol nd
ip http server
ip http secure-server
!
control-plane
 service-policy input system-cpp-policy
!
banner motd ^C D2, ENCOR Skills Assessment, Scenario 2 ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login
line vty 5 15
 login
!
end
```

Switch A1

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

Current configuration : 1926 bytes
!
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname A1
```

```
!
boot-start-marker
boot-end-marker
!
enable secret 9 $9$a7qnivVydjhJqa$ehWSSxHj7jf6s7gjbuVc4PLGJY0dv2k.VtPqL1cn0vs
!
username admin privilege 15 secret 9
$9$itvXO10OdR7sMq$9ffgjFDlEL2j8T3040Eb21fA/2Cyjb2tHF5rZrWtZKY
aaa new-model
!
aaa authentication login default local
!
aaa session-id common
system mtu routing 1500
!
no ip domain-lookup
ipv6 unicast-routing
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
interface Port-channel1
 switchport mode trunk
!
interface FastEthernet0/1
 switchport mode trunk
 channel-group 1 mode desirable
!
interface FastEthernet0/2
 switchport mode trunk
 channel-group 1 mode desirable
!
interface FastEthernet0/3
 shutdown
!
interface FastEthernet0/4
 shutdown
!
interface FastEthernet0/5
 shutdown
!
interface FastEthernet0/6
 shutdown
!
interface FastEthernet0/7
 shutdown
!
interface FastEthernet0/8
```

```
 shutdown
!
interface FastEthernet0/9
 shutdown
!
interface FastEthernet0/10
 shutdown
!
interface FastEthernet0/11
 shutdown
!
interface FastEthernet0/12
 shutdown
!
interface FastEthernet0/13
 shutdown
!
interface FastEthernet0/14
 shutdown
!
interface FastEthernet0/15
 shutdown
!
interface FastEthernet0/16
 shutdown
!
interface FastEthernet0/17
 shutdown
!
interface FastEthernet0/18
 shutdown
!
interface FastEthernet0/19
 shutdown
!
interface FastEthernet0/20
 shutdown
!
interface FastEthernet0/21
 shutdown
!
interface FastEthernet0/22
 shutdown
!
interface FastEthernet0/23
 switchport access vlan 8
 switchport mode access
 spanning-tree portfast edge
!
interface FastEthernet0/24
```

```
 shutdown
!
interface GigabitEthernet0/1
 shutdown
!
interface GigabitEthernet0/2
 shutdown
!
interface Vlan1
 no ip address
!
ip http server
ip http secure-server
!
banner motd ^C A1, ENCOR Skills Assessment, Scenario 2 ^C
!
line con 0
 exec-timeout 0 0
 logging synchronous
line vty 0 4
 login
line vty 5 15
 login
!
end
```