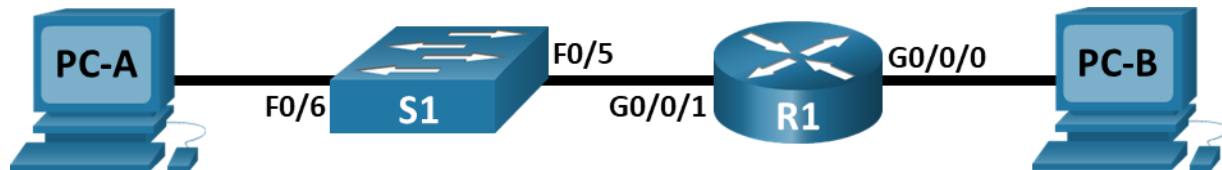


CCNAv7 ITN Skills Assessment (Instructor Version)

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

Topology



Assessment Objectives

Part 1: Develop an IP Addressing Scheme (20 points, 25 minutes)

Part 2: Initialize and Reload Devices (10 points, 20 minutes)

Part 3: Configure Device IP address and Security Settings (45 points, 35 minutes)

Part 4: Test and Verify IPv4 and IPv6 End-to-End Connectivity (15 points, 20 minutes)

Part 5: Use the IOS CLI to Gather Device Information (10 points, 10 minutes)

Scenario

In this Skills Assessment (SA) you will configure the devices in a small network. You must configure a router, switch and PCs to support both IPv4 and IPv6 connectivity. You will configure security, including SSH, on the router. In addition, you will test and document the network using common CLI commands.

Instructor Note: For the student version of this exam, the instructor should build the network and connect devices prior to the student starting the exam. This will save time and reduce wear on cables and equipment. The student will need to initialize and reload devices.

Instructor Note: The router used with this SA is a Cisco 4221 with Cisco IOS XE Release 16.9.4 (universalk9 image). The switches used in the labs are 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. Refer to the Router Interface Summary Table at the end of the lab for the correct interface identifiers. Refer to the **Router Interface Summary Table** at the end of the lab for the correct interface identifiers.

Instructor Note: For the initial SA setup, the router and switch should have a startup-configuration saved with hostnames (Rtr & Sws). The router should also have a loopback address configured and the switch should have vlan 99 configured. These configurations will be used to verify that the student initialized the devices correctly in Part 2. It is recommended that these configurations are saved to flash as SA_Init and used to reset the device for the next student.

Initial Script for SA:

Router

```

enable
config terminal
hostname Rtr
interface lo1
ip address 10.10.10.10. 255.255.255.255

```

```
end
copy run start
```

Switch

```
enable
config terminal
hostname Sws
vlan 99
end
copy run start
```

Instructor Note: Sample scoring and estimated times for each exam part are provided. These can be adjusted by the instructor as necessary to suit the testing environment. Total points for the exam are 100 and total time is estimated at 110 minutes. The instructor may elect to deduct points if excessive time is taken for a part of the assessment.

Required Resources

- 1 Router (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 1 Switch (Cisco 2960 with Cisco IOS Release 15.2(2) lanbasek9 image or comparable)
- 2 PCs (Windows with a terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Instructions**Part 1: Develop an IP Addressing Scheme**

Ref labs: Lab - Calculate IPv4 Subnets

Lab - Design and Implement a VLSM Addressing Scheme

Lab – Configure IPv6 Addresses on Network Devices

Total points: 20

Time: 25 minutes

- a. Your instructor will assign one of the IPv4 networks from the table below. You will subnet it to provide IP addresses to two subnets that will support the required number of hosts. No subnet calculators may be used. All work must be shown using the IP Addressing worksheet below.

Network	Number of Hosts in Subnet A	Number of Hosts in Subnet B
192.168.10.0/24	100	50
172.16.1.0/25	60	20
209.165.201.0/27	12	5

IP Addressing Worksheet

Specification	Subnet A	Subnet B
Number of bits in the subnet	Answers will vary.	Answers will vary.
IP mask (binary)	Answers will vary.	Answers will vary.
New IP mask (decimal)	Answers will vary.	Answers will vary.
Maximum number of usable subnets (including the 0 th subnet)	Answers will vary.	Answers will vary.
Number of usable hosts per subnet	Answers will vary.	Answers will vary.
IP Subnet	Answers will vary.	Answers will vary.
First IP Host address	Answers will vary.	Answers will vary.
Last IP Host address	Answers will vary.	Answers will vary.

b. Record your subnet assignment in the table below.

- 1) Assign the first IPv4 address of each subnet to a router interface
 - (i) subnet A is hosted on R1 G0/0/1
 - (ii) subnet B is hosted on R1 G0/0/0
- 2) Assign the last IPv4 address of each subnet to the PC NIC
- 3) Assign the second IPv4 address of subnet A to S1
- 4) List the maximum number of useable hosts per subnet

Description	Subnet A	Subnet B
First IP address	Answers will vary.	Answers will vary.
Last IP address	Answers will vary.	Answers will vary.
Maximum number of hosts	Answers will vary.	Answers will vary.

c. Record the IP address information for each device:

Device	IP address	Subnet Mask	Gateway	Points
PC-A	Answers will vary.	Answers will vary.	Answers will vary.	2 points
R1-G0/0/0	Answers will vary.	Answers will vary.	N/A	2 points
R1-G0/0/1	Answers will vary.	Answers will vary.	N/A	2 points
S1	Answers will vary.	Answers will vary.	Answers will vary.	2 points
PC-B	Answers will vary.	Answers will vary.	Answers will vary.	2 points

- d. Use the IPv6 address 2001:db8:acad::/48 and create two subnets for use in this network. Record the IPv6 addresses in the table.

Assigned to Interface	IPv6 Subnet Address	Prefix Length
Answers will vary.	Answers will vary.	Answers will vary.
Answers will vary.	Answers will vary.	Answers will vary.

- e. Record the IPv6 address information for each device.

Note: Use **FE80::1** as the link-local address on both router interfaces.

Device	IPv6 address	Prefix Length	Gateway	Points
R1-G0/0/0	Answers will vary.	Answers will vary.	N/A	3 pts
R1-G0/0/1	Answers will vary.	Answers will vary.	N/A	3 pts
S1	Answers will vary.	Answers will vary.	Answer will vary.	4 pts

Before proceeding, verify your IP addressing scheme with the instructor.

Instructor Sign-off Part 1:

Instructor Sign-off

Total Points for Part 1 (20 points):

Enter score here.

Part 2: Initialize and Reload Devices

Ref labs: 2.9.2 Lab – Basic Switch and End Device Configuration

10.4.4 Lab – Build a Switch and Router Network

Total points: 10

Time: 20 minutes

- Erase the startup configurations and VLANs from the router and switch and reload the devices.
- After the switch is reloaded, change the SDM template to one that supports IPv6 as necessary, and reload the switch again.

Before proceeding, ask your instructor verify device initializations.

Task	IOS Command	Points
Erase the startup-config file on the Router.	Rtr# erase startup-config	(2 point)
Reload the Router.	Rtr# reload (Verify by using show run command to see if loopback address is missing. Hostname should be reset back to Router .)	(1 point)
Erase the startup-config file on the Switch.	Sws# erase startup-config	(2 point)

Task	IOS Command	Points
Delete the vlan.dat file on the Switch	Sws# del vlan.dat (Verify by using the show vlan command and look for vlan 99, if vlan.dat file was deleted vlan 99 will not be listed.)	(2 point)
Reload the Switch.	Sws# reload (To verify check to see if hostname is reset back to Switch .)	(1 point)
Verify the Switch SDM Template	Switch# show sdm prefer (To verify check to see that the SDM template supports IPv6; this will vary depending upon the switch being used)	(2 point)

Instructor Sign-off Part 2:*Instructor Sign-off***Total points (10 points):***Enter score here.***Part 3: Configure Device IP Address and Security Settings****Ref labs: 2.9.2 Lab - Basic Switch and End Device Configuration****10.4.4 Lab - Build a Switch and Router Network****16.4.7 Lab - Configure Network Devices with SSH****16.5.2 Lab - Secure Network Devices****Total points: 45****Time: 35 minutes****Step 1: Configure R1.**

Configuration tasks for R1 include the following:

Task	Specification	Points
Disable DNS lookup		1 point
Router name	R1	1 point
Domain name	ccna-lab.com	1 point
Encrypted privileged EXEC password	ciscoenpass	1 point
Console access password	ciscoconpass	1 point
Set the minimum length for passwords	10 characters	2 points
Create an administrative user in the local database	Username: admin Password: admin1pass	2 points
Set login on vty lines to use local database		1 point

Task	Specification	Points
Set vty lines to accept SSH connections only		1 point
Encrypt the clear text passwords		1 point
Configure an MOTD Banner		1 point
Enable IPv6 Routing		1 point
Configure Interface G0/0/0	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as FE80::1 Set the Layer 3 IPv6 address Activate Interface	6 points
Configure Interface G0/0/1	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as FE80::1 Set the Layer 3 IPv6 address Activate Interface	6 points
Generate an RSA crypto key	1024 bits modulus	2 points

Instructor Note: Ask the student to connect to R1, and then verify the proper configuration.

Task	Specification	IOS Commands
Disable DNS lookup		R1# show run (Look for: no ip domain lookup)
Router name	R1	(Look for: R1> or R1# command prompt)
Domain name	ccna-lab.com	R1# show run (Look for: ip domain name ccna-lab.com)
Encrypted privileged EXEC password	ciscoenpass	R1> enable (Type in privileged EXEC password)
Console access password	ciscoconpass	R1# exit (Type in access password)
Set the minimum length for passwords	10 characters	R1# show run include security (Look for: security passwords min-length 10)
Create an administrative user the in local database	User: admin Password: admin1pass	R1# ssh -l admin 192.168.10.1 (G0/0/1 interface IP address) R1# ssh -l admin 172.16.1.1 (G0/0/1 interface IP address) R1# ssh -l admin 209.165.201.1 (G0/0/1 interface IP address) (Type in the username and password. Type exit to leave SSH session.)

Task	Specification	IOS Commands
MOTD Banner		(Verify banner during above step)
Set login on vty lines to use local database		R1# show run section vty (Look under line vty 0 4 for: login local)
Set vty lines to accept SSH connections only		R1# show run section vty (Look under line vty 0 4 for: transport input ssh)
Encrypt the plain text passwords		R1# show run include password (Look for: service password-encryption)
Enable IPv6 Routing		R1# show run include routing (Look for ipv6 unicast-routing)
Interface G0/0/0	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as FE80::1 Set the Layer 3 IPv6 address Activate Interface	R1# show interface g0/0/0 R1# show ipv6 interface g0/0/0 (Look for IP address, description, and verify that interface is not administratively down.)
Interface G0/0/1	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as FE80::1 Set the Layer 3 IPv6 address Activate Interface	R1# show ip interface g0/0/1 R1# show ipv6 interface g0/0/1 (Look for IP address, description, and verify that interface is not administratively down.)
Generate an RSA crypto key.	1024 bits modulus	R1# show crypto key mypubkey rsa (Look for Key name= R1.ccna-lab.com.)

Step 2: Configure S1.

Configuration tasks for S1 include the following:

Task	Specification	Points
Disable DNS lookup		1 point
Switch name	S1	1 point
Domain name	ccna-lab.com	1 point
Encrypted privileged EXEC password	ciscoenpass	1 point
Console access password	ciscoconpass	1 point
Shutdown all unused interfaces	F0/1-4, F0/7-24, G0/1-2	1 point

Task	Specification	Points
Create an administrative user in the local database	Username: admin Password: admin1pass	1 point
Set login on vty lines to use local database		1 point
Set vty lines to accept SSH connections only		1 point
Encrypt the clear text passwords		1 point
Configure an MOTD Banner		1 point
Generate an RSA crypto key	1024 bits modulus	2 points
Configure Management Interface (SVI) on VLAN1	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as FE80::2 Set the Layer 3 IPv6 address	2 points

Instructor Note: Have the student connect to S1, and then verify the proper configuration.

Task	Specification	IOS Commands
Disable DNS lookup		S1# show run inc domain (Look for: no ip domain lookup)
Switch name	S1	(Look for: S1> or S1# command prompt)
Domain name	ccna-lab.com	S1# show run include domain (Look for: ip domain name ccna-lab.com)
Encrypted privileged EXEC password	ciscoenpass	S1> enable (Type in privileged EXEC password)
Console access password	ciscoconpass	S1> exit (Type in console access password)
Interfaces shutdown	Interfaces F0/1-4, F0/7-24, G0/1-2	S1# show ip interface brief (all interfaces should be administratively down, except F0/5, F0/6, and VLAN 1)
Create an administrative user in the local database	User: admin Password: admin1pass	S1# ssh -l admin 192.168.10.2 (VLAN 1 interface IP address) S1# ssh -l admin 172.16.1.2 (VLAN 1 interface IP address) S1# ssh -l admin 209.165.201.2 (VLAN 1 interface IP address) (Type in the username and password. Type exit to leave SSH session.)
MOTD Banner		(Verify banner during above step)
Set login on vty lines to use local database		S1# show run section vty (Look under line vty 0 4 for: login local)

Task	Specification	IOS Commands
Set vty lines to accept SSH connections only		S1# show run section vty (Look under line vty 0 4 for: transport input ssh)
Encrypt the plain text passwords		S1# show run include password (Look for: service password-encryption)
Generate an RSA crypto key.	1024 bits modulus	S1# show crypto key mypubkey rsa (Look for Key name= S1.ccna-lab.com.)
Configure Management Interface (SVI)	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as FE80::2 Set the Layer 3 IPv6 address	S1# show interface vlan 1 S1# show ipv6 interface vlan 1 (Look at interface VLAN1 and verify that the correct IP address has been assigned.)

Step 3: Configure host computers.

After configuring each host computer, record the host network settings with the **ipconfig /all** command. (2 points)

PC-A Network Configuration (1 point)	
Description	Answers will vary.
Physical Address	Answers will vary.
IPv4 Address	Answers will vary.
Subnet Mask	Answers will vary.
IPv4 Default Gateway	Answers will vary.
IPv6 Address	Answers will vary.
IPv6 Default Gateway	Answers will vary.

PC-B Network Configuration (1 point)	
Description	Answers will vary.
Physical Address	Answers will vary.
IP Address	Answers will vary.
Subnet Mask	Answers will vary.
Default Gateway	Answers will vary.
IPv6 Address	Answers will vary.
IPv6 Default Gateway	Answers will vary.

Points for Step 1 (28 points):

Enter score here.

Points for Step 2 (15 points):

Enter score here.

Points for Step 3 (2 points):

Enter score here.

Instructor Sign-off Part 4:

Instructor Sign-off

Total Points for Part 3 (45 points)

Enter score here.

Part 4: Test and Verify End-to-End Connectivity

Ref lab: 13.3.2 Lab – Use Ping and Traceroute to Test Network Connectivity

Total points: 15

Time: 10 minutes

Use the ping command to test IPv4 and IPv6 connectivity between all network devices.

Note: If pings to host computers fail, temporarily disable the computer firewall and retest.

Use the following table to methodically verify connectivity with each network device. Take corrective action to establish connectivity if a test fails:

From	To	Protocol	IP Address	Ping Results	Points
PC-A	R1 G0/0/0	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point
	R1 G0/0/1	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point
	S1 VLAN 1	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point
	PC-B	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point
PC-B	R1 G0/0/0	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point
	R1 G0/0/1	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point
	S1 VLAN1	IPv4	Answers will vary.	Should be successful.	1 point
		IPv6	Answers will vary.	Should be successful.	1 point

In addition to the ping command, what other command is useful in displaying network delay and breaks in the path to the destination? (1 point)

Type your answers here.

tracert or traceroute**Instructor Sign-off Part 4:***Instructor Sign-off***Total points for Part 4 (15 points):***Enter score here.***Part 5: Use the IOS CLI to Gather Device Information****Ref labs: 2.9.2 Lab – Basic Switch and End Device Configuration****10.4.3 Lab – Build a Switch and Router Network****Total points: 10****Time: 10 minutes****Step 1: Issue the appropriate command to discover the following information:****Instructor Note:** Answers for step 1 will vary based on router model and IOS.

Description		Points
Router Model	Answers will vary.	1/3 point
IOS Image File	Answers will vary.	1/3 point
Total RAM	Answers will vary.	1/3 point
Total Flash Memory	Answers will vary.	1/3 point
Configuration Register	Answers will vary.	1/3 point
CLI Command Used	show version	1/3 point

Step 2: Enter the appropriate CLI command needed to display the following on R1:

Command Description	Command	Points
Display a summary of important information about the IPv4 interfaces on R1.	show ip interface brief	1 point
Display the IPv4 routing table.	show ip route	1 point
Display the Layer 2 to Layer 3 mapping of addresses on R1.	show arp	1 point
Display detailed IPv4 information about interface G0/0/0 on R1.	show interface g0/0/0	1 point
Display the IPv6 routing table.	show ipv6 route	1 point
Display a summary of IPv6 interface addresses and status.	show ipv6 interface brief	1 point
Display information about the devices connected to R1. Information should include Device ID, Local Interface, Hold time, Capability, Platform, and Port ID.	show cdp neighbor	1 point

Command Description	Command	Points
Save the current configuration so it will be used the next time the router is started.	<code>copy running-config startup-config</code>	1 point

Instructor Sign-off Part 5:*Instructor Sign-off***Total points for Part 5 (10 points):***Enter score here.***Part 6: Cleanup**

NOTE: DO NOT PROCEED WITH CLEANUP UNTIL YOUR INSTRUCTOR HAS GRADED YOUR SKILLS EXAM 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.

Before turning off power to the router and switch, remove the NVRAM configuration files (if saved) from both devices.

Disconnect and neatly put away all LAN cables that were used in the Final.

Router Interface Summary Table

Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
4221	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
4300	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)

Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.

Answer key for 192.168.10.0 /24

Specification	Subnet A (192.168.10.0 /24)	Subnet B (192.168.10.0 /24)
Number of bits in the subnet	7	6
IP mask (binary)	11111111.11111111.11111111.10000000	11111111.11111111.11111111.11000000
New IP mask (decimal)	255.255.255.128	255.255.255.192
Maximum number of usable hosts per subnet	126	62
Maximum usable subnets	2	4
IP Subnet	192.168.10.0	192.168.10.128
First IP Host address	192.168.10.1	192.168.10.129
Last IP Host address	192.168.10.126	192.168.10.190

Device	IP Address	Subnet Mask	Default Gateway
PC-A	192.168.10.125	255.255.255.128	192.168.10.1
S1-VLAN1	192.168.10.2	255.255.255.128	192.168.10.1
Router1-G0/0/0	192.168.10.129	255.255.255.192	N/A
Router1-G0/0/1	192.168.10.1	255.255.255.128	N/A
PC-B	192.168.10.190	255.255.255.192	192.168.10.129

Answer key for 172.16.1.0 /25

Specification	Subnet A	Subnet B
Number of bits in the subnet	6	5
IP mask (binary)	11111111.11111111.11111111.11000000	11111111.11111111.11111111.11100000
New IP mask (decimal)	255.255.255.192	255.255.255.224
Maximum number of usable hosts per subnet	62	60
Maximum usable subnets	2	4
IP Subnet	172.16.1.0	172.16.1.64
First IP Host address	172.16.1.1	172.16.1.65

Specification	Subnet A	Subnet B
Last IP Host address	172.16.1.62	172.16.1.94

Device	IP address	Subnet Mask	Default Gateway
PC-A	172.16.1.62	255.255.255.192	172.16.1.1
S1-VLAN1	172.16.1.2	255.255.255.192	172.16.1.1
Router1-G0/0/0	172.16.1.65	255.255.255.224	N/A
Router1-G0/0/1	172.16.1.1	255.255.255.192	N/A
PC-B	172.16.1.94	255.255.255.224	172.16.1.65

Answer key for 209.165.201.0 /27

Specification	Subnet A	Subnet B
Number of bits in the subnet	4	3
IP mask (binary)	11111111.11111111.11111111.11110000	11111111.11111111.11111111.11111000
New IP mask (decimal)	255.255.255.240	255.255.255.248
Maximum number of usable hosts per subnet	14	6
Maximum usable subnets	2	4
IP Subnet	209.165.201.0	209.165.201.16
First IP Host address	209.165.201.1	209.165.201.17
Last IP Host address	209.165.201.14	209.165.201.22

Device	IP address	Subnet Mask	Default Gateway
PC-A	209.165.201.14	255.255.255.240	209.165.201.1
S1-VLAN1	209.165.201.2	255.255.255.240	209.165.201.1
Router1-G0/0/0	209.165.201.17	255.255.255.248	N/A
Router1-G0/0/1	209.165.201.1	255.255.255.240	N/A
PC-B	209.165.201.22	255.255.255.248	209.165.201.17

Device Configs

Router R1 (Final)

```
R1# show run
```

```
Building configuration...
```

```
Current configuration : 1996 bytes
```

```
!
```

```
version 16.9
```

```
service timestamps debug datetime msec
```

```
service timestamps log datetime msec
```

```
service password-encryption
```

```
platform qfp utilization monitor load 80
```

```
no platform punt-keepalive disable-kernel-core
```

```
!
```

```
hostname R1
```

```
!
```

```
boot-start-marker
```

```
boot-end-marker
```

```
!
```

```
!
```

```
vrf definition Mgmt-intf
```

```
!
```

```
address-family ipv4
```

```
exit-address-family
```

```
!
```

```
address-family ipv6
```

```
exit-address-family
```

```
!
```

```
security passwords min-length 10
```

```
enable secret 5 $1$tb37$HEFly7HEQ9wFtxe8mOxge1
```

```
!
```

```
no aaa new-model
```

```
!
```

```
!
```

```
no ip domain lookup
```

```
ip domain name ccna-lab.com
```

```
!
```

```
login on-success log
```

```
!
```

```
subscriber templating
```

```
!
```

```
ipv6 unicast-routing
```

```
multilink bundle-name authenticated
```

```
!
```

```
spanning-tree extend system-id
```

```
!
```

```
username admin secret 5 $1$v7EB$LvxDoR.KMsSFTmxJHIuyz0
```

```
!  
redundancy  
mode none  
!  
!  
interface GigabitEthernet0/0/0  
description Connection to PC-B  
ip address 192.168.10.129 255.255.255.192  
! ip address 172.16.1.65 255.255.255.224  
! ip address 209.165.201.17 255.255.255.248  
negotiation auto  
ipv6 address FE80::1 link-local  
ipv6 address 2001:DB8:ACAD:A::1/64  
!  
interface GigabitEthernet0/0/1  
description Connection to S1  
ip address 192.168.10.1 255.255.255.128  
! ip address 172.16.1.1 255.255.255.192  
! ip address 209.165.201.1 255.255.255.240  
negotiation auto  
ipv6 address FE80::1 link-local  
ipv6 address 2001:DB8:ACAD:B::1/64  
!  
interface Serial0/1/0  
no ip address  
!  
interface Serial0/1/1  
no ip address  
!  
interface GigabitEthernet0  
vrf forwarding Mgmt-intf  
no ip address  
negotiation auto  
!  
ip forward-protocol nd  
no ip http server  
ip http secure-server  
ip tftp source-interface GigabitEthernet0  
!  
!  
control-plane  
!  
banner motd ^C Authorized Users Only! ^C  
!  
line con 0  
password 7 070C285F4D061A0A19020A1F17  
logging synchronous  
login  
transport input none  
stopbits 1
```



```
line aux 0
  stopbits 1
line vty 0 4
  login local
  transport input ssh
!
!
end
```

Switch S1 (Final)

```
S1#show run
Building configuration...

Current configuration : 1738 bytes
!
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname S1
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$U.Gu$rthhg.cuhJE18OG614qNh/
!
username admin secret 5 $1$c0St$WJhIQdKvG3VLq/6rqysLE.
no aaa new-model
system mtu routing 1500
!
!
no ip domain lookup
ip domain-name ccna-lab.com
!
!
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
interface FastEthernet0/1
  shutdown
!
interface FastEthernet0/2
  shutdown
```

```
!  
interface FastEthernet0/3  
shutdown  
!  
interface FastEthernet0/4  
shutdown  
!  
interface FastEthernet0/5  
!  
interface FastEthernet0/6  
!  
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
shutdown
!
interface FastEthernet0/24
shutdown
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
!
interface Vlan1
description Connection to R1
ip address 192.168.10.2 255.255.255.128
! ip address 172.16.1.2 255.255.255.192
! ip address 209.165.2201.2 255.255.255.240
ipv6 address FE80::2 link-local
ipv6 address 2001:DB8:ACAD:A::2/64
!
ip default-gateway 192.168.10.1
! ip default-gateway 172.16.1.1
! ip default-gateway 209.165.201.1
ip http server
ip http secure-server
!
!
banner motd ^C Authorized Users Only! ^C
!
line con 0
password 7 094F471A1A0A141D051C053938
login
line vty 0 4
login local
transport input ssh
line vty 5 15
login
!
end
```