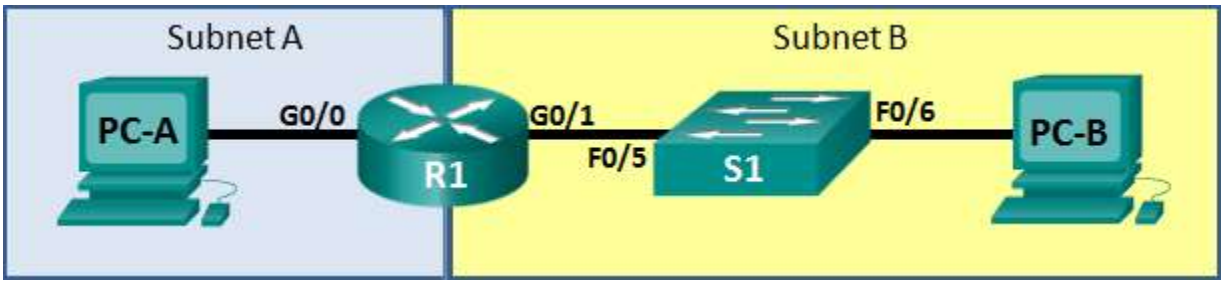
CCNA: Introduction to Networks

Skills Assessment – Student Training Exam

Topology



Assessment Objectives

Part 1: Develop the IPv4 Address Scheme (15 points, 20 minutes)

Part 2: Initialize and Reload Devices (10 points, 5 minutes)

Part 3: Configure Device IPv4 and Security Settings (30 points, 20 minutes)

Part 4: Test and Verify IPv4 End-to-End Connectivity (8 points, 10 minutes)

Part 5: Configure IPv6 Addressing on R1 (10 points, 10 minutes)

Part 6: Test and Verify IPv6 End-to-End Connectivity (7 points, 10 minutes)

Part 7: Use the IOS CLI to Gather Device Information (10 points, 10 minutes)

Part 8: Save the R1 Configuration to a TFTP Server (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. You will test and document the network using common CLI commands. Finally, you will save the router configuration to a TFTP server.

Required Resources

- 1 Router (Cisco 1941 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
- 1 Switch (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
- 2 PCs (Windows 7, Vista, or XP with terminal emulation program, such as Tera Term)
- Console cable to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Instructor Note: Part 8 requires a TFTP server. Tftpd32 is recommended and must be preinstalled on PC-A.

Instructor Note: If Windows XP hosts are used, it may be necessary to install IPv6. Refer to Lab 0.0.0.2: *Installing the IPv6 Protocol with Windows XP* in the Instructor Lab Manual.

Part 1: Develop the IPv4 Addressing Scheme

Total points: 15

Time: 20 minutes

Given an IP address and mask of __192.168.0.0/24__ (address / mask), design an IP addressing scheme that satisfies the following requirements. Network address/mask and the number of hosts for Subnets A and B will be provided by your instructor.

Subnet	Number of Hosts
Subnet A	126
Subnet B	126

The 0th subnet is used. No subnet calculators may be used. All work must be shown on the other side of this page.

Subnet A		
Specification	**Student Input**	**Points**
Number of bits in the subnet	25	(5 points)
IP mask (binary)	11111111.11111111.11111111.10000000	
New IP mask (decimal)	255.255.255.128	
Maximum number of usable subnets (including the 0th subnet)	2	
Number of usable hosts per subnet	126	
IP Subnet	192.168.0.0	
First IP Host address	192.168.0.1	
Last IP Host address	192.168.0.126	

Subnet B		
Specification	**Student Input**	**Points**
Number of bits in the subnet	25	(5 points)
IP mask (binary)	11111111.11111111.11111111.10000000	
New IP mask (decimal)	255.255.255.128	
Maximum number of usable subnets (including the 0th subnet)	2	
Number of usable hosts per subnet	126	
IP Subnet	192.168.0.128	
First IP Host address	192.168.0.129	
Last IP Host address	192.168.0.254	

Host computers will use the first IP address in the subnet. The network router will use the LAST network host address. The switch will use the second to the last network host address.

Write down the IP address information for each device:

Device	IP address	Subnet Mask	Gateway	Points
PC-A	192.168.0.1	255.255.255.128	192.168.0.126	(5 points)
R1-G0/0	192.168.0.126	255.255.255.128	N/A	
R1-G0/1	192.168.0.254	255.255.255.128	N/A	
S1	192.168.0.253	255.255.255.128	N/A	
PC-B	192.168.0.129	255.255.255.128	192.168.0.254	

Before proceeding, verify your IP addresses with the instructor.

Instructor Sign-off Part 1: _____

Points: _____ **of 15**

Part 2: Initialize and Reload Devices

Total points: 10

Time: 5 minutes

Step 1: Initialize and reload router and switch. (10 points)

Erase the startup configurations and VLANs from the router and switch and reload the devices.

Before proceeding, have your instructor verify device initializations.

Task	IOS Command	Points
Erase the startup-config file on the Router.	erase startup-config	(2 point)
Reload the Router.	reload	(2 point)
Erase the startup-config file on the Switch.	erase startup-config	(2 point)
Delete the vlan.dat file on the Switch	Delete flash:vlan.dat	(2 point)
Reload the Switch.	reload	(2 point)

Instructor Sign-off Part 2: _____

Points: _____ **of 10**

Part 3: Configure Device IPv4 and Security Settings

Total points: 30

Time: 20 minutes

Step 1: Configure host computers.

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

PC-A Network Configuration		Points
Description	PCANIC-R1G0/0	(2 points)
Physical Address	00.01.97.C9.56.67	
IP Address	192.168.0.1	
Subnet Mask	255.255.255.128	
Default Gateway	192.168.0.126	

PC-B Network Configuration		Points
Description	PCBNIC-S1F0/6	(2 points)
Physical Address	00.0C.CF.38.E2.E8	
IP Address	192.168.0.129	
Subnet Mask	255.255.255.128	
Default Gateway	192.168.0.254	

Step 2: 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)
Telnet access password	ciscovtypass	(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	login local	(1 point)
Set VTY lines to accept ssh and telnet connections only	transport input telnet ssh	(2 points)
Encrypt the clear text passwords	service password-encryption	(1 point)
MOTD Banner	banner motd	(1 point)
Interface G0/0	Set the description Set the Layer 3 IPv4 address Activate Interface	(2 points)
Interface G0/1	Set the description Set the Layer 3 IPv4 address Activate Interface	(2 points)
Generate a RSA crypto key	1024 bits modulus	(2 points)

Step 3: Configure S1.

Configuration tasks for R1 include the following:

Task	Specification	Points
Switch name	S1	(1 point)
Configure Management Interface (SVI)	Set the Layer 3 IPv4 address	(1 point)
Encrypted privileged exec password	ciscoenpass	(1 point)
Console access password	ciscoconpass	(1 point)
Telnet access password	ciscovtypass	(1 point)

Instructor Sign-off Part 3: _____

Points: _____ **of 30**

Part 4: Test and Verify IPv4 End-to-End Connectivity

Total points: 8

Time: 10 minutes

Step 1: Verify network connectivity.

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

Note: If pings to host computers fail, temporarily disable the computer firewall and retest. To disable a Windows 7 firewall, select Start > Control Panel > System and Security > Windows Firewall > Turn Windows Firewall on or off, select **Turn off Windows Firewall**, and click **OK**.

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

From	To	IP Address	Ping Results	Points
PC-A	R1, G0/0	192.168.0.126	Good	(1 point)
PC-A	R1, G0/1	192.168.0.254	Good	(1 point)
PC-A	S1 VLAN 1	192.168.0.253	good	(1 point)
PC-A	PC-B	192.168.0.129	good	(1 point)
PC-B	R1, G0/1	192.168.0.254	good	(1 point)
PC-B	R1, G0/0	192.168.0.126	good	(1 point)
PC-B	S1 VLAN 1	192.168.0.253	good	(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)

_____

tracert or traceroute

Instructor Sign-off Part 4: _____

Points: _____ **of 8**

Part 5: Configure IPv6 Addressing on R1

Total points: 10

Time: 10 minutes

Given an IPv6 network address of **2001:DB8:ACAD::/64**, configure IPv6 addresses for the Gigabit interfaces on R1. Use **FE80::1** as the link-local address on both interfaces.

Step 1: Configure R1.

Configuration tasks for R1 include the following:

Task	Specification	Points
Configure G0/0 to use the first address in subnet A.	Assign the IPv6 unicast address Assign the IPv6 link-local address	(4 points)
Configure G0/1 to use the first address in subnet B.	Assign the IPv6 unicast address Assign the IPv6 link-local address	(4 points)
Enable IPv6 unicast routing.	Command: Ipv6 unicast-routing	(2 points)

Instructor Sign-off Part 5: _____

Points: _____ **of 10**

Part 6: Test and Verify IPv6 End-to-End Connectivity

Total points: 7

Time: 10 minutes.

Step 1: Obtain the IPv6 address assigned to host PCs.

PC-A IPv6 Network Configuration		Points
Description	Fastethernet0	(1 point)
Physical Address	000C.8542.41D9	
IPv6 Address	**2001:DB8:ACAD:1::10**	
Default Gateway	2001:DB8:ACAD:1::1	

PC-B IPv6 Network Configuration		Points
Description	Fastethernet0	(1 point)
Physical Address	0007.ECE1.7186	
IPv6 Address	**2001:DB8:ACAD:2::10**	
IPv6 Default Gateway	**2001:DB8:ACAD:2::2**	

Step 2: Use the ping command to verify network connectivity.

IPv6 network connectivity can be verified with the ping command. Use the following table to methodically verify connectivity with each network device. Take corrective action to establish connectivity if a test fails:

From	To	IP Address	Ping Results	Points
PC-A	R1, G0/0	2001:DB8:ACAD:1::1	good	(1 point)
PC-A	R1, G0/1	2001:DB8:ACAD:2::2	good	(1 point)
PC-A	PC-B	2001:DB8:ACAD:2::10	good	(1 point)
PC-B	R1, G0/1	2001:DB8:ACAD:2::2	good	(1 point)
PC-B	R1, G0/0	2001:DB8:ACAD:1::1	Good	(1 point)

Instructor Sign-off Part 6: _____

Points: _____ **of 7**

Part 7: Use the IOS CLI to Gather Device Information

Total points: 10

Time: 10 minutes

Step 1: Issue the appropriate command to discover the following information:

Description	Student Input	Points
Router Model		(2 points)
IOS Image File		
Total RAM		
Total Flash Memory		
Configuration Register		
CLI Command Used	Show version	

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

Command Description	Student Input (command)	Points
Display a summary of important information about the interfaces on R1.	Sh ip int brief	(1 point)
Display the IPv4 routing table.	Sh ip route	(1 point)
Display the Layer 2 to Layer 3 mapping of addresses on R1.	Sh arp	(1 point)
Display detailed IPv4 information about interface G0/0 on R1.	Sh ip int g0/0	(1 point)
Display the IPv6 routing table.	Sh ipv6 route	(1 point)
Display a summary of IPv6 interface addresses and status.	Ah ipv6 int bri	(1 point)
Display information about the devices connected to R1. Information should include Device ID, Local Interface, Hold time, Capability, Platform, and Port ID.	Sh cdp neighbors	(1 point)
Save the current configuration so it will be used the next time the router is started.	copy running-config startup-config	(1 point)

Instructor Sign-off Part 7: _____

Points: _____ **of 10**

Part 8: Save the R1 Configuration to a TFTP Server.

Total points: 10

Time: 10 minutes

Save the current configuration for R1 to the TFTP Server on PC-A. Tftpd32 software has been installed on PC-A. You will need to start this program before you begin. Document the command used below:

Description	Student Input	Points
CLI Command	Copy startup-config tftp	(5 Points)
Address of remote host	192.168.0.1	
Destination Filename	R1-confg	

Instructor Sign-off Part 8: _____

Points: _____ **of 10**

Part 9: 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 Interface Summary				
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)

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.