

Skills-Based Assessment

Academy Student

Objective(s)

Part 1 - Create an IP addressing plan and document network device interfaces.

Part 2 – Connect the equipment, configure the customer router and verify network connectivity.

Exam Overview:

This skills-based assessment is the practical final exam for the course CCNA Discovery - Working at a Small-to-Medium Business or ISP. The exam is divided into two parts and Part 1 must be completed before Part 2. In Part 1 you will develop an IP subnet scheme and document device interfaces. In Part 2 you will cable the network and configure a customer router using IOS CLI commands. The customer router will route between Linksys wireless and wired local network clients and provide access to the ISP router. You will configure the customer router as a DHCP server to the wired networks. The Linksys will act as a DHCP server to the wireless clients. The RIP routing protocol will be used between the customer router and the ISP router.

When you have completed Part 1, give it to the instructor to check before starting on Part 2. Maximum time allowed to complete Part 1 is 50 minutes and Part 2 is also 50 minutes.

The ISP router will be preconfigured by the instructor. The startup configuration in your customer router will be erased prior to starting the exam.

Skills Based Assessment - Part 1

Develop the IP addressing scheme and document interfaces.

Interface Connections

Use the requirements provided in the next steps and the diagram following Step 3 to begin documenting the network. You will be working with customer AnyCompany1 or AnyCompany2. The customer router interface Fa0/0 connects to the Switch and wired clients on one subnet. The customer router interface Fa0/1 connects to the Linksys external Internet interface which supports wireless clients. This FastEthernet connection will share a second subnet.

Company name assigned by instructor (circle one): AnyCompany1 or AnyCompany2

NOTE:

If your local network is connected to the ISP as AnyCompany1, the IP address of the ISP serial 0 interface is 10.1.1.1 /24

If your local network is connected to the ISP as AnyCompany2, the IP address of the ISP serial 1 interface is 10.2.2.1 /24

The customer base IP address and subnet mask assigned: _____

NOTE:

If local network customer is AnyCompany1, use 192.168.11.0 /24

If local network customer is AnyCompany2, use 192.168.22.0 /24

Subnet requirements:

Develop a subnet scheme using the address assigned that will allow the existing customer network to support two subnets of up to forty (40) clients each and allow for growth to three (3) subnets in the future. The first subnet will be used for the wired clients. The second subnet will be used to assign an IP address to the customer router Fa0/1 and Linksys external Internet interface. The internal wireless network clients will use the default IP addressing assigned by the Linksys (network 192.168.1.0 /24 and host addresses from 192.168.1.100 – 192.168.1.149). The Linksys will use NAT/PAT to translate internal wireless client addresses to the external address. The internal wireless clients will not require a subnet from the base address.

Step 1: Label the cabling, devices, and interfaces on the diagram

- Draw the cabling between the networking devices and hosts. Use a lightning bolt to represent a serial cable, a solid line for an Ethernet straight-through cable, and a dashed line for an Ethernet crossover cable. Use a wavy line for wireless.
- Label each of the host PCs as wired or wireless.
- Label the FastEthernet and serial interfaces on the customer router and Linksys. Label which serial interface on the ISP router (Serial 0/0 or 0/1) is to be used. Label the switch ports to be used.

Step 2: Determine the number of subnet bits needed.

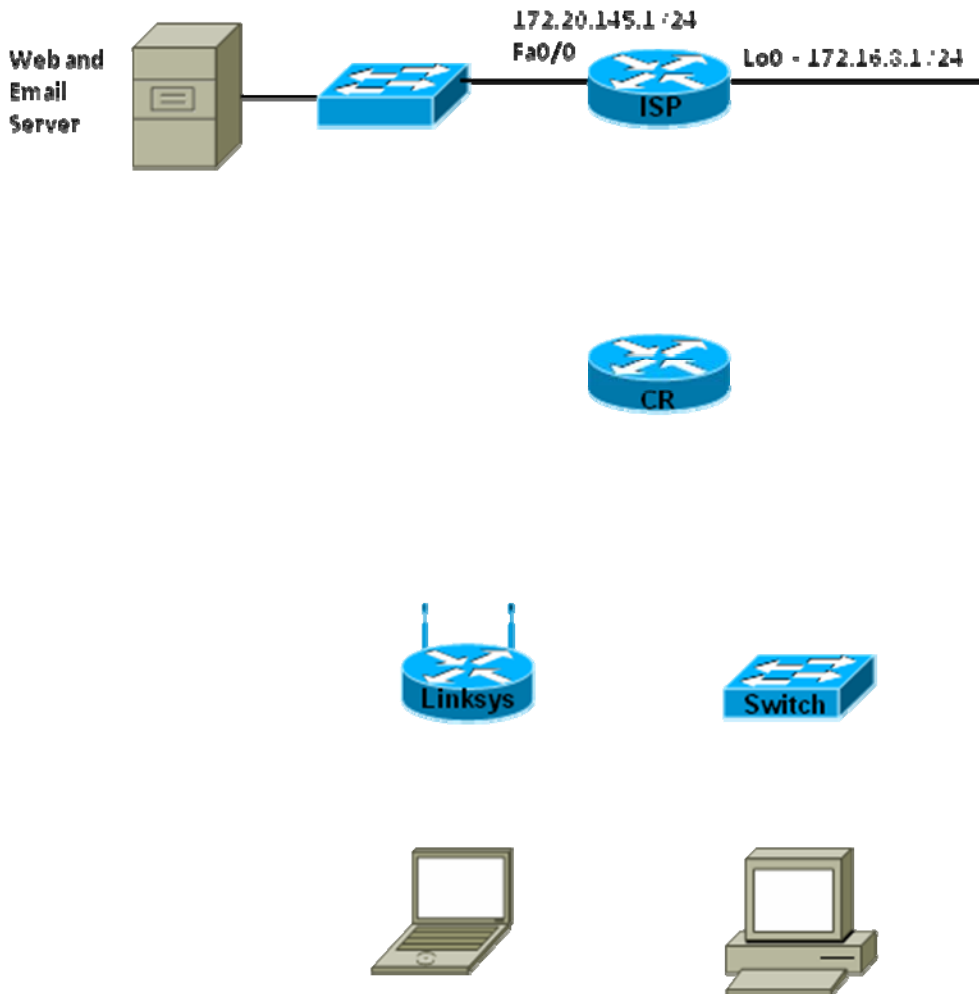
- Based on the customer requirements, how many hosts must each subnet support and how many subnets must there be to allow for future growth? _____ hosts per subnet and ____ subnets.

- b. To support the maximum number of hosts required per subnet, what is the number of host bits required? _____.
- c. How many host ID bits are reserved for the subnet ID to allow for the number of subnets required for future growth? _____
- d. What is the maximum possible number of subnets with this scheme? _____

Step 3: Calculate the custom subnet mask.

- a. What is the custom subnet mask in dotted decimal notation? _____._____._____._____
- b. What is the custom subnet mask in /# bits notation? _____

Customer / ISP Network Diagram



Step 4: Identify subnet and host IP addresses.

Based on the IP address assigned and the subnet mask identified, complete the table showing all the possible subnets for the 192.168.11.0 network if you are working with AnyCompany1, or 192.168.22.0 network if you are working with AnyCompany2. Provide entries for all of the subnets determined in Step 2. Note that some may be unused in your network.

Subnet	Subnet Address	Host IP Address Range	Broadcast Address

Step 5: Document the 1841 interfaces and Host IP addresses.

- a. Fill in the following table with the IP addresses, subnet masks, and connection information for the customer router interfaces. If an interface is not used, enter N/A. This information will be used in configuring the customer router (CR). If you are using a router other than an 1841, use the interface chart at the end of the lab to determine the proper interface designations.

NOTE: The first subnet will be used to assign DHCP addresses for wired clients attached to the switch. The second subnet will be used to assign static IP addresses for the customer router FastEthernet 0/1 interface and Linksys external interface.

For the Ethernet interfaces on the customer router, select the first available IP address on each subnet for the router interface on that subnet.

Interface (1841)	IP Address / Subnet Mask (include dotted decimal and slash bit notation for subnet mask)	How Address Obtained (Static or DHCP)	Connects to Device / Interface
Serial 0/0/0			
Serial 0/0/1			
Fa 0/0			
Fa 0/1			

- b. Write the IP address and /# bits subnet mask next to each interface on the diagram. This information will be used to configure the customer router.

Step 6: Document the Linksys interfaces and host IP addresses.

- a. Fill in the following table with the IP addresses, subnet masks, and connection information for the Linksys interfaces and wired and wireless hosts.

NOTE: The Linksys external Internet interface will not be a DHCP client.

Device / Interface	IP Address / Subnet Mask	How Address Obtained (Static or DHCP and from what device)
Linksys Internet interface (external address)		
Default Linksys LAN gateway (internal address)		
Default wireless hosts address range		
Wired hosts address range		

- b. Write the IP address and /# bits subnet mask next to each interface on the diagram. This information will be used to configure the customer router.

Skills-Based Assessment - Part 2

Connect the equipment, configure the customer router, and verify network connectivity.

Step 1: Configure the Linksys Internet interface and set the SSID.

- a. Log in to the Linksys router and verify that it is in the factory default state. Use the factory default of no user ID and a password of **admin**. The router internal IP address should be set to 192.168.1.1 and a subnet mask of 255.255.255.0. The DHCP address range should be 192.168.1.100 through 192.168.1.149. All security settings should be at the default settings, with no MAC filtering.
- b. If necessary, reset the Linksys using the **Administration** tab and the **Factory Defaults** option.
- c. Change the default Service Set Identifier (SSID) of the Linksys to **AnyCompany1** (or AnyCompany2) and ensure that it is being broadcast.
- d. Set the Internet IP address on the external interface to a static address and subnet mask that is compatible with the customer router FastEthernet interface Fa0/1. This address can be found in the Linksys table created in Part 1, Step 6. Set the default gateway to the address of the FastEthernet interface Fa0/1.

IP address: _____

Subnet mask: _____

Default gateway: _____


Step 2: Verify host PCs are DHCP clients.

Verify that both the wired and wireless host PCs are set to obtain their IP addresses automatically. What GUI options or commands did you use? _____

Step 3: Connect the network devices.

- a. Fill in the following table with the information indicated.
- b. Connect the network devices and hosts using the proper cables. Check off the installation items as you complete them.

Cabling Checklist

	Devices Connected	From Device /Interface	To Device /Interface	Cable Type
	Connect the Linksys to the 1841			
	Connect the 1841 to the ISP router (DCE)			
	Connect the 1841 to the switch			
	Connect wired PC to switch			
	Connect wireless PC to Linksys SSID entered in Part B, Step 1			


Step 4: Configure the 1841 customer router.

Use the following checklist to assist in configuring the 1841 customer router. Check off the configuration items as you complete them. Use IOS CLI commands to configure the router.

NOTE: Fill in all blanks in the table.

Device Configuration Checklist

Device Manuf. / Model Number: _____ IOS version: _____


	Configuration Item	Configuration Value	Notes / IOS Commands
	Configure the customer router host name	CR1 (if AnyCompany1) or CR2 (if AnyCompany2)	
	Configure passwords	Console: cisco Enable: cisco Enable Secret: class VTY terminals: cisco	
	Configure FastEthernet interface 0/0	IP address: _____ SN mask: _____	
	Configure FastEthernet interface 0/1	IP address: _____ SN mask: _____	
	Configure the WAN interface Serial 0/0/0 with PPP encapsulation (ISP provides clock rate)	IP address: _____ SN mask: _____	
	Configure DHCP server for wired network pool)	Subnet 1: _____	
	Configure a default route to the ISP router	IP address of ISP interface: _____	
	Configure RIP version 2 to advertise the customer networks	Net: _____ Net: _____	
	Display the running configuration and verify all settings		
	Save the running configuration to the startup configuration		

Step 5: Verify device configurations and network connectivity.

Use the following checklist to verify the IP configuration of each host and to test network connectivity. You will also display the running configuration, interface information, and routing tables. Check off the items as you complete them.

NOTE: Fill in all blanks in the table.

Configuration Verification and Connectivity Checklist

	Verification Item	Record Results Here
	From the command prompt of the wired PC, display the IP address, subnet mask, and default gateway	IP address: _____ Subnet mask: _____ Default gateway: _____
	From the command prompt of the wireless PC, display the IP address, subnet mask and default gateway	IP address: _____ Subnet mask: _____ Default gateway: _____
	Login to the Linksys GUI from the wireless host and record the LAN IP address and subnet mask, the Internet IP address and subnet mask, and the default gateway.	LAN IP address: _____ LAN subnet mask: _____ Internet address: _____ Subnet mask: _____ Default gateway: _____
	Ping from the CR router to the ISP Lo0 interface.	Result: _____
	Ping from the wired host to the ISP Lo0 interface.	Result: _____
	Ping from the wireless host to the ISP Lo0 interface.	Result: _____
	Display the IP routing table for the customer router	What three types of routes are in the table? _____ _____ _____
	Display the detailed interface information for S0/0 using the show interfaces s0/0 command	What is the encapsulation? _____
	Display the interface information for all CR interfaces using the show ip interface brief command	What is the status and protocol of interface Fa0/0, Fa0/1 and S0/0/0? _____ _____
	Capture the running configuration from the customer 1841 router in a text file on the desktop to show to the instructor. Name the file using your initials.	

Router Interface Summary				
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
800 (806)	Ethernet 0 (E0)	Ethernet 1 (E1)		
1600	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)
1700	Fast Ethernet 0 (FA0)	Fast Ethernet 1 (FA1)	Serial 0 (S0)	Serial 1 (S1)
1800	Fast Ethernet 0/0 (FA0/0)	Fast Ethernet 0/1 (FA0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2500	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)
2600	Fast Ethernet 0/0 (FA0/0)	Fast Ethernet 0/1 (FA0/1)	Serial 0/0 (S0/0)	Serial 0/1 (S0/1)
<p>NOTE:To find out exactly how the router is configured, look at the interfaces. Doing this will identify the type of router, as well as how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided in this chart are the identifiers for the possible combinations of interfaces in the device. This interface chart does not include any other type of interface, even though a specific router may contain one. An example of this is the ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in an IOS command to represent the interface.</p>				