LAB#7 Basic Static Route Configuration
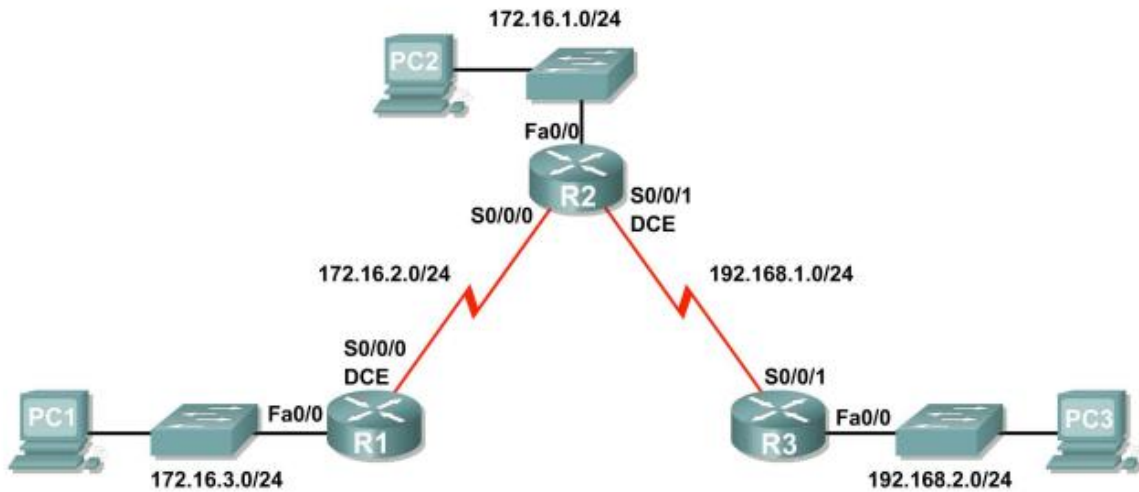
Topology Diagram

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	172.16.3.1	255.255.255.0	N/A
R1	S0/0/0	172.16.2.1	255.255.255.0	N/A
R2	Fa0/0	172.16.1.1	255.255.255.0	N/A
R2	S0/0/0	172.16.2.2	255.255.255.0	N/A
R2	S0/0/1	192.168.1.2	255.255.255.0	N/A
R3	FA0/0	192.168.2.1	255.255.255.0	N/A
R3	S0/0/1	192.168.1.1	255.255.255.0	N/A
PC1	NIC	172.16.3.10	255.255.255.0	172.16.3.1
PC2	NIC	172.16.1.10	255.255.255.0	172.16.1.1
PC3	NIC	192.168.2.10	255.255.255.0	192.168.2.1

Objectives

• Cable a network according to the Topology Diagram.

• Erase the startup configuration and reload a router to the default state.

• Perform basic configuration tasks on a router.

• *Interpret debug ip routing output.*

• *Configure and activate Serial and Ethernet interfaces.*

• *Test connectivity.*

• *Configure a static route using an exit interface.*

• *Compare a static route with intermediate address to a static route with exit interface.*

• *Configure a default static route.*

Procedures:

In this lab activity, you will create a network that is similar to the one shown in the Topology Diagram. Begin by cabling the network as shown in the Topology Diagram. You will then perform the initial router configurations required for connectivity. Use the IP addresses that are provided in the Addressing Table to apply an addressing scheme to the network devices. After completing the basic configuration, test connectivity between the devices on the network. First test the connections between directly connected devices, and then test connectivity between devices that are not directly connected. Static routes must be configured on the routers for end-to-end communication to take place between the network hosts. You will configure the static routes that are needed to allow communication between the hosts. View the routing table after each static route is added to observe how the routing table has changed.

Task 1: Cable, Erase, and Reload the Routers.

Step 1: Cable a network that is similar to the one in the Topology Diagram.

Step 2: Clear the configuration on each router Clear the configuration on each of the routers using the erase startup-config command and then reload the routers. Answer no if asked to save changes.

Task 2: Perform Basic Router Configuration.

Step 1: Use global configuration commands. On the routers, enter global configuration mode and configure the basic global configuration commands including:

• *hostname*

• *no ip domain-lookup*

• *enable secret*

Step 2: *Configure the console and virtual terminal line passwords on each of the routers.*

• *password*

• *login*

Step 3: *Add the logging synchronous command to the console and virtual terminal lines. This command is very helpful in both lab and production environments and uses the following syntax:*

Router(config-line)#logging synchronous

To synchronize unsolicited messages and debug output with solicited Cisco IOS software output and prompts for a specific console port line, auxiliary port line, or virtual terminal line, we can use the logging synchronous line configuration command. In other words, the logging synchronous command prevents IOS messages delivered to the console or Telnet lines from interrupting your keyboard input. For example, you may have already experienced something similar to the following example:

Note: Do not configure R1 interfaces yet.

R1(config)#interface fastethernet 0/0

R1(config-if)#ip address 172.16.3.1 255.255.255.0

R1(config-if)#no shutdown

R1(config)#line console 0

R1(config-line)#logging synchronous

R1(config-line)#line vty 0 4

R1(config-line)#logging synchronous

Task 3: Configure a Static Route Using a Next-Hop Address.

Step 1: *To configure static routes with a next-hop specified, use the following syntax:*

Router(config)# ip route network-address subnet-mask ip-address

• *network-address:—Destination network address of the remote network to be added to the routing table.*

• *subnet-mask—Subnet mask of the remote network to be added to the routing table. The subnet mask can be modified to summarize a group of networks.*

• *ip-address—Commonly referred to as the next-hop router's IP address.*

On the R3 router, configure a static route to the 172.16.1.0 network using the Serial 0/0/1 interface of R2 as the next-hop address.

R3(config)#ip route 172.16.1.0 255.255.255.0 192.168.1.2

R3(config)#

Step 2: View the routing table to verify the new static route entry. Notice that the route is coded with an S, which means that the route is a static route.

Task 4: Configure a Static Route Using an <mark>Exit Interface.</mark>

To configure static routes with an exit interface specified, use the following syntax:

 Router(config)# ip route network-address subnet-mask exit-interface

• network-address—Destination network address of the remote network to be added to the routing table.

• subnet-mask—Subnet mask of the remote network to be added to the routing table. The subnet mask can be modified to summarize a group of networks.

• exit-interface—Outgoing interface that would be used in forwarding packets to the destination network

Use the show running-config command to verify the static routes that are currently configured on R3.

Task 5: Configure a Default Static Route.

In the previous steps, you configured the router for specific destination routes. But could you do this for every route on the Internet? No. The router and you would be overwhelmed. To minimize the size of the routing tables, add a default static route. A router uses the default static route when there is not a better, more specific route to a destination. Instead of filling the routing table of R1 with static routes, we could assume that R1 is a stub router. This means that R2 is the default gateway for R1. If R1 has packets to route that do not belong to any of R1 directly connected networks, R1 should send the packet to R2. However, we must explicitly configure R1 with a default route before it will send packets with unknown destinations to R2. Otherwise, R1 discards packets with unknown destinations. To configure a default static route, use the following syntax:

Router(config)#ip route 0.0.0.0 0.0.0.0 { ip-address | interface }

Step 1: Configure the R1 router with a default route

Configure the R1 router with a default route using the Serial 0/0/0 interface of R1 as the next-hop interface.

R1(config)#ip route 0.0.0.0 0.0.0.0 172.16.2.2

R1(config)#