Lab 8: Static Routing Using Packet Tracer.

Student Name: -------------------------------------

Student ID: ----------------------------------------

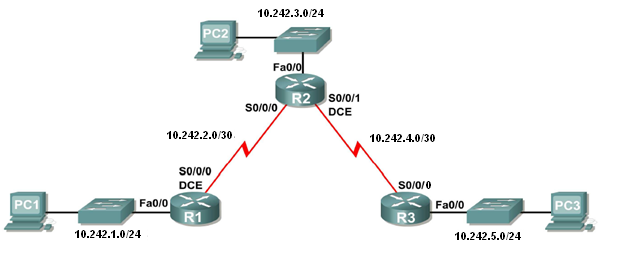
Student Section: ------------------------------------

**Objective:** Learn how to apply static routing on a network.

**Outcomes:** the student should be able to:

1. Cable a network according to the Topology Diagram.
2. Erase the startup configuration and reload a router to the default state.
3. Perform basic configuration tasks on a router.
4. Interpret debug IP routing output.
5. Configure and activate Serial and Ethernet interfaces.
6. Test connectivity.
7. Gather information to discover causes for lack of connectivity between devices.
8. Configure a static route using an intermediate address.
9. Configure a static route using an exit interface.
10. Configure a default static route.

**Topology Diagram:**



**Addressing Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** | **Default Gateway** |
| R1 | Fa0/0 | 10.242.1.1 | 255.255.255.0 | N/A |
| S0/0/0 | 10.242.2.1 | 255.255.255.252 | N/A |
| R2 | S0/0/0 | 10.242.2.2 | 255.255.255.252 | N/A |
| Fa0/0 | 10.242.3.1 | 255.255.255.0 | N/A |
| S0/0/1 | 10.242.4.1 | 255.255.255.252 | N/A |
| R3 | S0/0/0 | 10.242.4.2 | 255.255.255.252 | N/A |
| Fa0/0 | 10.242.5.1 | 255.255.255.0 | N/A |
| PC1 | NIC | 10.242.1.10 | 255.255.255.0 | 10.242.1.1 |
| PC2 | NIC | 10.242.3.10 | 255.255.255.0 | 10.242.3.1 |
| PC3 | NIC | 10.242.5.10 | 255.255.255.0 | 10.242.5.1 |

**Scenario:**

In this lab, we will create a network that is similar to the one shown in the Topology Diagram.

Begin by cabling the network shown. We 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.

**Task 1:** Cabling.

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

**Task 2:** Configuring Routers Interfaces.

**Step 1:** Configure R1 Interfaces (Fast interface and serial interface).

**Step 2:** Configure R2 Interfaces (Two serial interfaces and the fast interface).

**Step 3:** Configure R3 Interfaces (Fast interface and serial interface).

Configure PCs IP addresses.

**Task 3:** Test and Verify the Configurations.

**Step 1:** Test connectivity.

* From the host PC1, is it possible to ping the default gateway? \_\_\_\_\_\_\_\_
* From the host PC2, is it possible to ping the default gateway? \_\_\_\_\_\_\_\_
* From the host PC3, is it possible to ping the default gateway? \_\_\_\_\_\_\_\_

**Step 2:** Use the ping command to test connectivity between directly connected routers.

* + From the router R2, is it possible to ping R1 at 10.242.2.1? \_\_\_\_\_\_\_\_
  + From the router R2, is it possible to ping R3 at 10.242.4.2? \_\_\_\_\_\_\_\_

**Step 3:** Use ping to check connectivity between devices that are not directly connected.

* From the host PC3, is it possible to ping the host PC1? \_\_\_\_\_\_\_\_
* From the host PC3, is it possible to ping the host PC2? \_\_\_\_\_\_\_\_
* From the host PC2, is it possible to ping the host PC1? \_\_\_\_\_\_\_\_
* From the router R1, is it possible to ping router R3? \_\_\_\_\_\_\_\_
* These pings should all fail. Why?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task 6:** Gather Information.

**Step 1:** Check status of interfaces using the show command.

**R2# show ip interface brief.**

* Are all of the relevant interfaces on each router activated (that is, in the up and up state)? \_\_\_\_\_\_\_\_
* How many interfaces are activated on R1 and R3? \_\_\_\_\_\_\_
* Why are there three activated interfaces on R2? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 2:** View the routing table information for all three routers.

* R1#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R2#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What networks are present in the Topology Diagram but not in the routing table for R1? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What networks are present in the Topology Diagram but not in the routing table for R2? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What networks are present in the Topology Diagram but not in the routing table for R3? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task 7:** 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.

**Step2:** Configure static route to R1, R2, R3.

* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R2(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R2(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 3:** View the routing table to verify the new static route entry.

* R1#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R2#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What are the networks that have been added to the routing table for R1? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What are the networks that have been added to routing table for R2? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What are the networks that have been added to routing table for R3? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 4:** Use ping to check connectivity between the host PC3 and the host PC2.

* From the host PC3, is it possible to ping the host PC2? \_\_\_\_\_\_\_\_

**Task 8:** Configure a Static Route Using an Exit Interface.

**Step 1:** 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.

**Step 2:** Configure static route to R1, R2, and R3.

* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R2(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R2(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* R3(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 3:** View the routing table to verify the new static route entry (Provide a print screen of the routers routing tables.

**Step 4:** Use the show running-config command to verify the static routes that are currently configured on R3.

* How would you remove either of these routes from the configuration?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 5:** Use ping to check connectivity between the host PC2 and PC1.

* From the host PC1, is it possible to ping the host PC2? \_\_\_\_\_\_\_\_
* From the host PC1, is it possible to ping the host PC3? \_\_\_\_\_\_\_\_
* From the host PC3, is it possible to ping the host PC1? \_\_\_\_\_\_\_\_

**Task 9:** Configure a Default Static Route.

**Step 1:** A router uses the default static route when there is not a better, more specific route to a destination.

* 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 2:** Configure the R1 router with a default route.

* R1(config)#\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 3:** View the routing table to verify the new static route entry (provide a print screen for R1 Routing table).

* R1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_