**Static Routing Lab Activity**

**Lab Setup - Topology Diagram**



In this lab activity, you will create a network that is similar to the one shown in the

Topology Diagram. Create a VLSM Network that will allow us to save address space. Create a VLSM network using the Class C Network address **192.168.10.0.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Router** | | **Interface** | | **IP Address** | | **Subnet Mask** | |
| **R1** | | **Eth1/0** | | 192.168.10.89 | | **255.255.255.252** | |
| **Eth1/1** | | 192.168.10.85 | | **255.255.255.252** | |
| **Eth1/2** | | 192.168.10.65 | | **255.255.255.248** | |
| **R2** | | **Eth1/0** | | 192.168.10.97 | | **255.255.255.252** | |
| **Eth1/1** | | 192.168.10.86 | | **255.255.255.252** | |
| **Eth1/2** | | 192.168.10.81 | | **255.255.255.252** | |
| **R3** | | **Eth1/0** | | 192.168.10.90 | | **255.255.255.252** | |
| **Eth1/1** | | 192.168.10.93 | | **255.255.255.252** | |
| **Eth1/2** | | 192.168.10.1 | | **255.255.255.192** | |
| **R4** | | **Eth1/0** | | 192.168.10.98 | | **255.255.255.252** | |
| **Eth1/1** | | 192.168.10.94 | | **255.255.255.252** | |
| **Eth1/2** | | 192.168.10.73 | | **255.255.255.248** | |
| **Computer #** | **IP Address** | | **Subnet Mask** | | **Gateway** | |
| **PC1** | 192.168.10.66 | | **255.255.255.248** | | 192.168.10.65 | |
| **PC2** | 192.168.10.82 | | **255.255.255.252** | | 192.168.10.81 | |
| **PC3** | 192.168.10.2 | | **255.255.255.192** | | 192.168.10.1 | |
| **PC4** | 192.168.10.74 | | **255.255.255.248** | | 192.168.10.73 | |

Cable a network to match the Topology Diagram from page 1.

***Procedure*:**

For all of the steps below, please type the required commands below within each statement. Please pay close attention to the modes that you are in.

1. Configure the ***Ethernet1/0*** interface of ***R1 router*** with the ***IP address provided in the addressing table.***

***R1(config)#interface ethernet 1/0***

***R1(config-if)#ip address <IP Address> <Subnetmask>***

***R1(config-if)#no shutdown***

***R1(config-if)#***

***Note: The interface will not be fully active until the interface on R2 is configured and activated.***

1. Using Step 1 as an example, configure IP addresses and subnet masks for Ethernet ports 1/1 and 1/2.
2. Use the ***show running-config*** command to view the contents of R1.
3. Save the R1 configuration using the ***copy running-config startup-config***

command. (In Privileged EXEC mode).

1. Use the ***show startup-config*** command to display the startup configuration file of R1 router contained in NVRAM.
2. Use the ***show interfaces*** command to display the statistics for all interfaces configured on the router.
3. Use the ***show ip interface brief*** command to display a summary of the usability status information for each interface. See that all the relevant interfaces on the router is activated and should be in up and up state.
4. Enter the command ***show ip route*** to verify that the new routes are now in the routing table for R1. (In Privileged EXEC mode).

***For R2, R3, and R4*** repeat the above procedures.

**Configure IP address, subnet mask (slash notation) and gateway for each host PC.**

Configure the Ethernet interfaces of PC1, PC2, PC3, and PC4 with the ***IP address provided in the addressing table on page 1.*** Below is an example:

**PC-1> ip 172.17.10.21/24 172.17.10.1**

IP Address Slash Notation Gateway

***Testing Connectivity***

 Ping the router’s IP addresses that are directly connected to your router to verify all of the connections are working. (You should be able to successfully ping from routers directly connected to eachother).

 Ping the router’s IP addresses that are not directly connected to your router to **verify all of the connections are NOT working**.(From the router R1, is it possible to ping router R4?).

 Static routing can be added to the network so that devices that are not directly connected can ping each other.

 Set the necessary 5 static routes so that your router knows all of the networks that need to be routed. Verify that they are added to the routing table.

 Configure a Static Route Using a Next-Hop Address. To configure static routes with a next-hop specified, use the following syntax:

***Router(config)# ip route destination-network-address subnet-mask next\_hop\_ip- address***

**Parameters:**

*Destination-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.

*Next-hop-ip-address*: Address of the next-hop router that will receive the packet and forwarded it to the remote network. This is the IP address of a router interface that’s directly connected to the network, but is not an interface of the router you’re configuring

***Example:*** To send a packet destined for the 192.168.2.0/24 network:

***R1(config)#ip route 192.168.2.0 255.255.255.0 192.168.1.2***



 Ping the router’s IP addresses that are not directly connected to your router to verify all of the connections are working.

 Save your configuration to the router’s permanent memory

***Completion Criteria***:

Submit a MS Word document with following: (screenshots are acceptable)

1. Show IP interface brief and Show IP Route from all 4 routers
2. From PC1 ping PCs 2,3,4.
3. From PC2 ping PCs 1,3,4.
4. From PC3 ping PCs 2,1,4.
5. From PC4 ping PCs 2,3,1.