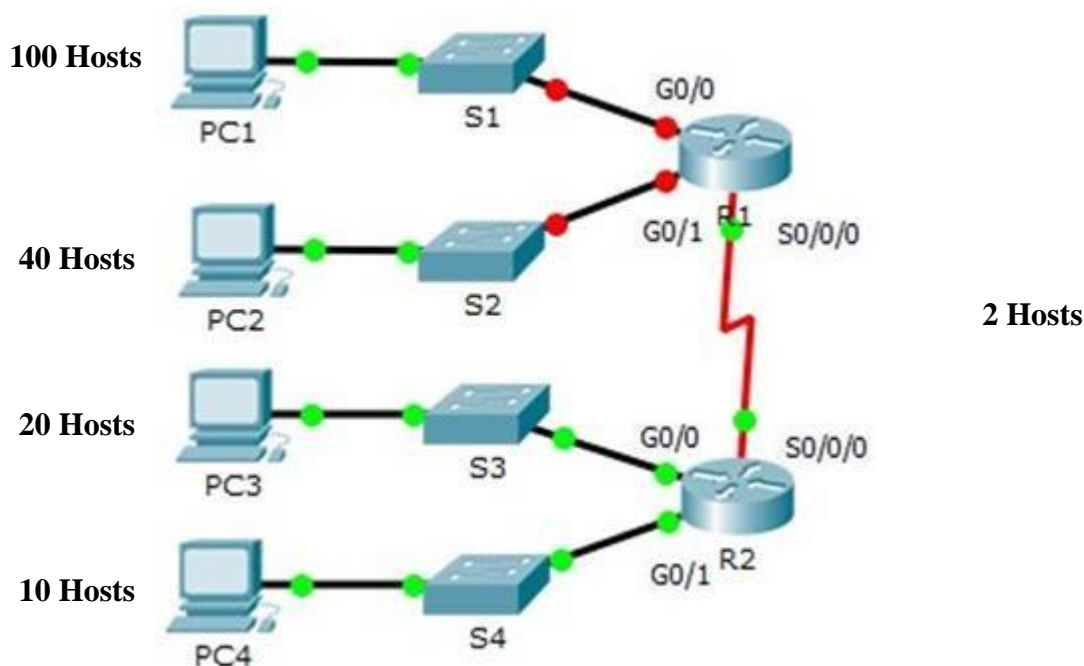


Packet Tracer - Subnetting Scenario - VLSM

Topology



Objectives

1. Design an IP Addressing Scheme (VLSM)
2. Assign IP Addresses to Network Devices and Verify Connectivity

Scenario

In this activity, you are given the network address of 195.152.92.0/24 to subnet and provide the IP addressing for the network shown in the topology. Each LAN in the network requires enough space for, at least, 25 addresses for end devices, the switch and the router. The connection between R1 to R2 will require an IP address for each end of the link.

Design an IP Addressing Scheme

Step 1: Subnet the 195.152.92.0/24 network into the appropriate number of subnets.

- a) Based on the topology, how many subnets are needed?
- b) How many bits must be borrowed to support the number of subnets in the topology table?
- c) How many subnets does this create?
- d) How many usable hosts does this create per subnet?

Note: If your answer is less than the 100 hosts required, then you borrowed too many bits.

a) Calculate the binary value for the first five subnets.

Net 0: 195. 152. 92 .0 0 0 0 0 0 0 0

Net 1: 195. 152. 92. 1 0 0 0 0 0 0 0

Net 2: 195. 152. 92. 1 1 0 0 0 0 0 0

Net 3: 195. 152. 92. 1 1 1 0 0 0 0 0

Net 4: 195. 152. 92. 1 1 1 1 0 0 0 0

b) Calculate the binary and decimal value of the new subnet mask.

Subnet 0 Mask: **255.255.255.128** Subnet 3 Mask: **255.255.255.240**

Subnet 1 Mask: **255.255.255.192** subnet 4 Mask: **255.255.255. 252**

Subnet 2 Mask: **255.255.255.224**

c) Fill in the Subnet Table, listing the decimal value of all available subnets, the first and last usable host address, and the broadcast address. Repeat until all addresses are listed.

Note: You may not need to use all rows.

Subnet Table

Sub net Num ber	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	195.152.92.0	195.152.92.1	195.152.92.126	195.152.92.127
1	195.152.92.128	195.152.92.129	195.152.92.190	195.152.92.191
2	195.152.92.192	195.152.92.193	195.152.92.221	195.152.92.223
3	195.152.92.224	195.152.92.225	195.152.92.238	195.152.92.239
4	195.152.92.240	195.152.92.241	195.152.92.242	195.152.92.243
5				
6				
7				
8				
9				
10				

Step 02: Assign the subnets to the network shown in the topology.

- Assign Subnet 0 to the LAN connected to the GigabitEthernet 0/0 interface of R1.
- Assign Subnet 1 to the LAN connected to the GigabitEthernet 0/1 interface of R1.
- Assign Subnet 2 to the LAN connected to the GigabitEthernet 0/0 interface of R2
- Assign Subnet 3 to the LAN connected to the GigabitEthernet 0/1 interface of R2
- Assign Subnet 4 to the WAN link between R1 to R2

Step 3: Document the addressing scheme.

Fill in the Addressing Table using the following guidelines:

- Assign the first usable IP addresses to R1 for the two LAN links and the WAN link.
- Assign the first usable IP addresses to R2 for the LANs links. Assign the last usable IP address for the WAN link.
- Assign the second usable IP addresses to the hosts.
- Assign the last usable IP addresses to the hosts.

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	195.152.92.1	255.255.255.128	N/A
	G0/1	195.152.92.129	255.255.255.192	N/A
	S0/0/0	195.152.92.241	255.255.255.252	N/A
R2	G0/0	195.152.92.193	255.255.255.224	N/A
	G0/1	195.152.92.225	255.255.255.240	N/A
	S0/0/0	195.152.92.242	255.255.255.252	N/A
PC1	NIC	195.152.92.2	255.255.255.128	195.152.92.1
PC2	NIC	195.152.92.130	255.255.255.192	195.152.92.129
PC3	NIC	195.152.92.194	255.255.255.224	195.152.92.193
PC4	NIC	195.152.92.226	255.255.255.240	195.152.92.225

Assign IP Addresses to Network Devices and Verify Connectivity

Most of the IP addressing is already configured on this network. Implement the following steps to complete the addressing configuration.

Step 1: Configure IP addressing on R1 LAN interfaces.

Step 2: Configure IP addressing on S3, including the default gateway

Step 3: Configure IP addressing on PC4, including the default gateway.

Step 4: Verify connectivity.

Verify connectivity from LAN to every other LAN. However, you should be able to ping every IP address listed in the Addressing Table.

Note:

- Take the screen shot of the results which is verified in Simulation Mode /Real mode and write the inference.
- After the completion of the experiment, answer all the viva question given below in the lab itself.

Lab Viva Questions

1. What is VLSM?
2. Given the network address of 112.44.0.0 and the network mask of 255.255.0.0
Would the two stations with addresses 112.44.22.19/16 and 112.44.23.2/16 be on the same network?
3. Workstations with addresses 172.16.22.1/22 and 172.16.23.9/22, what network and broadcast address?
4. The network 182.16.192.0 with a mask of 255.255.240.0 will support how many of devices to connect in this networks.
5. Given a class B network of 155.44.200.0, what mask could be used to provide 15 networks each supporting 120 users.
6. How many network devices can be supported on a single network using network mask of 255.255.240.0?
7. What is the broadcast and network address for host 112.48.160.183
255.255.255.192?
8. What is the broadcast and network address for host 222.129.199.222/21?
9. What is the broadcast address and network for station 192.168.99.77/19?