Lab 1.1.1b Variable Length Subnet Masking

Objectives

181. 10.0.0/16

In this lab, the student will:

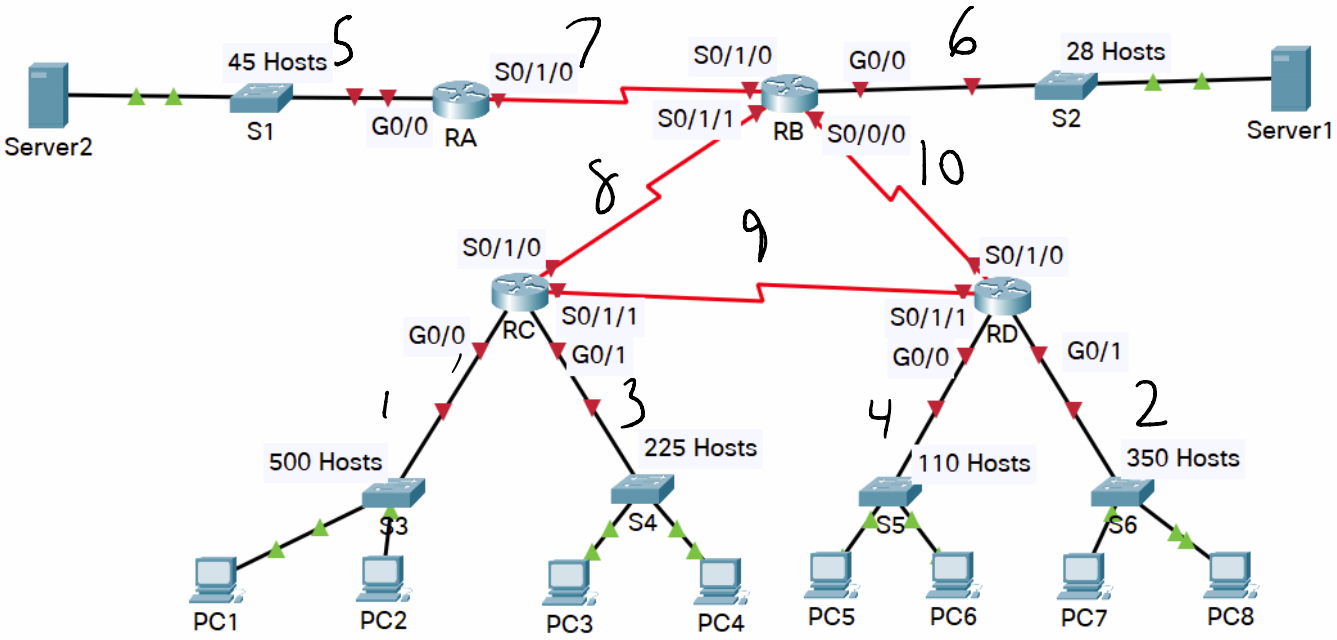
- Determine how many subnets are needed in a given scenario
- Document the order that the networks need to be addressed
- Document the Network Addresses, CIDR Prefixes, First Host, Last Host and Broadcast Addresses for the Subnets

Resources

- Scratch paper and pencil for VLSM calculations
- Computer with Internet connection to upload the completed assignment

Assignment

Your company has been given the **main Network IP Address of 181.10.0.0 / 16**. You will need to subnet each of the networks coming off of the various Routers in this scenario. The following topology is to be used for implementing the VLSM scheme:



1. How many subnets do you need? Hint: Count the number of links coming out of the routers. Routers that are connected together count as one subnet, such as RA-RB, RB-RC, RC-RD and RD-RB. 10

2. List the order for addressing this network layout. You may not use all of the spaces provided.

Router / Interface	**Number of Hosts**
RC G0/0	500
RD G0/1	350
RC G0/1	225
RD G0/0	110
RA G 0/0	45
RB G 0/0	28
RA S0/1/0	2
RB S01/1	2

RC S0/1/1	2
RD S01/0	2

128| 64|32|16| 8| 4|2|1

256|128|64|32|16|8|4|2

3. In the following table, list the Subnetwork Address, CIDR notation, and valid host ranges for each subnet. You may not use all of the spaces provided.

	Network Address	CIDR Notation	First Host Address	Last Host Address	Broadcast Address
500	180.10.0.0	/23	180.10.0.1	180.10.0.254	180.10.0.255
350	180.10.2.0 +2	/23	180.10.2.1	180.10.3.254	180.10.3.255
225	180.10.4.0 +2	/24	180.10.4.1	180.10.4.254	180.10.4.255
110	180.10.5.0 +1	/25	180.10.5.1	180.10.5.126	180.10.5.127
45	180.10.5.128 +128	/26	180.10.5.129	180.10.5.190	180.10.5.191
28	180.10.5.192 +64	/27	180.10.5.193	180.10.5.222	180.10.5.223
2	180.10.5.224 +32	/30	180.10.5.225	180.10.5.226	180.10.5.227
2	180.10.5.228 +4	/30	180.10.5.229	180.10.5.230	180.10.5.231
2	180.10.5.232 +4	/30	180.10.5.233	180.10.5.234	180.10.5.235
2	180.10.5.236 +4	/30	180.10.237	180.10.5.238	180.10.5.239

Type A = 255.0.0.0 Range 0.0.0.0 to 127.255.255.255

Type B = 255.255.0.0 Range 128.0.0.0. To 191.255.255.255

Type C = 255.255.255.0 Range 192.0.0.0 to 192.255.255.255

128| 64|32|16| 8| 4|2|1 Subnets Go Right

256|128|64|32|16|8|4|2 Host go Left

4. Use the VLSM scheme you created and implement it in the Packet Tracer file.
   a. Open the attached Packet Tracer file named **VLSM Implementation**
   b. Click on the **router** (RA, RB, RC, or RD), then click on the **Config** tab.
   c. Click on the appropriate interface type under the **Interface** option.
   d. In the interface properties box, set the **Port Status** to **On** and type in the IPv4 Address and Subnet Mask. **The IPv4 Address you need to use is the First Usable Host of the Subnet.**
   e. For the Serial Links, (the **router-to-router connections; RA-RB, RB-RC, RB-RD, and RC-RD**), you **will need to use the First Usable Host on one side of the Serial link, and the Second Usable Host for the other side of the Serial link**.

5. Once the addressing is implemented, save the Packet Tracer and upload both the Packet Tracer file and this document for grading.

Rubric

Criteria	**Point Value**
Criteria 1: Correct answer to question 1	5 points
Criteria 2: List the order for addressing the network layout.	28 points
Criteria 3: Listing of the Subnet Network Addresses, CIDR Notation, and Valid Hosts for each subnet.	50 points
Criteria 4: Implementing the IP Addresses and Subnet Masks in the corresponding Packet Tracer file	17 points