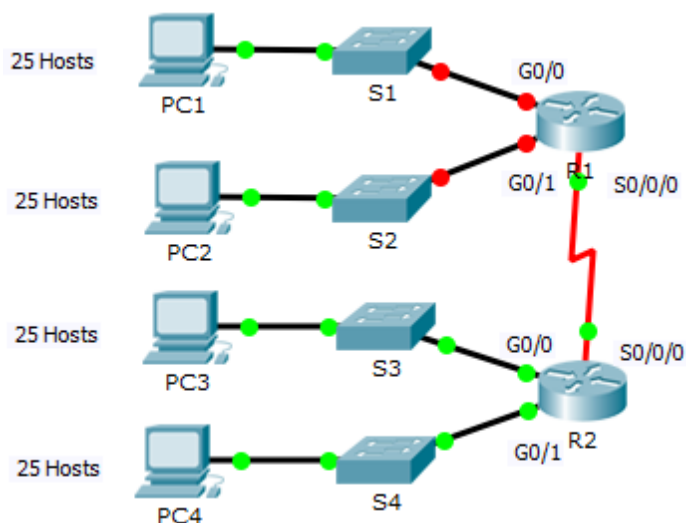


Packet Tracer - Subnetting Scenario (Instructor Version)

Instructor Note: Red font color or gray highlights indicate text that appears in the instructor copy only. Optional activities are designed to enhance understanding and/or to provide additional practice.

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.100.1	255.255.255.224	N/A
	G0/1	192.168.100.33	255.255.255.224	N/A
	S0/0/0	192.168.100.129	255.255.255.224	N/A
R2	G0/0	192.168.100.65	255.255.255.224	N/A
	G0/1	192.168.100.97	255.255.255.224	N/A
	S0/0/0	192.168.100.158	255.255.255.224	N/A
S1	VLAN 1	192.168.100.2	255.255.255.224	192.168.100.1
S2	VLAN 1	192.168.100.34	255.255.255.224	192.168.100.33
S3	VLAN 1	192.168.100.66	255.255.255.224	192.168.100.65
S4	VLAN 1	192.168.100.98	255.255.255.224	192.168.100.97
PC1	NIC	192.168.100.30	255.255.255.224	192.168.100.1
PC2	NIC	192.168.100.62	255.255.255.224	192.168.100.33
PC3	NIC	192.168.100.94	255.255.255.224	192.168.100.65
PC4	NIC	192.168.100.126	255.255.255.224	192.168.100.97

Objectives

Part 1: Design an IP Addressing Scheme

Part 2: Assign IP Addresses to Network Devices and Verify Connectivity

Scenario

In this activity, you are given the network address of 192.168.100.0/24 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.

Part 1: Design an IP Addressing Scheme

Step 1: Subnet the 192.168.100.0/24 network into the appropriate number of subnets.

- Based on the topology, how many subnets are needed? **5**
 - How many bits must be borrowed to support the number of subnets in the topology table? **3**
 - How many subnets does this create? **8**
 - How many usable hosts does this create per subnet? **30**
- Note:** If your answer is less than the 25 hosts required, then you borrowed too many bits.
- Calculate the binary value for the first five subnets. The first subnet is already shown.

Net 0: 192 . 168 . 100 . 0 0 0 0 0 0 0 0

Packet Tracer - Subnetting Scenario 1

Net 1: 192 . 168 . 100 . _____
 Net 1: 192 . 168 . 100 . 0 0 1 0 0 0 0 0

Net 2: 192 . 168 . 100 . _____
 Net 2: 192 . 168 . 100 . 0 1 0 0 0 0 0 0

Net 3: 192 . 168 . 100 . _____
 Net 3: 192 . 168 . 100 . 0 1 1 0 0 0 0 0

Net 4: 192 . 168 . 100 . _____
 Net 4: 192 . 168 . 100 . 1 0 0 0 0 0 0 0

- f. Calculate the binary and decimal value of the new subnet mask.

11111111.11111111.11111111. _____
 11111111.11111111.11111111. 1 1 1 0 0 0 0 0
 255 . 255 . 255 . _____
 255 . 255 . 255 . 224

- g. 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

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	192.168.100.0	192.168.100.1	192.168.100.30	192.168.100.31
1	192.168.100.32	192.168.100.33	192.168.100.62	192.168.100.63
2	192.168.100.64	192.168.100.65	192.168.100.94	192.168.100.95
3	192.168.100.96	192.168.100.97	192.168.100.126	192.168.100.127
4	192.168.100.128	192.168.100.129	192.168.100.158	192.168.100.159
5	192.168.100.160	192.168.100.161	192.168.100.190	192.168.100.191
6	192.168.100.192	192.168.100.193	192.168.100.222	192.168.100.223
7	192.168.100.224	192.168.100.225	192.168.100.254	192.168.100.255
8				
9				
10				

Step 2: 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: 192.168.100.0 /27
- Assign Subnet 1 to the LAN connected to the GigabitEthernet 0/1 interface of R1: 192.168.100.32 /27

- c. Assign Subnet 2 to the LAN connected to the GigabitEthernet 0/0 interface of R2: 192.168.100.64 /27
- d. Assign Subnet 3 to the LAN connected to the GigabitEthernet 0/1 interface of R2: 192.168.100.96 /27
- e. Assign Subnet 4 to the WAN link between R1 to R2: 192.168.100.128 /27

Step 3: Document the addressing scheme.

Fill in the **Addressing Table** using the following guidelines:

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

Part 2: 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.

You can only verify connectivity from R1, S3, and PC4. However, you should be able to ping every IP address listed in the **Addressing Table**.

Suggested Scoring Rubric

Note: The majority of points are allocated to designing and documenting the addressing scheme. Implementation of the addresses in Packet Tracer is of minimal consideration.

Activity Section	Question Location	Possible Points	Earned Points
Part 1: Design an IP Addressing Scheme	Step 1a	1	
	Step 1b	1	
	Step 1c	1	
	Step 1d	1	
	Step 1e	4	
	Step 1f	2	
Complete Subnet Table	Step 1g	10	
Assign Subnets	Step 2	10	
Document Addressing	Step 3	40	
Part 1 Total		70	
Packet Tracer Score		30	
Total Score		100	