

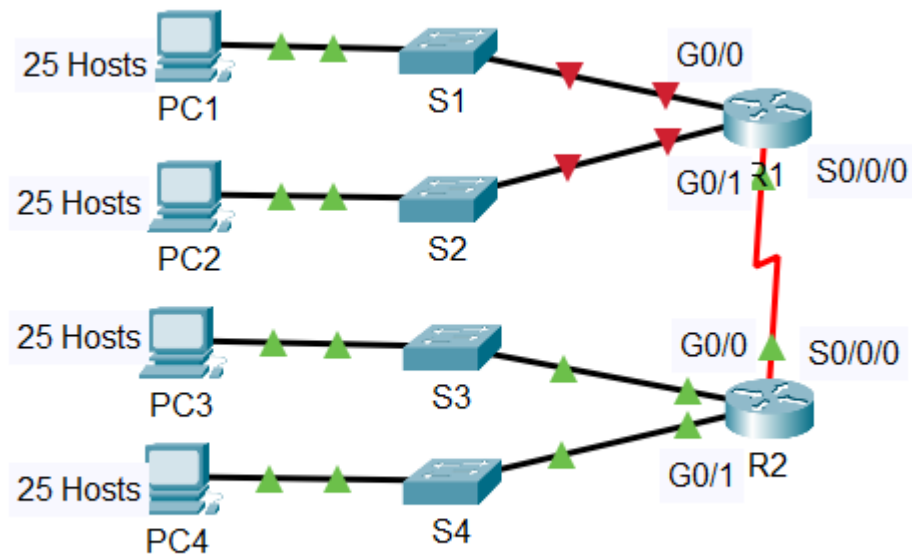
Experiment 11

Aim: To implement a subnetting scenario

Software Used:

Cisco Packet Tracer

Topology:



Procedure:

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

Device	Interface	IP Address	Subnet Mask	Default Gateway
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	19.168.100.33
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

Procedure:

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 four for Lans and one for the link between the routers.
- 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
- Calculate the binary value for the first five subnets. The first two subnets have been done for you.

Subnet	Network Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	192.168.100.	0	0	0	0	0	0	0	0
1	192.168.100.	0	0	1	0	0	0	0	0
2	192.168.100.	0	1	0	0	0	0	0	0
3	192.168.100.	0	1	1	0	0	0	0	0
4	192.168.100.	1	0	0	0	0	0	0	0

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

First Octet	Second Octet	Third Octet	Mask Bit 7	Mask Bit 6	Mask Bit 5	Mask Bit 4	Mask Bit 3	Mask Bit 2	Mask Bit 1	Mask Bit 0
11111111	11111111	11111111	1	1	1	0	0	0	0	0
First Decimal Octet	Second Decimal Octet	Third Decimal Octet	Fourth Decimal Octet							
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.

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

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:
- 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 in each subnet to R1 for the two LAN links and the WAN link.
- Assign the first usable IP addresses in each subnet to R2 for the LAN links. Assign the last usable IP address for the WAN link.
- Assign the second usable IP address in the attached subnets to the switches.
- Assign the last usable IP addresses to the PCs in each subnet.

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

Step 1: Configure R1 LAN interfaces.

- Configure both LAN interfaces with the addresses from the Addressing Table.
- Configure the interfaces so that the hosts on the LANs have connectivity to the default gateway.

```
Tushar(config-if)#  
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up  
  
Tushar(config-if)#exit  
Tushar(config)#interface gigabitethernet0/1  
Tushar(config-if)#ip address 192.168.100.33 255.255.255.224  
Tushar(config-if)#no shutdown  
  
Tushar(config-if)#  
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up  
  
Tushar(config-if)#exit  
Tushar(config)#interface serial0/0/0  
Tushar(config-if)#ip address 192.168.100.129 255.255.255.224  
Tushar(config-if)#no shutdown  
Tushar(config-if)#exit  
Tushar(config)#  
Tushar(config)#exit  
Tushar#  
%SYS-5-CONFIG_I: Configured from console by console  
  
Tushar#
```

Step 2: Configure IP addressing on S3.

- Configure the switch VLAN1 interface with addressing.
- Configure the switch with the default gateway address.

```
S3(config-if)#exit  
S3(config)#interface vlan 1  
S3(config-if)#ip address 192.168.100.66 255.255.255.224  
S3(config-if)#no shutdown  
S3(config-if)#end  
S3#  
%SYS-5-CONFIG_I: Configured from console by console  
  
S3(config)#ip default-gateway 192.168.100.65  
S3(config)#exit  
S3#  
%SYS-5-CONFIG_I: Configured from console by console
```

Step 3: Configure PC4.

Configure PC4 with host and default gateway addresses.

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.100.126

Subnet Mask: 255.255.255.224

Default Gateway: 192.168.100.97

DNS Server: 0.0.0.0

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**.

Packet Tracer Activity:

Congratulations Tushar! You completed the activity.

Overall Feedback Assessment Items Connectivity Tests

Assessment Items	Status	Points	Component(s)	Feedback
Network				
PC4				
Ports				
FastEthernet0				
IP Address	Correct	2	IPv4 Host Address...	
Subnet Mask	Correct	2	IPv4 Subnet Mask...	
R1				
Ports				
GigabitEthernet0				
IP Address	Correct	3	IPv4 Host Address...	
Port Status	Correct	1	Device Interface ...	
Subnet Mask	Correct	3	IPv4 Subnet Mask...	
GigabitEthernet1				
IP Address	Correct	3	IPv4 Host Address...	
Port Status	Correct	1	Device Interface ...	
Subnet Mask	Correct	3	IPv4 Subnet Mask...	
S3				
Ports				
FastEthernet0	Correct	3	Default Gateway ...	
Vlan1				
IP Address	Correct	3	IPv4 Host Address...	
Port Status	Correct	1	Device Interface ...	
Subnet Mask	Correct	3	IPv4 Subnet Mask...	

Score : 30/30

Item Count : 13/13

Component	Items/Total	Score
Default Gateway Configuration	2/2	5/5
Device Interface Configuration	3/3	3/3
IPv4 Host Address Calculation	4/4	11/11
IPv4 Subnet Mask Calculation	4/4	11/11

Conclusion:

The router was configured successfully.