Expert Q&A

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Assume that you are a network administrator at World University Bangladesh. The University has four departments connected with WAN links. Design the university network according to following requirements by using **VLSM** technique. If you do not apply VLSM technique, how many IP will be wasted?

i) CSE department has 220 computers.

ii) EEE department has 200 computers.

iii) Civil department has 180 computers.

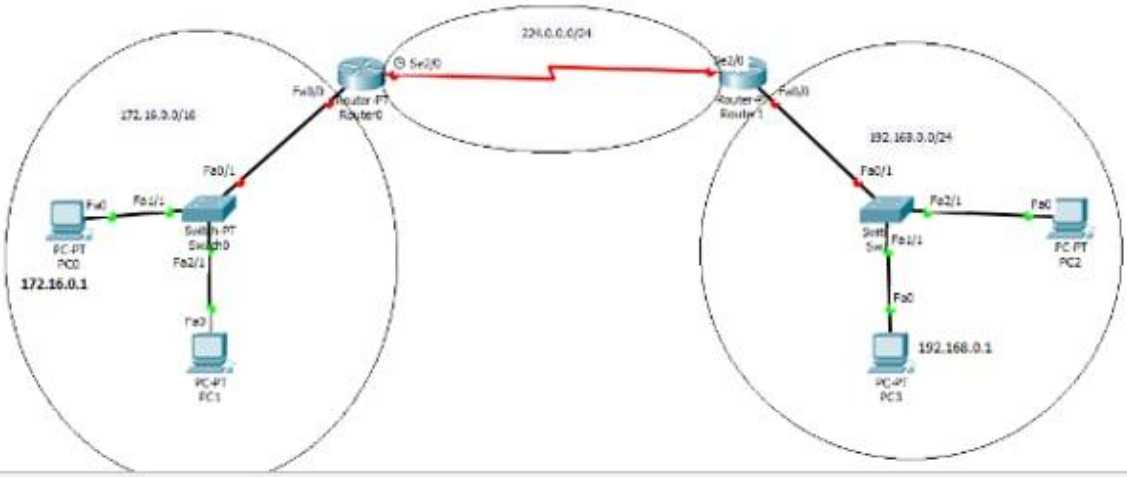
iv) Pharmacy department has 50 computers.

v) All departments are connected with each other via WAN links.

vi) Each WAN link requires two IP addresses.

vii) The given address space is 172.16.0.0/22.

Illustrate IPv4 and IPv6 Header according to the following networking diagram where source address is 172.16.0.1 and destination address is 192.168.0.1. You can consider IPv6 addresses(Source and Destination)as your own.



ANSWER:

Given networks 202.125.150.128/27

I used VLSM (Variable-Length Subnet Mask) for sub-netting of IP Addresses for my networks 202.125.150.128/27

1- Total Number of Host required for Doha LAN network = 14 hosts

Number of host per required = 2^n –2 = 2^4 –2 = 16—2 = 14 hosts (This IP range can full fill the requirement**)**

n= 4 (The **n = 4**, means 4 bits are used for hosts and there will be 4 zeros in last octet of the subnet for hosts bits)

Binary notation of Subnet Mask = 11111111.11111111.11111111.11110000

Decimal notation of Subnet Mask = 255.255.255.240

Slash notation of Subnet Mask = /28

Block Size = 16

Network ID = 202.125.150.128

First Usable IP Address 202.125.150.129

Last Usable IP Address 202.125.150.142

Broadcast IP Address 202.125.150.143

2- Total Number of Host required for Al-Wakrah LAN network = 6 hosts

Number of host per required = 2^n –2 = 2^3 –2 = 8—2 = 6 hosts

n= 3 (The **n = 3**, means 3 bits are used for hosts and there will be 3 zeros in last octet of the subnet for hosts bits)

Binary notation of Subnet Mask = 11111111.11111111.11111111.11111000

Decimal notation of Subnet Mask = 255.255.255.248

Slash notation of Subnet Mask = /29

Block Size = 8

Network ID = 202.125.150.144

First Usable IP Address 202.125.150.145

Last Usable IP Address 202.125.150.150

Broadcast IP Address 202.125.150.151

3- Total Number of Host required for Link between R1 to R2 network = 2 hosts

Number of host per required = 2^n –2 = 2^2 –2 = 4—2 = 2 hosts

n= 2 (The **n = 2**, means 2 bits are used for hosts and there will be 2 zeros in last octet of the subnet for hosts bits)

Binary notation of Subnet Mask = 11111111.11111111.11111111.11111100

Decimal notation of Subnet Mask = 255.255.255.252

Slash notation of Subnet Mask = /30

Block Size = 4

Network ID = 202.125.150.152

First Usable IP Address 202.125.150.153

Last Usable IP Address 202.125.150.154

Broadcast IP Address 202.125.150.155

4- Total Number of Host required for Link between R2 to R3 network = 2 hosts

Number of host per required = 2^n –2 = 2^2 –2 = 4—2 = 2 hosts

n= 2 (The **n = 2**, means 2 bits are used for hosts and there will be 2 zeros in last octet of the subnet for hosts bits)

Binary notation of Subnet Mask = 11111111.11111111.11111111.11111100

Decimal notation of Subnet Mask = 255.255.255.252

Slash notation of Subnet Mask = /30

Block Size = 4

Network ID = 202.125.150.156

First Usable IP Address 202.125.150.157

Last Usable IP Address 202.125.150.158

Broadcast IP Address 202.125.150.159

1. The subnet address, mask and range of usable addresses for each subnet:

Subnet Name	Network Address	First Available Valid Device IP Address	Last Available Valid Device IP Address	Broadcast-IDs	Mask

Doha LAN	202.125.150.128	202.125.150.129	202.125.150.142	202.125.150.143	255.255.255.240
Al-Wakrah LAN	202.125.150.144	202.125.150.145	202.125.150.150	202.125.150.151	255.255.255.248
R1-R2	202.125.150.152	202.125.150.153	202.125.150.154	202.125.150.155	255.255.255.252
R2-R3	202.125.150.156	202.125.150.157	202.125.150.158	202.125.150.159	255.255.255.252

i. ***Network address of Doha LAN:*** **202.125.150.128 /28**

ii. ***Network address of R1-R2 network:*** **202.125.150.152 /30**

iii. Network address of R2-R3 network: **202.125.150.156 /30**

iv. ***Network address of Al-Wakrah LAN:*** **202.125.150.144 /29**

Conclusion:

I used **VLSM** (Variable Length Subnet Mask) Scheme for sub-netting of the network which company has decided to buy /27 network (202.125.150.128/27)for corporation.. I used proper formula for sub-netting and calculation of number of hosts required per subnet. I calculated subnets for all networks according to requirement. I created a **Table** for subnets to explain in details. I used **VLSM** (Variable Length Subnet Mask) Scheme. Because VLSM help to create subnet according to needs. VLSM help to reduce wastage of IP addresses.

SIR I AM IN DEEP STRUGGLE UNDERSTAND MY SITUATION LIKE A BROTHER AND PLEASE GIVE ME UPVOTE

Was this answer helpful?