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③

CCA -3

Q1] what is subnetting? Explain with an Example

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Subnetting is technique used in computer networking to divide a single physical network into multiple smaller logical subnetwork or subnets. It allows network adminstrators to efficiently use IP address space & improve network performance by redu broadcast traffic & network corgestion

Here's an example :- Suppose you have a ne with IP

192.168.0.0124 This means that the networ 256 IP addresses available for use ranging fro 192.168.0.01 to 192.166.0.255

Q2] what are advantages & disadvantages of subnett

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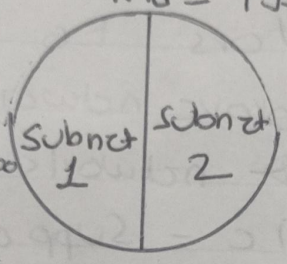
Advantages :-

- It allows to isolate topology change from oth routers
- It also speeds up the lookup of routing tab
- It also minimize network traffic
- The router memory table size is reduced condencsing numerous routing data entries a single entiy
- Maintenance is quite easy

Mid = 193.1.2.0



Range =
193.1.2.00000000
to 193.1.2.01111111

Range = 193.1.2.10000000
to
193.1.2.11111111

Disadvantages :-

- The subnet's network must all use the same IP address class
- The block combination should be constructed in power
- The entire network should be in same class.
- To reach a process in ~~a single net~~ subnetting 4 phases are required
  - Source host to Destination network
  - Destination network to appropriate subnet
  - subnet to host & finally
  - Host to process

compared to 3 steps in ~~proc~~ single network

Q3] Compare IPV4 & IPv6

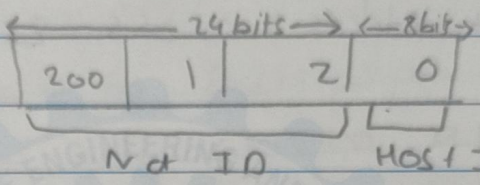
IPv4	IPv6
-has a 32 bit address length	- IPv6 has a 128-bit address length
- end to end connection integrity is unachievable	- end to end, connection integrity is Achievable
- Address representation of IPV4 is in decimal	- Address Representation of IPV6 is in Hexadecimal.
- In IPV4 checksum field is available	- In IPV6 checksum field is not available
- can be converted to IPV6	- not all IPV6 can be converted to IPV4
-Supports VLSM eg 66.94.29.13	- doesn't support VLSM 2001:0000:3238:DFE1:0063:0000:0000:FEFB

Q4 Write in detail two examples of subnetting

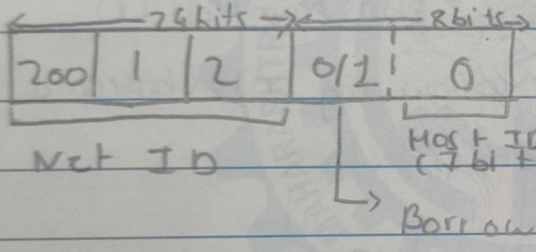
Subnetting Examples: -

Ex 1 :-

We have a big single network having IP address 200.1.2.0 to do subnetting & divide this into 2 subnets



- We borrow one bit from the Host ID part.
- After borrowing one bit, Host ID part remains with 7 bits

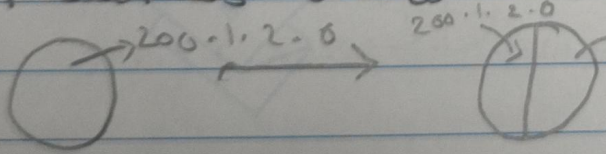


If borrowed bit = 0, represents the first subnet

- If borrowed bit = 1, then it represent the second subnet.

IP address of two subnets are :- 200.1.2.0

200.1.2.128



For 1st subnet

IP address = 200.1.2.0

No. of IP addresses = 128

No. of hosts = 126

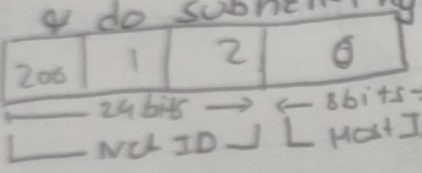
Range of IP addresses = [200.1.2.0, 200.1.2.127]

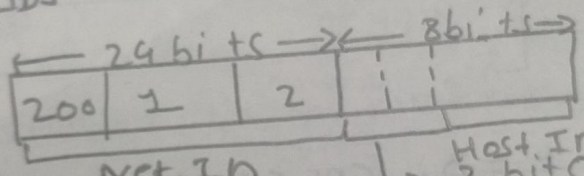
Direct Broadcast address = 200.1.2.127

Limited Broadcast Address = 255.255.255.255

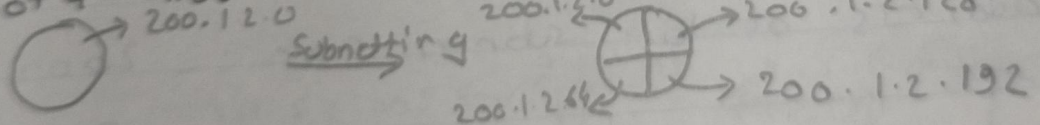
For 2nd Subnet
IP address = 200.1.2.128
Total IP address = 128
Hosts that can be configured = 126
Range of IP address = [200.1.2.128, 200.1.2.255]
Direct Broadcast Address = 200.1.2.255
Limited Broadcast Address = 255.255.255.255

Example-02 :-
-we have a big single network having IP Address 200.1.2.0
& do subnetting, divide this network into 4 subnets
-we borrow 2bits from Host ID
-After borrowing only 6bits remains.





borrowed bits 00 = 1st subnet, 01 = 2nd subnet, 10 = 3rd subnet, 11 = 4th sub
IP address of 4 subnets are :- 200.1.20, 200.1.2.64, 200.1.2.128, 200.1.2



1st Subnet
= 200.1.2.0
of IP = 64
of hosts = 62
e = [200.1.2.0, 200.1.2.63]
ct Broadcast Address = 200.1.2.63
ited Broadcast Address = 255.255.255.255

4) contd.

For 2nd Subnet

IP address = 200.1.2.64
Total no. of IP address = 64
Total no. of Hosts configured = 62
Range of IP address = [200.1.2.64, 200.1.2.127]
Direct Broadcast Address = 200.1.2.127
Limited Broadcast Address = 255.255.255.255

For 3rd Subnet

IP address = 200.1.2.128
Total no. of IP adresses = 64
Total no. of hosts configured = 62
Range of IP address = [200.1.2.128, 200.1.2.191]
Direct Broadcast Adress = 200.1.2.191
Limited Broadcast Addresses = 255.255.255.255

For 4th Subnet

IP address = 200.1.2.192
Total number of IP addresses = 64
Total no. of host configurations = 62
Range of IP addresses = [200.1.2.192, 200.1.2.255]
Direct Broadcast Address = 200.1.2.255
Limited Broadcast Address = 255.255.255.255