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Tutorial - 6

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Questions

Q.1.) Subnet the class C IP address 206.16.2.0, so that you have 30 subnets. How many host can each subnet have? (4)

Q.2.) Subnet the class C IP address 195.1.1.0, so that you have 10 subnets each with a max of 12 hosts on each subnet. (4)

Q.3.) Explain the role of ICMP. (2)

Solutions

A1.) The default subnet of class C IPv4 is as follows: 192.0.0.0/24 — 223.0.0.0/24

∴ The given IPv4 address:

206.16.2.0/24 - is its default subnet.

∴ An IP of class C has by default 1 subset (the, ~~network~~ ip itself) & 254 hosts.

To acomodate 30 subnets we need at least 5 bits from the host part of the class C IP. Because $2^5 = 32$ is capable of providing 32 subnets

∴ The modified IPv4 address would be

206.16.2.0/29 → (24+5)

29 → default

(24+5) → from host part

Hence the subnetting will be as:

206.16.2.0/29 =>

~~206.16.2.3~~

11001110. 00010000. 00000010. 00000000

11111111. 11111111. 11111111. 11111000

255 255 255 248

∴ The subnet mask is 255.255.255.248

- Since 5-bits were taken from the host side there are 3 bit remaining that are assigned to hosts.
- Hence in each subnet there will be $2^3 = 8$ hosts.

as:

206.16.2.0/29
206.16.2.8/29
206.16.2.16/29
206.16.2.24/29
⋮
206.16.2.254/29

30 such subnets with 8 hosts each

A2.) Given.

Class C IP address : 195.1.1.0

Requirement: 10 subnets & 12 host (at max)

- Since 10 subnets are required
  - if we take 3 bit from the host we can only have $2^3 = 8$ subnets
  - Therfore we take 4 bits from the host so that we can accomodate $2^4 = 16$ subnets (even though requirment of subnets is satisfied 6 subnets will be wasted)

∴ The subnetting will be as.

195.1.1.0

11000011 . 00000001 . 00000001 . 00000000
11111111 . 11111111 . 11111111 . 11110000
255 255 255 240

∴ The subnet mask will be : 255.255.255.240

⇒ 195.1.1.0 /28 → (24+4)

~ Now since there are 4 Host bits left
it means that we can have upt $2^4 = 16$ host.
(∵ 8 will be less than 12, 3 bit were not chosen).

∴ The IP subnets will be like.

195.1.1.0 /28
195.1.1.16/28
195.1.1.32/28
⋮
195.1.1.254/28

16 such subnets with at most 16 hosts each

A3.) ICMP – Internet control message protocol

~ IP addresses do not have inbuilt / inherited mechanism for sending error report or control message.
~ For this cause IP address rely on another protocol called ICMP (Internet control message protocol) to mange the network activities.
~ ICMP mainly helps in providing two types of services 1. Error Messages 2. Query Message.

~ With error messages, ICMP helps in providing appropriate messages to when corresponding errors occur. eg:- When there is congestion in the network ICMP sends the "source Quench" message.

~ Some time information is needed from a network, so ICMP send query messages. For example to obtain or sync time it sends "Time stamp request or reply".