**Sub-netting**

Sub-netting is the practice of dividing a large n/w into two (or) more smaller n/w.

Purchase one n/w id…and then, break the n/w into small pieces of n/w. those small pieces of n/w’s are called as subnetworks or subnets.

**Subnet Mask**

Subnet mask is used to determine the n/w and host portion of an IP address.

Subnet mask has 1’s and 0’s,

1’s 🡪network bits

0’s 🡪host bits

**Magic Number**

The magic number tells us how to find our networks and let us know that the networks will be going up in increments of 64

For example, the first subnet is always zero.so, 192.168.1.0/26. The next subnet is 64. And 64 plus 64 is 128 and 128 plus 64 is 192.

Types

Case 1

Case 2

Case 3

**Case 1**

If x<8,

Formula, MN=2^x

Condition,

Leave the first bit number- as it is,

Second bit number- as it is,

Third bit number- as it is,

Fourth bit number – Add magic number

**Calculation**

**Network ID** = 192.168.25.0/24🡪 It means now, I run in a company and we need 5 number of subnets.

So, I choose class C Network,

Number of subnets = 2^n

Number of hosts/subnets = (2^x)-2

This formula is using for calculate the number of host and subnets.

**Now, we calculate number of subnetworks**,

Borrow the bits from host part and add it to the n/w part.

n=1 n=2 n=3

2^1= 2<5 2^2=4<5 2^3=8<5

We get, Borrow 3 bits from host part to provide 8 subnets.

**Then, now we calculate Subnet Mask**,

Default Subnet mask of C is **255.255.255.0**

Next, we convert to binary form of host bits only.

=255.255.255. (0.0.0.0.0.0.0.0)

=255.255.255. (1.1.1.0.0.0.0.0) [these number 1’s is borrow bits]

Addition of number 1’s value is 224.

Finally, we get subnet mask = 255.255.255.224

**Now, we calculate the Sub-netting,**

n=3 [n is a number bits borrowed]

x=5 [x is a number of 0’s left after borrowing]

And also x **value used for calculate CIDR**, = 32-5 =27

**X value is less than 8.so, we can use case 1**,

Case 1 formula is 2^x = 2^5 =32

Now, that subnet is calculate the addition of 32.

1🡪192.168.25.0/27 [the first n/w always starts with 0]

2🡪192168.25.32/27

3🡪192.168.25.64/27

4🡪192.168.25.96/27

5🡪192.168.25.128/27

6🡪192.168.25.160/27

7🡪192.168.25.192/27

8🡪192.168.25.224/27

We need valid IP b/w the subnets

For example, we choose any one of the above networks,

The network is 192.168.25.0/27

First valid IP is 192.168.25.1/27

Last valid IP is 192.168.25.30/27

Broadcast IP is 192.168.25.31/27

These, valid IP’s are calculate b/w 2 networks.

**Case 2**

If, x=8, x>8, x<16

Formula, MN = (2^x) / (2^8)

Conditions,

Leave the first bit number = as it is,

Second bit number = as it is,

Third bit number = Add magic number,

Forth bit number = 0

**Case 3**

If, x=16, x>16, x<24

Formula, MN = (2^x) / (2^16)

Conditions,

Leave the first bit number = as it is,

Second bit number = Add magic number,

Third bit number =0,

Forth bit number = 0.