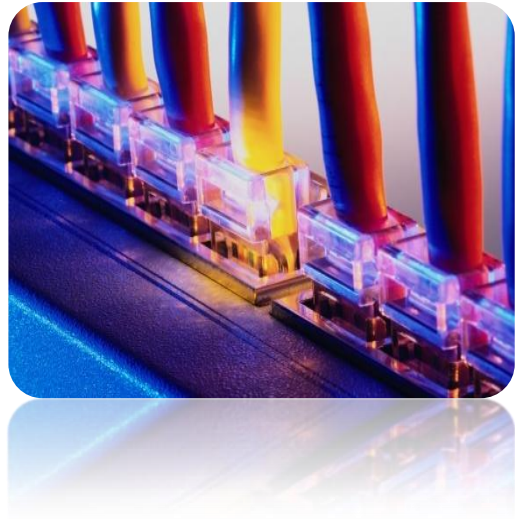


Subnetting



Review

What do you remember about class A,B,C ? Which portion of these IP are for network and which are for hosts?

What is subnetting ?

Subnetting is taking one big network and divide it to smaller networks.

You only get one public IP (1 network address and many hosts) and you want to have many subnets inside of it?

Then you have to subnet this network segment and break it into smaller pieces!.

How to create subnets ?

By taking some bits from **host side** and reserve them to define subnet address. So the more subnets the less hosts.

Remember : you are NOT allowed to use bits of network given to you (since they are not in your network and you don't own them !)

Subnet mask

32-bit value that allows the recipient of IP packet to **distinguish network ID portion in the IP address from the host ID portion.**

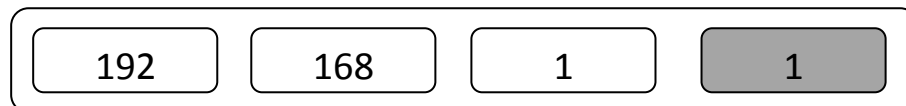
- Default subnet mask

As we know, for example class C contains IPs like this : NET.NET.NET.HOST so its default subnet mask is 255.255.255.0

See this:

192 . 168 . 1 . 1

Default subnet mask : 255.255.255.0 ,, imagine it like this :



So the network address is : 192.168.1.0

Generally

Class	Format	Default Subnet Mask
A	<i>network.node.node.node</i>	255.0.0.0
B	<i>network.network.node.node</i>	255.255.0.0
C	<i>network.network.network.node</i>	255.255.255.0

Classless inter-Domain Routing (CIDR)

A notation that indicates how many 1's are set in the subnet mask for example

IP address 192.168.1.1 with subnet mask 255.255.255.0 can be written as:

192.168.1.1/24

Remember : 255.255.255.0 = 1111 1111 . 1111 1111 . 1111 1111 . 0000 0000

Another example :

For subnet mask 11111111. 11111111. 11111111.11100000=255.255.255.224

it can be written as **/27**

Subnetting in class C

Remember: it's forbidden to go even close to original network address !! you are only allowed to use HOST bits only ..

Before you start, you have to answer these questions :

- How Many Subnets?

(2^x) x : number of masked bits.

- How Many Hosts Per Subnet?

$(2^y - 2)$ y : number of remaining bits in host side or unmasked bits. **Why -2???**

- What Are The Valid Subnets?

Block size = 256 – subnet mask = increment = 2^y

- What's The Broadcast Address For Each Subnet?
- What Are The Valid Hosts?

Example :

Given IP 192.168.10.1/26

Example :

192.168.10.15/28

For the report : 192.168.10.15/29

Faster way?

/28 == .240 == 4 bit masked (28-default(24)=4)

Then:

$2^4=16$ subnet $2^{(8-4)}-2=14$ host

Block size = 16 then subnets are 0 16 32 48 ...

DONE!

What about /31 /30 /32?

Subnetting in class B

Example : 172.16.20.10/20

For the report : 172.16.20.10/19

Subnetting in class A

Example : 10.10.10.10/16

For the report : 10.10.10.10/20