IPv4 – Addressing

* An IP address is a 32-bit number, consists of four octets separated by dots.
* IP address is divided into 5 different classes.

Class A Address

 The first bit of the first octet is always set to 0 (zero). Thus the first octet ranges from 1 – 127, i.e.



 Class A addresses only include IP starting from 1.x.x.x to 126.x.x.x only. The

IP range 127.x.x.x is reserved for loopback IP addresses.



 The default subnet mask for Class A IP address is 255.0.0.0 which implies that Class A addressing can have 126 networks (27-2) and 16777214 hosts (224-2).

 Class A IP address format thus, is **0NNNNNNN**.HHHHHHHH.HHHHHHHH.HHHHHHHH

Class B Address

 An IP address which belongs to class B has the first two bits in the first octet set to 10, i.e.



 Class B IP Addresses range from 128.0.x.x to 191.255.x.x. The default subnet mask for Class B is 255.255.x.x.



 Class B has 16384 (214) Network addresses and 65534 (216-2) Host addresses.

 Class B IP address format is, **10NNNNNN.NNNNNNNN**.HHHHHHHH.HHHHHHHH

Class C Address

 The first octet of Class C IP address has its first 3 bits set to 110, that is



 Class C IP addresses range from 192.0.0.x to 192.255.255.x. The default subnet mask for Class B is 255.255.255.x.



 Class C gives 2097152 (221) Network addresses and 254 (28-2) Host addresses.

 Class C IP address format is **110NNNNN.NNNNNNNN.NNNNNNNN**.HHHHHHHH

Class D Address

 Very first four bits of the first octet in Class D IP addresses are set to 1110, giving a range of



 Class D has IP address rage from 224.0.0.0 to 239.255.255.255.

 Class D is reserved for Multicasting. In multicasting data is not destined for a particular host, that's why there is no need to extract host address from the IP address, and Class D does not have any subnet mask.

Class E Address

 This IP Class is reserved for experimental purposes only like for R&D or

Study.

 IP addresses in this class ranges from 240.0.0.0 to 255.255.255.254.

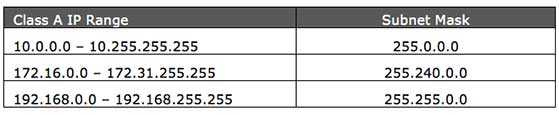
 Like Class D, this class too is not equipped with any subnet mask.

Private IP Addresses

 Every class of IP, (A, B & C) has some addresses reserved as Private IP

addresses.

 These IP can be used within a network, campus, company and are private to it.



 In order to communicate with outside world, Internet, these IP addresses must have to be translated to some public IP addresses using NAT process or Web Proxy server can be used.

IPv4 - Subnetting

 Subnetting is a process of breaking large network in small networks known as subnets.

 Subnetting happens when we extend default boundary of subnet mask.

 Basically we borrow host bits to create networks.

Advantage of Subnetting

 Subnetting breaks large network in smaller networks and smaller networks are easier to manage.

 Subnetting reduces network traffic by removing collision and broadcast traffic, that overall improve performance.

 Subnetting allows you to apply network security polices at the interconnection between subnets.

 Subnetting allows you to save money by reducing r equirement for IP range.

Classless Inter Domain Routing (CIDR)

 It provides the flexibility of borrowing bits of Host part of the IP address and using them as Network in Network, called Subnet.

 By using subnetting, one single Class A IP addresses can be used to have smaller sub-networks which provides better network management capabilities.

Examples

192.168.1.0 /25 ??