IP Address - Session 2

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Previous Session

- Public and Private IP address
  - Public IP address is visible in the internet
  - Private is local address; it do not have any identity in internet.
- Public IP address - It will cost, Private IP Address - Free of Cost
- Network Address Translation (NAT) Table
  - Maintained by the router.
  - Maps the private and public IP addresses
  - Ports - End points
- IP Addresses - IPv4 and IPv6 Addressing schemes.

IPv4 Addressing Scheme

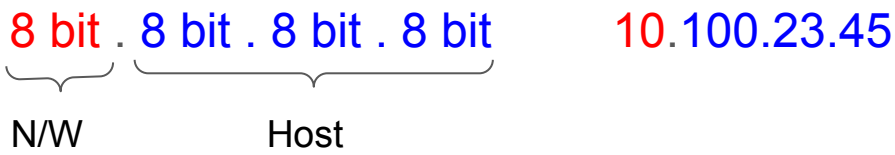
- 8 bytes Address, 2^{32} - 4.3 Billion IP addresses
- IP - Internet Protocol
- 5 Classes of IPv4 Addresses
  - Class A - Used for Huge Networks - ISPs - Bakhaul Network
  - Class B - Used for the networks with a medium number of hosts
  - Class C- Used for the networks which has less number of hosts.
  - Class D - Reserved for Multicasting
  - Class E - Reserved for experiments and Research.

Address Range of 5 Classes

- Class A 1.0.0.0 to 126.0.0.0.
- Class B 128.0.0.0 - 191.225.0.0
- Class C 192.0.0.0 - 223.255.255.0
- Class D 224.0.0.0 - 239.255.255.255
- Class E 240.0.0.0 - 255.255.255.255
- 127.0.0.0 - 127.255.255.255 ?
    - Loop Back Address .

Class A Address - 1.0.0.0 - 126.0.0.0

- It supports total 126 networks.
  - 1.0.0.0, 2.0.0.0, 3.0.0.0 , 4.0.0.0 upto 126.0.0.0
- Total Systems/Hosts per network - 16,777,214
- Subnet Mask
  - Used for separating Network address and Host Address
  - 255.0.0.0
- How ?

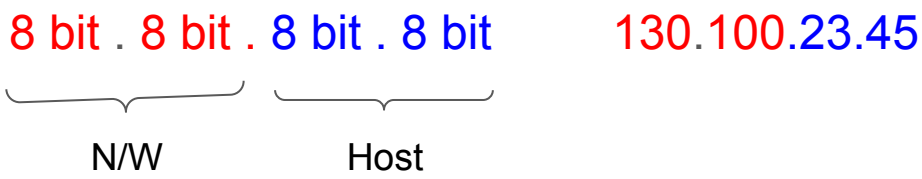


- 1.1.1.1 , 1.1.1.2, 1.1.1.3 ……. 1.1.1.255 (4th Octet)
- 1.1.2.1, 1.1.2.2, 1.1.2.3…….. 1.1.2.255 (3rd Octet)
- 1.1.3.1…. 1.1.3.255
- 1.1.255.255.
- 1.2.1.1, ….. (2nd Octet)
- 1.255.255.255
- 2.1.1.1…. (1st Octet)

= 16,777,214

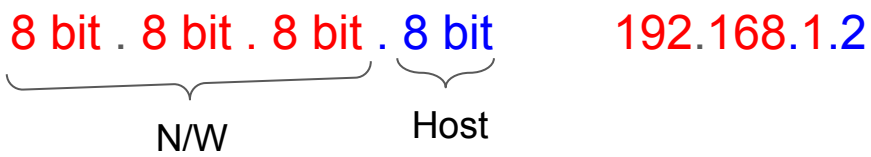
Class B - 128.0.0.0 to 191.255.0.0

- Medium to large Networks
- It supports total 16382 networks.
- Total Systems/Hosts per network - 65,534
- Subnet Mask
  - 255.255.0.0
- How ?



Class C - 192.0.0.0 to 223.255.255.0

- Small Scale Networks (LANs)
- It supports total 2,097,150 networks.
- Total Systems/Hosts per network - 254
- Subnet Mask
  - 255.255.255.0
- How ?



Class D - 224.0.0.0 - 239.255.255.255

It is basically used for multicasting

Can not be used for regular traffic

Class E - 240.0.0.0 - 255.255.255.255

It is reserved.

Summary

Class A Subnet Mask	Netwok	Host	Host	Host
	255	0	0	0
Class B Subnet Mask	Netwok	Network	Host	Host
	255	255	0	0
Class C Subnet Mask	Netwok	Network	Network	Host
	255	255	255	0

Image Source: Internet

@ NITK

- We do not need much networks - limited buildings (Depts. and Hostels)
- We have more systems, hence, we need sufficient host addresses.
- Class A address - 10.x.x.x

NITK Campus

10.100.1.1
to
10.100.1.255

Main Building

10.100.2.1
to
10.100.2.255

IT Dept.

10.100.3.1
to
10.100.3.255

Faculty Apartment

10.100.4.1
to
10.100.4.255

10.100.5.1
to
10.100.5.255

Mega Hostel

Image Source: Internet

IT Department

10.100.2.1
to
10.100.2.255

- UG Lab - I = 50 Systems
- UG Lab- II = 50
- Project Lab = 50
- Research Lab = 100

- In 2021 A New Lab is established
- UG Lab III - 100 capacity ? How to allocate IP address to new lab ?
- 10.100.6.1 to 10.100.6.255

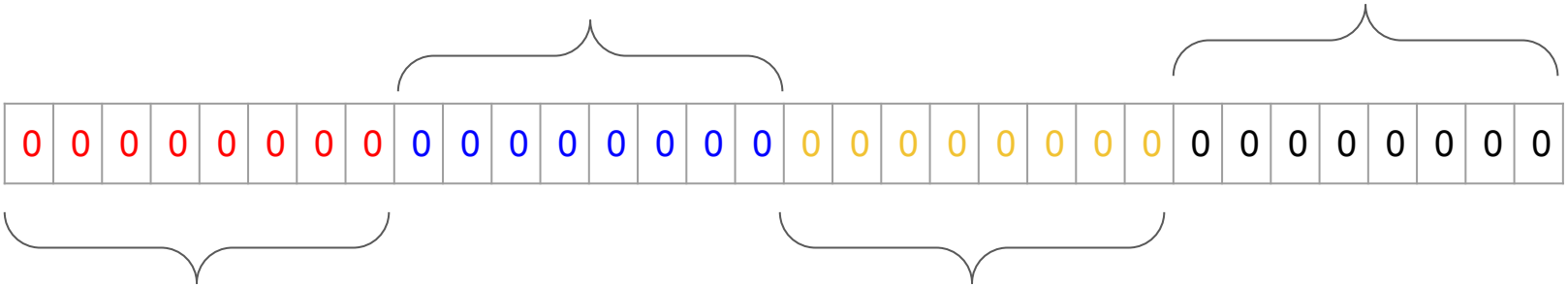
Subnet Masking

- When a packet comes @ router
  - Router has to find out where the received packet should be forwarded.
  - Which is the nearest path to reach the destination network ?
  - Remember
    - @ Network layer Network will be identified.
    - @ DLL Individual System will be identified with in the network..
- Used by the router.
- Used to bifurcate network address and host address in a given IP address.

Subnet Masking Example

10.0.0.1

8 Bit. 8Bit . 8Bit . 8 Bit



8 bit	7 bit	6 bit	5 bit	4 bit	3 bit	2 bit	1 bit
128	64	32	16	8	4	2	1

10.0.0.1

0	0	0	0	0	0	0	0	
128	64	32	16	8	4	2	1	
0	0	0	0	1	0	1	0	10
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1

0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1