- 2 ways to display an IP address:
  - Binary Notation
  - Dotted Decimal
- It's a logical address

30-01-2025   www.computernetworkingnotes.com
              freecccnaworkbook.in

Multi cloud

Azure computing is better and Aws storage
is better in that time we can combine them.

IP Address Classes

- 5 Different classes are there.
- This calles what kind of network we are using

Class	Address range	Actual IP	
A	1-126	0.0.0.0 - 127.255.255.255	127.0.0.1 - loop back Address
B	128-191		
C	192-223		
D	224-239		
E	240-255		

Class A
- making and creating Large networks with millions of host
- Default mask -

class: b
- medium-sized networking

Class C
- small network

class D (may be for military)
- multicast (one source to different groups)

Class E

- future use, someone say for ~~military~~ purpose. Experimental.

Reserved IP addresses (ranges):

0.0.0.0 — network ID

169.254.0.0 — 169.254.255.255 — APIPA

244.0.0.0 — 239.255.255.255 — multicast group.

240.0.0.0 — 255.255.255.254 — experimental usage

255.255.255.255 — broadcast IP address
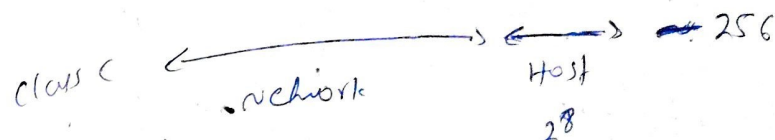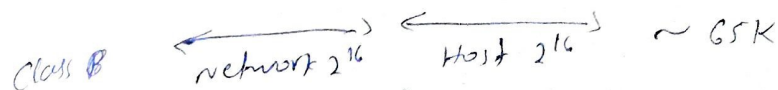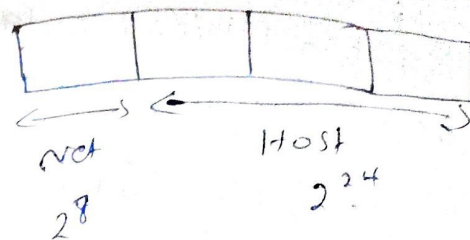
we use these for <u>internal/private</u> usage.

10.0.0.0 — 10.255.255.255 —— Class A Private IP address. ~16m

172.16.0.0 — 172.31.255.255 —— Class B Private IP address ~65

192.168.0.0 — 192.168.255.255 — Class C private IP addr ~256

Private IP

- are usable within LAN, close saved

Public

- internet IP, wan

Class A — Net 2^8 Host 2^{24} ~16m

Class B — network 2^{16} Host 2^{16} ~65K

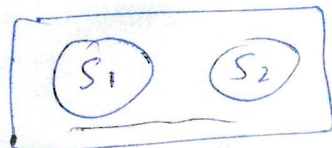Class C — network   Host 2^8 ~256

Subnet

- Breaking down a bigger network into smaller its called SUBNET

- Subnetting is used for minimizing the IP wastage.

- can use any number of IP (10, 20, 100...)

Supernetting

- It is opposite of subnetting
- Smaller network are merged together to make a bigger networks.
- It is useful in managing network.

sub example:
Subnet 1 - 192.168.10.1 - 192.168.10.10
Subnet 2 - 192.168.10.150 - 200

Supernetting = sub1 + sub2

100 + 50 = 150

Subnet mask:

- is a 32 bit number

- It helps in determining the

1. network

2. hosts

- types:

1) fixed length subnet mask (FLSM)

- all the subnets will have same subnet mask

- this leads to the wastage of IP addresses

2) variable length subnet mask (VLSM)

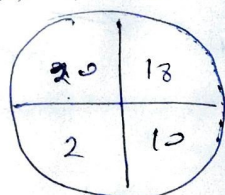- all the subnets that uses VLSM, will have variable lengths.

FLSM | Every room have 20

Devices

S1 - 20
S2 - 18
S3 - 20
S4 - 2

20	18
2	10

Total wastage
30

~~Devices~~ Available
80

- thus, minimizing the IP wastage

FLSM

Class	CIDR Notation	CIDR notation
Class A	18	255.0.0.0
Class B	116	255.255.0.0
Class C	124	255.255.255.0
Class D	NA	NA
Class E	NA	NA.

CIDR - Classless Inter-Domain Routing

Subnet	CIDR (VLSM)	CIDR (FLSM)
20	127	127
18	127	127
10	128	127
2	131	127

CIDR prefix	Total IP addresses
/32	1
/31	2
/30	4
/29	8
/28	16
/27	32
/26	64
/26	

CIDR (Classless Inter-Domain Routing)

- CIDR is a method for more flexible IP address allocation and efficient routing.

- It come as a replacement for class-based IP addressing system (Class A, B, C)

- CIDR addresses use Variable-length subnet making (VLSM), etc.

Public IP Address

- A public IP address is a globally unique IP address assigned to devices for communication over the internet.
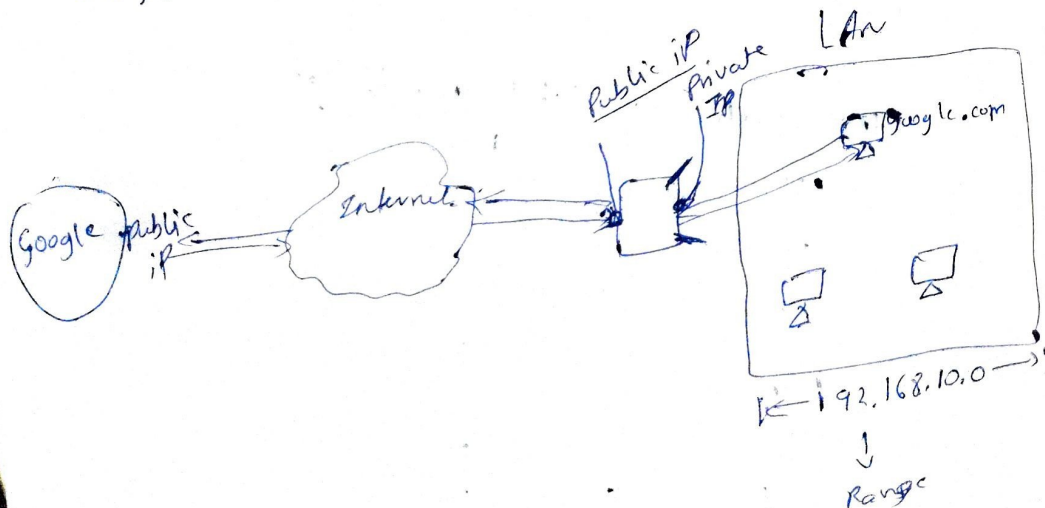
Private IP Address

- Reserved for Local Area network

- Not accessible from public IP addresses.

OSI LAYER (theoretical)

Introduced by ISO - International Standardization Organization

1. Physical layer
   ↓
2. Data link layer
   ↓
3. network layer
   ↓
4. Transport layer
   ↓
5. Session layer
   ↓
6. Presentation layer
   ↓
7. Application layer

1. Application Layer

   Applications create the data

2. Presentation

   Data is formatted, compressed & encrypte

Session

Connections are established and managed.

Transport layer:

Data is broken into segments for reliable delivery.

network layer:

Segments are packaged into packets and routed.

Data link layer:

Packets are framed and sent to the next device

Physical layer:

Frames are converted into bits and transmitted physically.

TCP/IP (4 layer)	TCP/IP (5 layer)
Application	Application
Transport	Transport
network	Internet layer
network	Data link
Access	Physical layer

TCP → Acknowledgment send to sender

UDP → No Acknowledgment.

black cable
copper straight

orrange circle - connection getting up

green arrow - connection established.