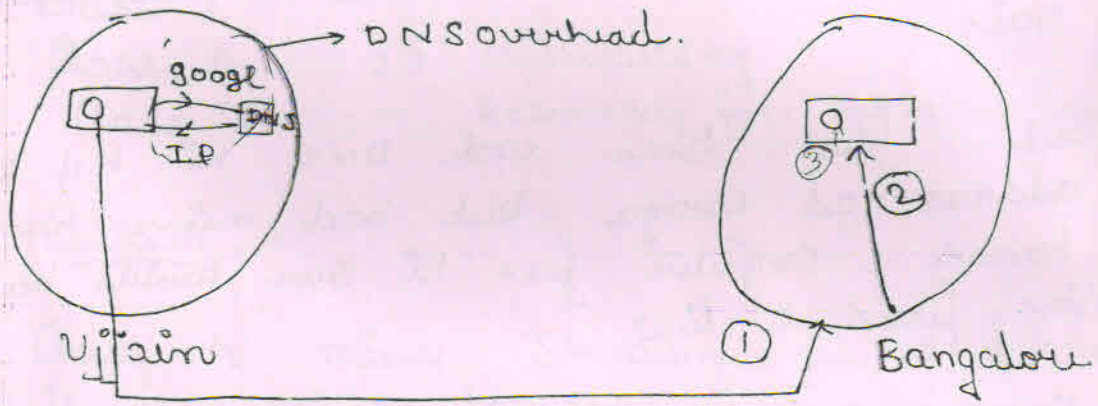
Computer Networks: →

IP- Addressing: →

→ First of all concept of Networking. Suppose hum Ujjain K network par hai aur us network se connected hamara system hai, now us system se mujhe Bangalore K kisi network par ek host hai usse data send karna hai, · Is puri process mein teen steps involve hote hai.



i Us process se data kaha gaya Bangalore K network par.

ii Now second step mein us network mein konse host par send karna hai woh second step

iii Now us host mein kis process ko dena hai. Third step.

· Is steps ko recognize karne K liye hamne number chahiye gaye. Isliye

IP- addressing ka concept aaya.

- But hum IP- address toh dete hi nahi hai, hum toh directly google.com like dete hai toh First that name is converted into IP- address.

- Toh yeh convertion kon karta hai, toh yeh Convertion Domain Name Server karta hai. DNS

→ Aur yeh convesion DNS overhead kahalata hai.

- But first time woh DNS ki help se IP address get karega but bad mein hum usko hamare computer par hi save karlete hai kuch time period k liye.

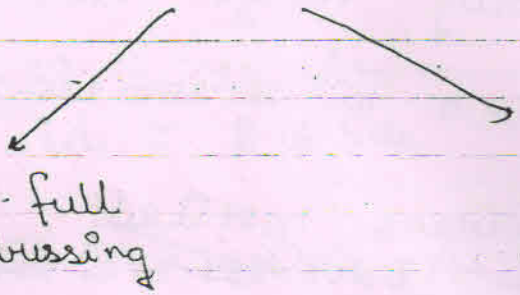
Some Conversion :-

K → 1024 (2^{10})
M B → 2^{20}
G B → 2^{30}
T → 2^{40}.

- We are using IPv4 but IPv6 is in progress.

- IPv4 consist of 32 bits. i.e 4byte.

- IP address is subdivided into two categories



Class-full Addressing :-

1. CLASS A :-
2. Class B
3. Class C

→ IP-addressing

4. Class D → Multicasting
5. Class E → Reserved for special purpose.

Class A :→

- Class A mein Starting bit is fixed i.e It is set to 0.
- And IP-address is divided into two parts net_id and host_id.
- Toh Class A mein Starting ki 8 bits represent net_id and remaining host_id.

0 - - - - - - - . 0 . 0 . 0 to .

~~127. 0. 0~~ 127.255.255.255.

No. of Networks = $2^7 = 128$

No. of Host in each network $\simeq 2^{24} - 2$

and No. of IP-address = 2^{31}.

but practically range starts from

1.0.0.0 to 126.255.225.255

~~0.0.0.0~~ - ~~represent~~ host itself
and ~~127.0.0.0 127.255.255.255~~
and 12

- 0 wali series host itself k liye reserved hai aur 127 wali ~~lost~~ loopback k liye.
  { 127 → Testing the functionality of network card & TCP/IP.
  0.0.0.0 → Used for bootstrap.

Class B :-

net id = 16 bit
host_id = 16 bit
No. of ip address possible = 2^{30}.

Here starting two bits are reserved i.e 10.

No. of Network possible = 2^{14}

No. of host in each subnet ≈ $2^{16} - 2$

Range :-

128.0.0.0 to 191.~~0.0~~.255.255.255.

Class C :→

net_id = 24 bits
Host_id = 8 bits

No. of ip addresses possible = 2^{29}.

Here starting three bits are reserved i.e 110

No. of network possible = 2^{21}

No. of Host for network = $2^8 - 2$.

Range :- 192.0.0.0 to 223.255.255.255

Class D :→

Ket:- Class D mein hum IP address ko net_id aur host_id mein divide nahi karte but here starting ki 4 bits reserved hoti hai. i.e 1110.

No. of ip address possible = 2^{28}

- This class is used for multicasting, not used for IP-address assigning.
- Range:-

224.0.0.0 to 239.255.255.255

Class E :→

- Class E mein starting ki four bit reserved hoti hai i.e 1111

Range $240.0.0.0$ to $255.255.255.255$.

- This class also not used for IP address assigned, it is used or reserved for futher uses i.e in military communication.

- No. of ip address possible $= 2^{28}$

- Is class mein bhi IP address net_id aur host_id mein divide nahi hota hai.

- IP- address ko hum three ways mein represent kar sakte hai.

1] pure 32 bit number binary mein represent kar do.

2] Decimal number mein lik do pure 32 bit ko.

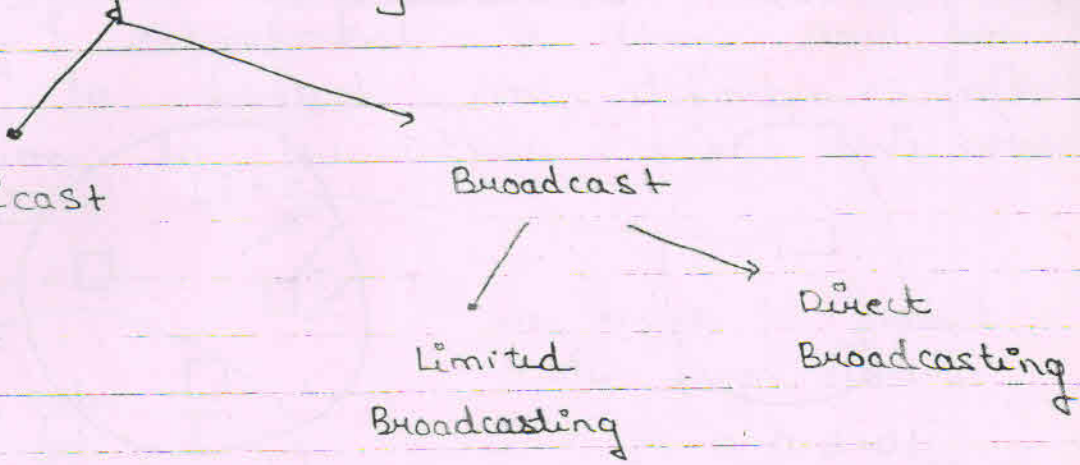
3] dotted decimal representation

This notation is practically used.

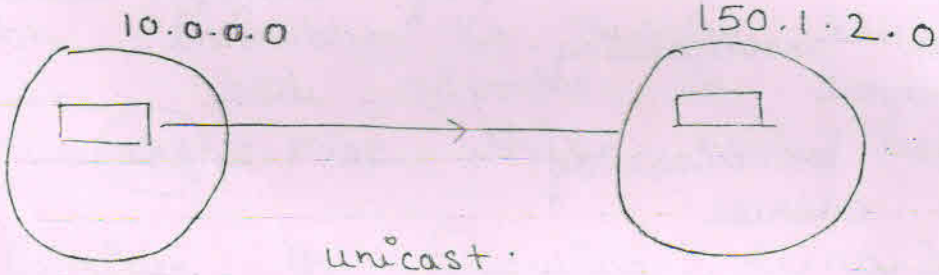
(10) 5. 255. 10

4 * 8 bit = 32 bit.

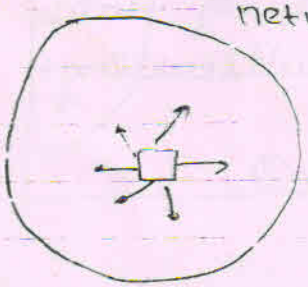
Concept of Casting :→



i) Unicast :→ (one to one)



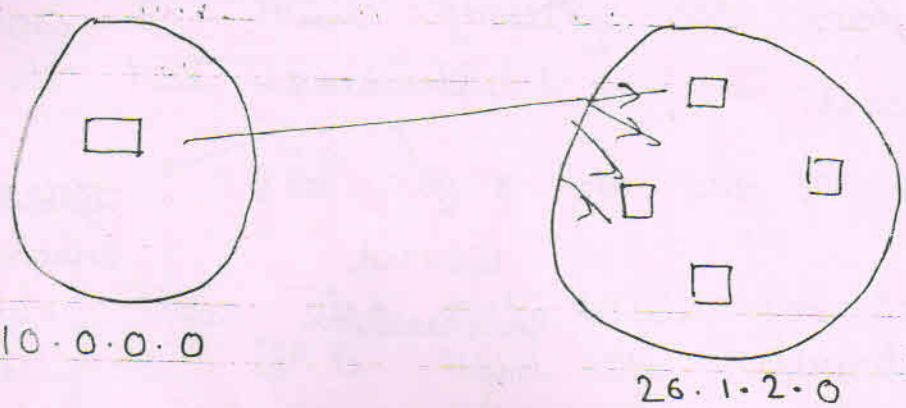
ii) Limited Broadcasting



ek hi network mein jitane bhi host hai sab ko msg bhejna send karna is Limited Broadcasting.

Limited Broadcasting ka address fixed hota hai → 255.255.255.255.

(iii) Direct broadcasting :→



Ek network k ek host se dusre network k sabhi host ko msg transfer karna is direct broadcasting.

Direct broadcasting address = 26.1.2.255

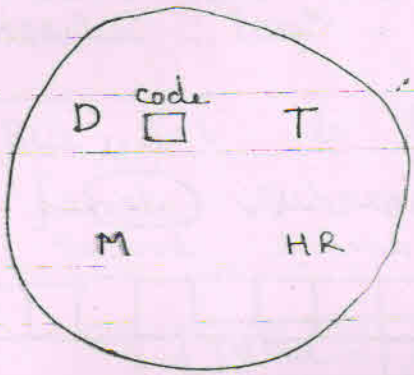
→ Host-id all 1's → Represent broadcast address

Multicast matlab group of data mein broadcast karna is multicasting.

⇒ Concept of subnetting :-

- In practical we don't want very big network because maintaining the bigger network is very difficult and there is an lack of security.

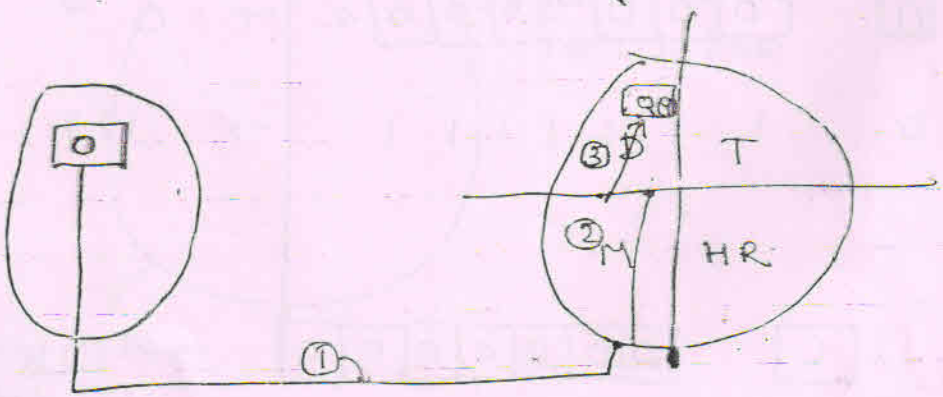
- Security in the sense, like in company many department is there and we want to protect one department information to the other then this become difficult.



we want to protect code from tester.

- Iss problem ko resolve karne k liye hum bade networks ko small-small networks mein divide karte hai.

Consider the following scenario.



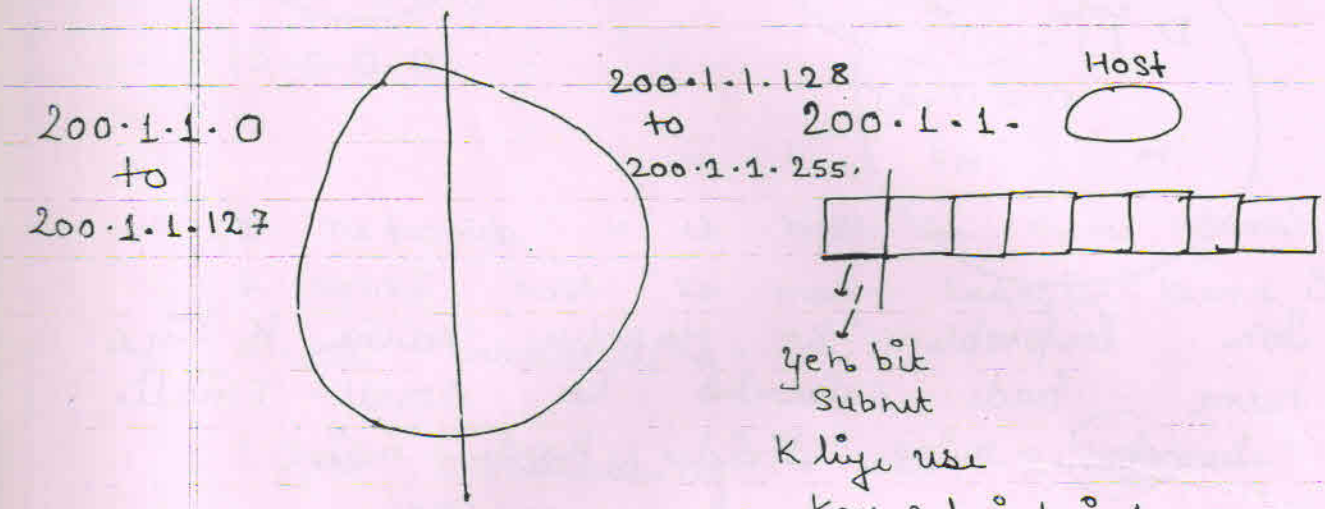
Now to find the reciever we have 4 steps.

→ ~~First~~ First network fielding then with the network konse dept mein send karna hai aur fir Host then process.

Consider the following situation:-

→ We have given class C address -
200.1.1.0

- Now we have to create two networks within this network



I department

0 0 0 0 0 0 0 0 → 0

0 1 1 1 1 1 1 1 → 127.

II department

1 0 0 0 0 0 0 0 → 128

1 1 1 1 1 1 1 1 → 255.

Range:→ 200.1.1.128 to 200.1.1.255.