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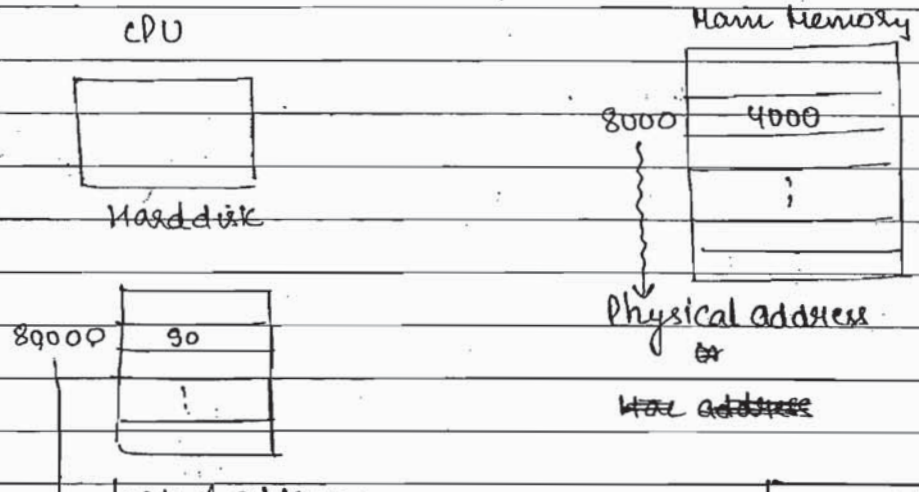
Computer Network and Security



MAC address is local, so cannot be used as unique identification number

Physical address
(or)
Mac address
(or)
~~Mac~~ Ethernet address ⇒ 48 bit address
(or)
LAN card address
(or)
NIC card address

→ Implicit address

① —— ② S.A, D.A — S.MAC, D.MAC — Scope is local

logical address (classful addressing)
32 bit address (IPv4)

IANA → Internet Assigned Number Authority

Note> Using MAC address alone cannot be used as an identification unit in transmitting the data, because scope is local.

(IP) logical address ⟶ 32 bit address
address
↓ classes ⟶ A, B, C, D, (E) — Research
Unicasting
multicasting

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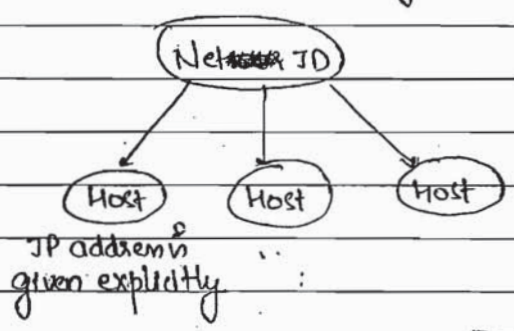
⊙ classful supports two level hierarchy.



www.yahoo.com
hostname

→ Whenever an IP address is assigned to a computer, it is known as host.

→ Entire Network will be represented by a number known as the Net ID.

Notation

i) Binary notation [2]

Ex- 10101111 10101010 10101111 11110000

System friendly. 1st octet 2nd octet 3rd octet 4th octet

ii) Dotted Decimal Notation [10]

Ex- 143.89.99.126 ——→ User friendly.

——→ In Binary notation starting few bits will decided the type of class

——→ In dotted decimal notation, first octate will decided the type of class.

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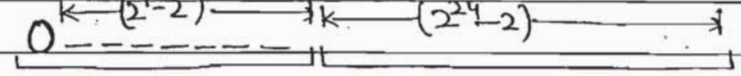
Class A>



Net bits 8bit — Host bits 24 bits

0 0000000 → 0

1111111 → 127

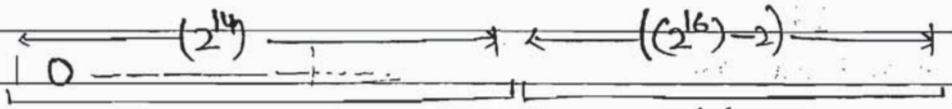
(0—127) but 0 and 127 not used

∴ (1—126) → Class A

0.0.0.0 → DHCP client

127.x.y.z → loop back address

Class B>



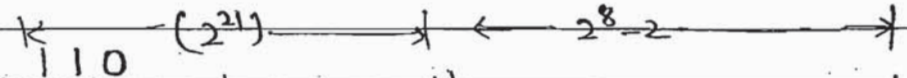
Net bits 16 bits — Host bits 16 bits

1 0 000000 → 128

1 1 1111 → 191

Class B Range → (128—191)

Class C



Net bits 24 bits — Host bits 8bits

1 1 0 00000 → 192

1 1 0 11111 → 223

Class C Range → (192—223)

224
5
239

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Class D — 1110 — no division — multicasting

1110 0000 → 224
1110 1111 → 239

Class D Range → (224–239)

Class E — 1111 — Research

1111 0000 → 240
1111 1111 → 255

Class E Range → (240–255)

Q) IP: 201.44.89.99

Net Id =

Direct Broad cast address of network =

Network mask (or Default mask)

Class A: 11111111.00000000.00000000.00000000
mask of A → 255.0.0.0
Class B: 255.255.0.0
Class C: 255.255.255.0

Mask → allowing and stopping

→ Network mask is a mathematical tool which is used for solving networking problems

IP: 201.44.89.99 (dane)
mask: 255.255.255.0
201.44.89.0 (And)

99: 01100011
0: 00000000
0: 00000000

89: 01011001
255: 11111111
89: 01011001

x	y	output And
0	0	0
0	1	0
1	0	0
1	1	1

When want to send address to all the host present

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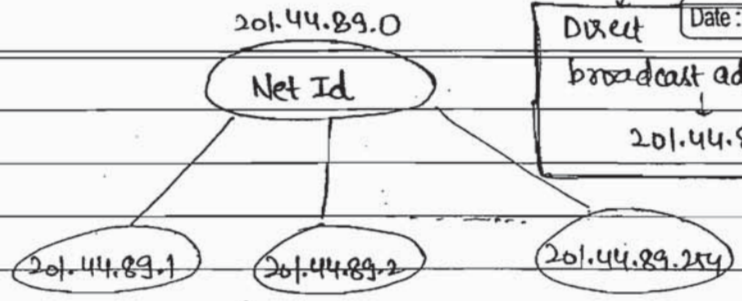
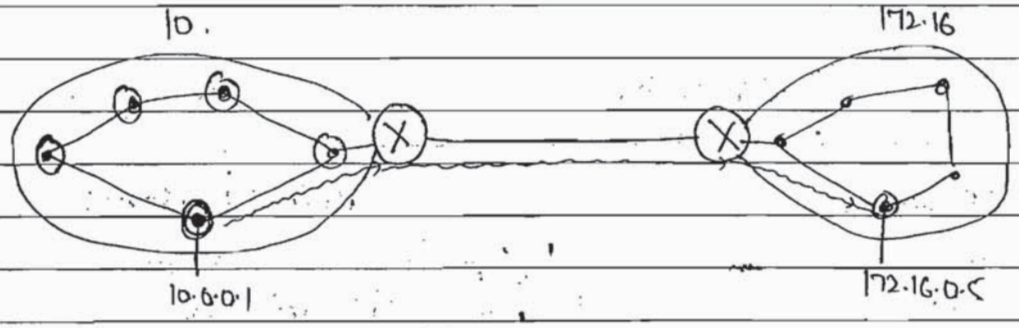
Direct broadcast address.

201.44.89.255



(i) We are subtracting 2 addresses in the no. of host, because one is used for net Id and other one is used for DBA of network

Pseudo approach of network



(i)

	S.IP	D.IP
D	10.0.0.1	172.16.0.5

ClassB

↓

It is a unicasting packet between the networks (different networks)

(ii)

	SIP	DIP
D	10.0.0.1	172.16.255.255

all 1's in host bit

Directed broadcast address

D	172.16.255.255	10.0.0.1

(X) (no meaning)

Signifies Direct broadcast address

→ It is a broadcasting packet on the other network

→ Direct Broadcast address will always be used as Destination IP.

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(iii)

	S.IP	D.IP
D	10.0.0.1	10.0.0.9

It is a unicasting packet within the network. (same network)

(iv) Special case →

D	10.0.0.1	255.255.255.255

(Broadcast within the network) ↑

↓ limited broadcast address
→ scope is local (LAN)

→ limited Broadcast address will always be used as destination IP.

↓ (used in LAN)

IP address

Private IP address

1. Scope is local
2. Work only in LAN
3. By loading networking operating system
4. Ranges of private IP.

Ranges of private IP	No. of Network
10.0.0.0 — 10.255.255.255	1
172.16.0.0 — 172.31.255.255	16
192.168.0.0 — 192.168.255.255	256

5. free of cost
6. Will not get Internet service

Public IP address

1. Scope is globally unique
2. used To get Internet service
3. Not free of cost
4. have control of ISP (Internet Service provider)