

Computer Network - SN

IP addressing:• IP address \rightarrow

N/W ID	Host ID
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• $2^{10} \quad 2^{20} \quad 2^{30} \quad 2^{40}$
 $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 K M G T

\rightarrow In CN IP add is 32 bits \rightarrow

8 bit NID	24 HID
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• class A: IP in class-A is 2^{31}

0	NID	HID
8 bit	24 bit	

\rightarrow range = (1-126) = class A. $(2^8 - 2^7)$
 $= 128$

• class B: IP in class B is 2^{30}

10	NID	HID
16 bit	16 bit	

\rightarrow range B/W (128-191) = class B $(2^8 - 2^6)$
 $= 192$

• class C: IP add = 2^{29}

110	NID	HID
24 bits	8 bit	

\rightarrow range B/W (192-223) $(2^8 - 2^5)$
 $= 224$

• class-D: IP add = 2^{28}

\rightarrow range B/W (224-239) $(2^8 - 2^4)$
 $= 240$

• class-E: IP add = 2^{27}

\rightarrow range B/W (240-255) $(2^8 - 2^3)$
 $= 256$

** \rightarrow if in a network having 2^m IP address then, total host present = $(2^m - 2)$

	# IP add	# Host
	2^m	$2^m - 2$
CA \rightarrow	2^{24}	$2^{24} - 2$
CB \rightarrow	2^{16}	$2^{16} - 2$
CC \rightarrow	2^8	$2^8 - 2$

IP address	N/W ID	Direct Broadcast address	Limited Broadcast Address
CA \rightarrow (1-126) $\frac{1.2.3.4}{10.15.20.60}$ NID	1.0.0.0 10.0.0.0	1.255.255.255 10.255.255.255	255.255.255.255 255.255.255.255
CB \rightarrow (128-191) $\frac{130.1.0.0}{150.0.0.0}$ NID	130.1.0.0 150.0.0.0	130.1.255.255 150.0.255.255	" "
CC \rightarrow (192-223) $\frac{200.1.10.100}{220.15.1.10}$	200.1.10.0 220.15.1.0	200.1.10.255 220.15.1.255	" "
CE \rightarrow (240-255) 250.0.1.2	X	X	X
(300).1.2.3 \rightarrow Not valid.			

• Subnets: Dividing a big n/w into many small network.

• Subnet Mask: 32 bit (contain)

1's \rightarrow N/W ID & Subnet ID, 0's \rightarrow Host ID.

255 255 . 255 . 255 . 192
 11111111 . 11111111 . 11111111 . 11000000
 NID SID Host ID

Subnet mask - 255 . 255 . 255 . 192
 IP add - 11001000 . 00000001 . 00000010 . 10000000
 11001000 . 00000001 . 00000010 . 10000000
 200 . 1 . 2 . 128

\rightarrow given IP add and Subnet mask we can find out network id of network to which the IP address belongs.

\rightarrow Q. given Subnet Mask (SM) 255.255.255.15 how many subnet possible

\Rightarrow 255 . 255 . 255 . 15
 11111111 . 11111111 . 11111111 . 01111

$$\boxed{N/WID + \text{Subnet} = 28}$$

$$24 + \text{SID} = 28$$

$$\text{SID} = 4$$

$$\text{Subnet mask} = 2^4$$

\rightarrow Subnet ID
 SM
 IP

\rightarrow HID = n, $2^n - 2 \rightarrow$ # hosts.

• Classes Inter Domain Routing (CIDR) -

rules for forming CIDR block -

- (i) All IP add should contiguous (ii) block size always power of 2
- (iii) First IP add in the block should be evenly divisible by size of block (2^n) .

EX: $\boxed{150.10.20.64}$
 150.10.20.65
 150.10.20.66
 .
 150.10.20.127
 $64 = 2^6 \rightarrow$ 2nd rule followed.

\rightarrow this block are CIDR block.

$$\text{IP add} = 2^6, \text{HID} = 6,$$

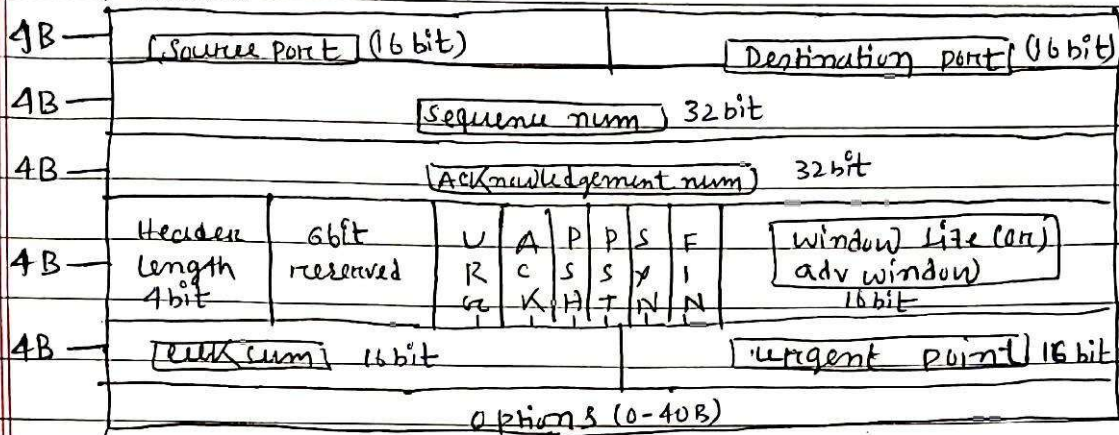
$$\text{HID} + \text{BID (NID)} = 32$$

$$\rightarrow \text{BID} = 28$$

CIDR representation, $\boxed{150.10.20.64/28}$

** TCP (Transmission Control Protocol) -

• TCP headers -



* \rightarrow length of the headers = $(4+4+4+4+4) = 20 \text{ B}$ (Minimum)
 $\Rightarrow 20\text{B} + 40\text{B} = 60 \text{ B}$ (Maximum)

\rightarrow Socket = IP + port num = 48 bit.
 (32) (16)

** Application Protocols:

\rightarrow DNS, HTTP, FTP, SMTP, POP (application protocols)

• DNS

\rightarrow Domain $\xrightarrow{\text{DNS}}$ IP

\rightarrow IP are not static.

\rightarrow DNS use UDP at Transport layer.

• HTTP

\rightarrow mainly used to getting webpage.

\rightarrow used TCP at Transport layer.

\rightarrow stateless protocol.

• FTP (File transfer protocol)

\rightarrow statefull.

• SMTP and POP \rightarrow (post office protocol)

\rightarrow used TCP at transport layer.

\downarrow (simple mail transfer protocol)

\rightarrow Supernetting not used to improve security.

\rightarrow router can use logical addressing system.