Computers Network - SN

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• IP addressing :

- IP address → | N/W ID | Host ID |
- 2^{10} 2^{20} 2^{30} 2^{40}
  K M G T

→ In CN IP add is 32 bits → | 8 bit (NID) | 24 (HID) | ← 32 →

- Class A : IP in class-A is 2^{31}

0	NID	HID
	8 bit	24 bit

→ 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

→ 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

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

- Class-D : IP add = 2^{28}

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

- Class-E : IP add = 2^{28}

→ range B/W (240 - 255) $(2^8 - 2^4)$

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→ if in a Network having 2^n IP address then, total host present = $2^n - 2$

	# IP add	# Host
	2^n	$2^n - 2$
CA →	2^{24}	$2^{24} - 2$
CB →	2^{16}	$2^{16} - 2$
CC →	2^8	$2^8 - 2$

	IP address	N/W ID	Direct Broadcast address	Limited Broadcast Address
CA → (1-126)	1.2.3.4	1.0.0.0	1.255.255.255	255.255.255.255
	10.15.20.60 (NID)	10.0.0.0	10.255.255.255	255.255.255.255.
CB → (128-191)	130.1.0.0	130.1.0.0	130.1.255.255	»
	150.0.0.0 (NID)	150.0.0.0	150.0.255.255	»
CC → (192-223)	200.1.10.100	200.1.10.0	200.1.10.255	»
	220.15.1.10	220.15.1.0	220.15.1.255	»
CE → (240-255)	250.0.1.2	X	X	X
	300.1.2.3 → Not valied.			

- Subnets: Dividing a big n/w into many small network.
- SubnetMask: 32 bit (contain)

1's → N/W ID & subnet ID , 0's → Host ID.

255 . 255 . 255 . 192

11111111 . 11111111 . 11111111 . 11000000

NID | SID | Host ID

- Subnet mask - 225 . 255 . 255 . 192
  11111111 . 11111111 . 11111111 . 11000000
  IP add - 11001000 . 00000001 . 00000010 . 10000000
  200 . 1 . 2 . 128

→ given IP add and Subnet mask we can find out network id of network to ~~with~~ which the IP address belongs.

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

⇒ 255. 255 255 15
11111111 . 11111111 . 11111111 . 01111

N/W ID + subnet = 28

24 + SID = 28

SID = 4

Subnet mask = 2^4

→ Subnet ID: SM . . . .
IP . . . .
. . . .
NID | SID | HID

→ HID = n, $2^n - 2$ → # hosts.

- Classes Inter Domain routing (CIDR) –

rules for forming CIDR Block :–

(i) All IP add should continuous (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: 150.10.20.64
150.10.20.65
150.10.20.66
⋮
150.10.20.127

64 = 2^6 → 2nd rule followed.

→ this block are CIDR block.

IP add = 2^6 , HID = 6 ,

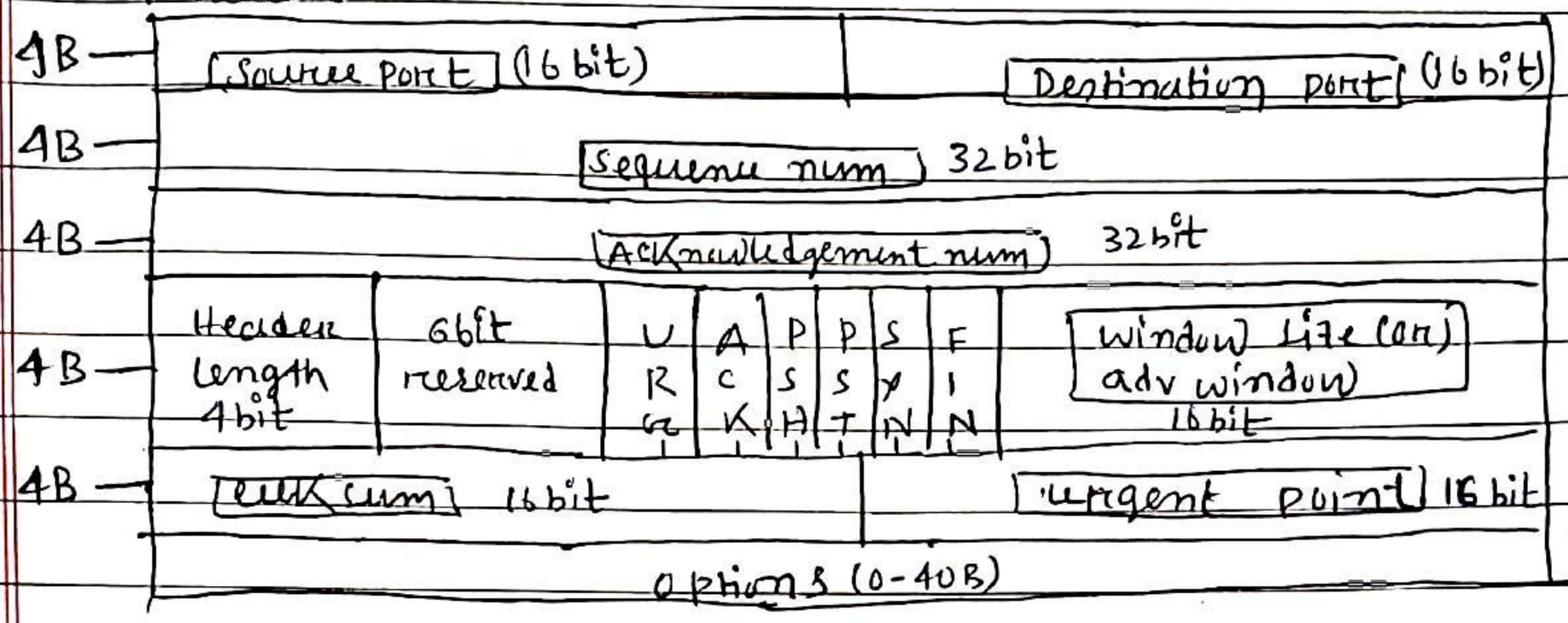
HID + BID(NID) = 32

↳ BID = 28

CIDR representation, 150.10.20.64/28

** • TCP (Transmission control protocol) –

• TCP header –



* → length of the header = (4+4+4+4+4) = 20 B (Minimum)

⇒ 20B+40B = 60 B (Maximum)

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

** • Application Protocols:

→ DNS, HTTP, FTP, SMTP, POP (application protocol)

• DNS

→ Domain $\xrightarrow{DNS}$ IP

→ IP are not static.

→ DNS use UDP at Transport layer.

• HTTP

→ mainly used to getting Webpage.

→ used TCP at Transport layer.

→ ~~sate~~ stateless protocol.

• FTP (file transfer protocol)

→ stateful.

• SMTP and POP → (post office protocol)

→ used TCP at transport layer.

(simple mail transfer protocol)

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→ Supernetting not used to improve security.

→ Routers can use logical addressing system.