CS & IT ENGINEERING

COMPUTER NETWORKS

TCP & UDP

Lecture No- 02

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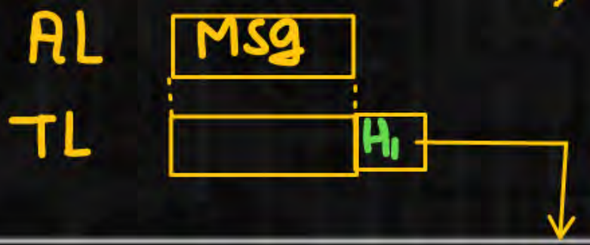
Wrap Around Time

TCP Header



16 bits								16 bits	
Source Port (16 bit)								Destination Port (16 bit)	→ 4B
Sequence number (32 bit)									→ 4B
Acknowledgement number (32 bit)									→ 4B
HL (4 bit)	Reserved (6 bits)	URG	ACK	PSH	RST	SYN	FIN	Window Size or (Advertisement Window) (16 bit)	→ 4B
Check Sum (16 bit)								Urgent Pointer (16 bit)	→ 4B
Options (0-40 bytes)									5*4B = 20 Byte

20 Byte Header fixed

40B ⇓ Variable

minimum Header size = 20B + 0B = 20 Byte

maximum Header size = 20B + 40B = 60 Byte

HL (Header Length) = 4 bit $\xrightarrow{\text{Max No}}$ 1111 → 15

Maximum Header size = 60 Byte

$$\frac{60}{x} = 15$$

(S.F) → x

$$\frac{60}{4} = 15$$

(S.F) → 4

Header size	HLF
$\frac{20B}{4} = 5$	0101
$\frac{32B}{4} = 8$	1000
$\frac{40B}{4} = 10$	1010
$\frac{60B}{4} = 15$	1111

Header size	HLF
$\frac{30B}{4} = 7.5$ X	
$30B + 2B = \frac{32B}{4} = 8$	1000

dummy Byte

⇓

option

⇓

Padding = 2B

Port No = 16 bit

Range → (0 to $2^{16}-1$) → (0 to 65,535)

0 to 1023 → Well Known Port Number

Assigned & control by IANA

	PortNo
SMTP	25
HTTP	80
FTP	20, 21
DNS	53
IMAP	143
POP	110
Telnet	23

1024 ↓ 49151

Reserved or Registered Port Number

Not assigned and control by IANA
only Registered with IANA

49152 ↓ 65,535

Dynamic Port No

neither control nor
Registered with IANA

Source Port Address

This is a 16 – bit field that defines the port number of the application program in the host that is sending the segment.

Destination Port Address

This is a 16 – bit field that defines the port number of the application program in the host that is receiving the segment.

Sequence Number

This is a 32-bit field defines the sequence number of the first data byte .

Acknowledgement Number

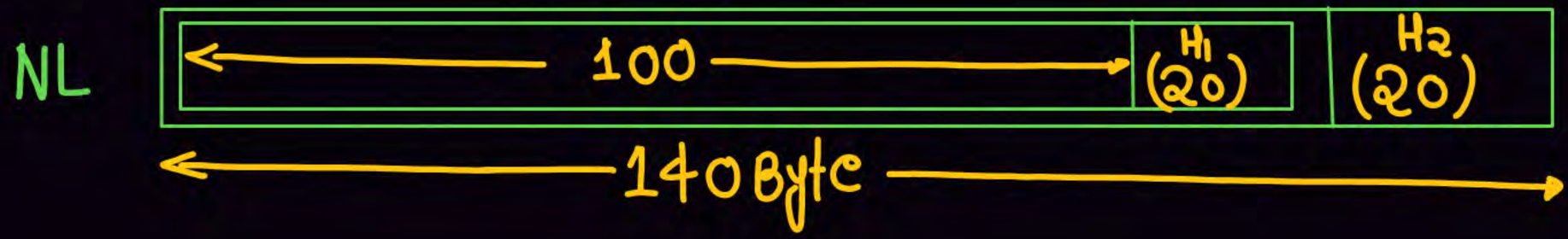
This is a 32-bit field defines the sequence number of the next expected byte . If receiver has successfully received byte number x from other party , it returns x+1 as the acknowledgement number.

① TCP is a Byte stream Protocal i.e every Byte is associated with one sequence Number

② IP is a Packet stream Protocal i.e every Packet is associated with one sequence Number


S
R
data = 100B
Header
Seq No = 100
199 ..... 102 101 100
Seq No = 100
Ack No = 200
1st Byte Seq No = 100
Total length at NL = 140 Byte
Data length at TL = 100 Byte
Last Byte Seq No = 100 + 100 - 1
= 199
Ack No = 200
AL
Msg
TL
100
H1
20
Segment
120
NL
120
H2
20
Datagram
140
Total lenght at NL = 140

OR



Data size at TL = Total length (IP) - IP(H) - TCP(H)

Q: HL = 10
Total length = 1000
} IP

Seq No = 100
HL = 5
} TCP

Ack No = ?

Data size at TL = 940

1st Byte Seq No = 100

last Byte Seq No = 100 + 940 - 1 = 1039

Ack No = 1040

Soln:


THANK YOU
GW
SOLDIERS !