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L5 - WI (ETH)

TCP/IP Protocol Stack (11) ①

Concepts Covered

- IP Datagram

- IP Header files.

- IP layer provides connectionless, unreliable delivery system for packets.

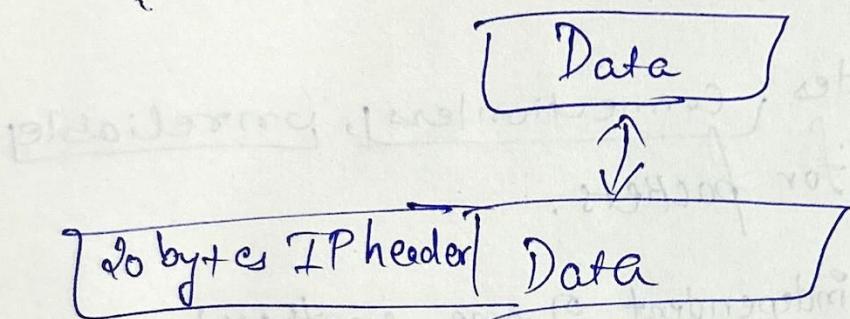
- Each packets is independent of one another.

- - ↳ IP layer ~~needs~~ doesn't maintain any history.
 - ↳ Each IP packet contains the source & destination.
 - ↳ IP layer do not guarantee delivery of packets.

because when
packet is received
by receiver it sends
the (ACK) ~~ACK~~

IP layer encapsulation

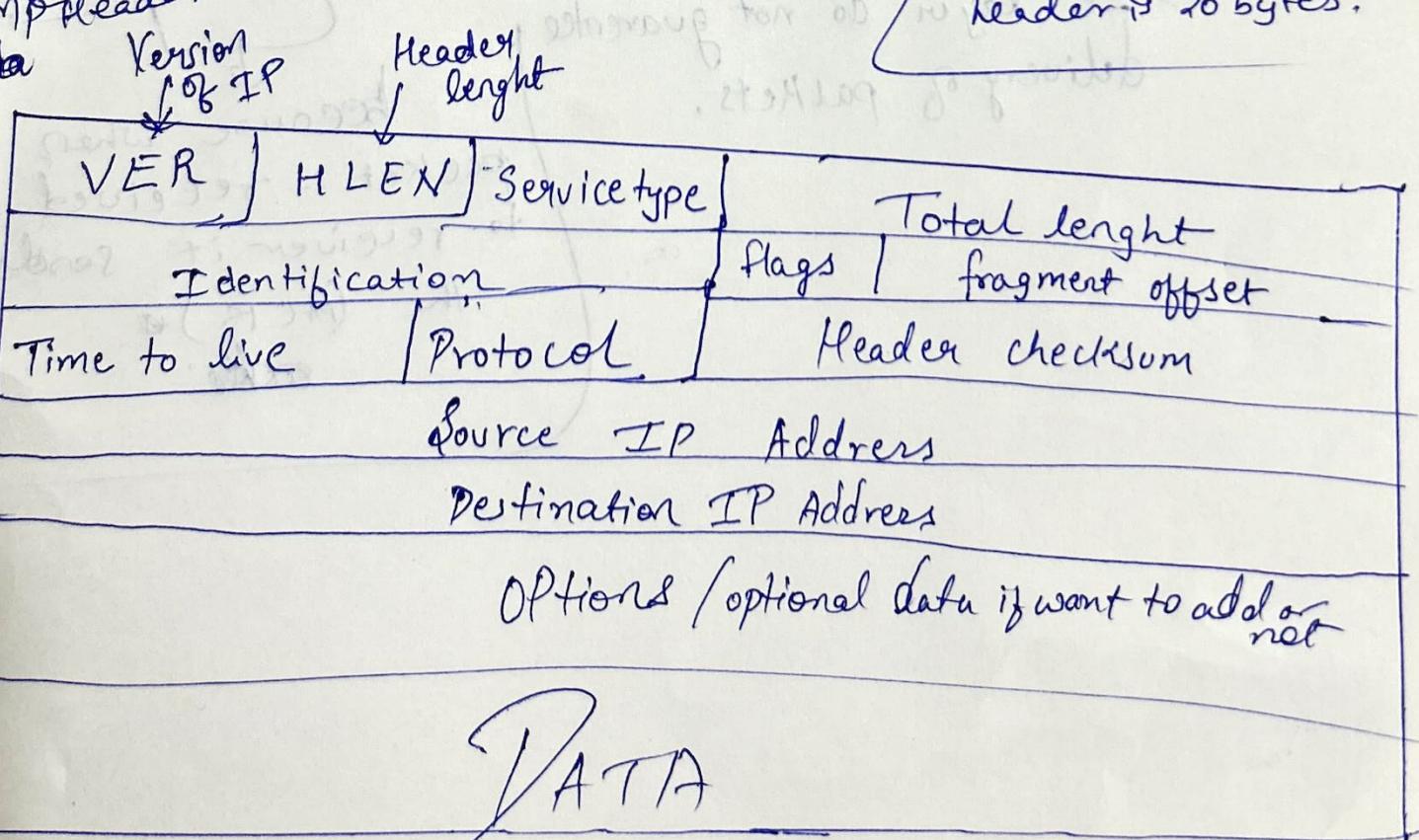
- Receives a data chunk from the higher layer (TCP or UDP)
- Prepare a header of minimum 20 bytes,
 - Containing relevant information for handling routing & flow control.



format of IP Datagram

32 bits = 4 bytes

total 5 columns
header is 20 bytes.



Header ~~bits~~ fields

③

- VER (4 bits)

↳ Version

Here we talk about IPv4

of IP protocol in use

- HLEN (4 bits)

• Length of header, expressed as the number of 32-bit words.

• Minimum of 5 & maximum of 15.

- Total length.

• Length in bytes of the datagram, including headers.

• Maximum datagram size : $2^{16} = 65536$ bytes.

- Service Type (8 bits).

• Allows packets to be assigned a priority

• Router can use this field to route packets.

- Time to live (8 bits).

• Prevents a packet from travelling in a loop.

• Sender sets a value, that is decremented at each hop.
if it reaches zero, packet is discarded.

- Protocol (8 bits)

• Identifies the higher protocol being used.

• Source IP Address (32 bits)

- internet address of Sender.

• Destination IP Address (32 bits)

- internet address of Destination.

• Identification, flags, fragment offset.

- used for handling fragmentation

• options (Variable width).

- Can be given provided router supports.

- source routing, for example.

Header checksum

• Covers only the IP Header

• How it's been Computed?

↳ Header is treated as a sequence of 16bit integers.

↳ The header are all added using ones Compliment arithmetic

↳ Ones Compliment of the final sum is taken as the checksum.

* It's a very small kind of arithmetic calculation done by computer hardware automatically.

• A mismatched in checksum causes datagram to be discarded.

(5)

Viewing IP packets.

- we can use packet sniffers to view IP packets
 - some of them are
 - wireshark
 - Windump
 - tcpdump
 - Tshark
 - Solar Winds.