CS & IT ENGINEERING

COMPUTER NETWORKS

IPv4 Header & Fragmentation

Lecture No-3

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IPv4 Header

IPv4 Header

Completed

VER(4)	HL(4)	Services(8)	Total Length(16)
Identification No.(16)	Flags (3)	Fragment offset (13)	
Time to Live (8 bit) ✓	Protocol (8bit) ✓	Header checksum (16 bit) ✓	
Source IP Address (32bit)			
Destination IP Address (32bit)			
Option			

TTL : (Time to Live) = 8 bit $\xrightarrow{\text{Range}}$ 0 to $2^8 - 1$ = 0 to 255

1. TTL is used to avoid infinite looping
2. TTL field is used to control the maximum no. of hops visited by datagram.
3. When a source host sends a datagram ,it stores a number in this field. Each router that process the datagram decrements this number by one. If TTL field reaches zero before the datagram arrives at its destination ,then the datagram is discarded and an ICMP message is sent back to sender.

Routing table

NID	SM	IF
—	—	a
—	—	b
—	—	c
0.0.0.0	0.0.0.0	d

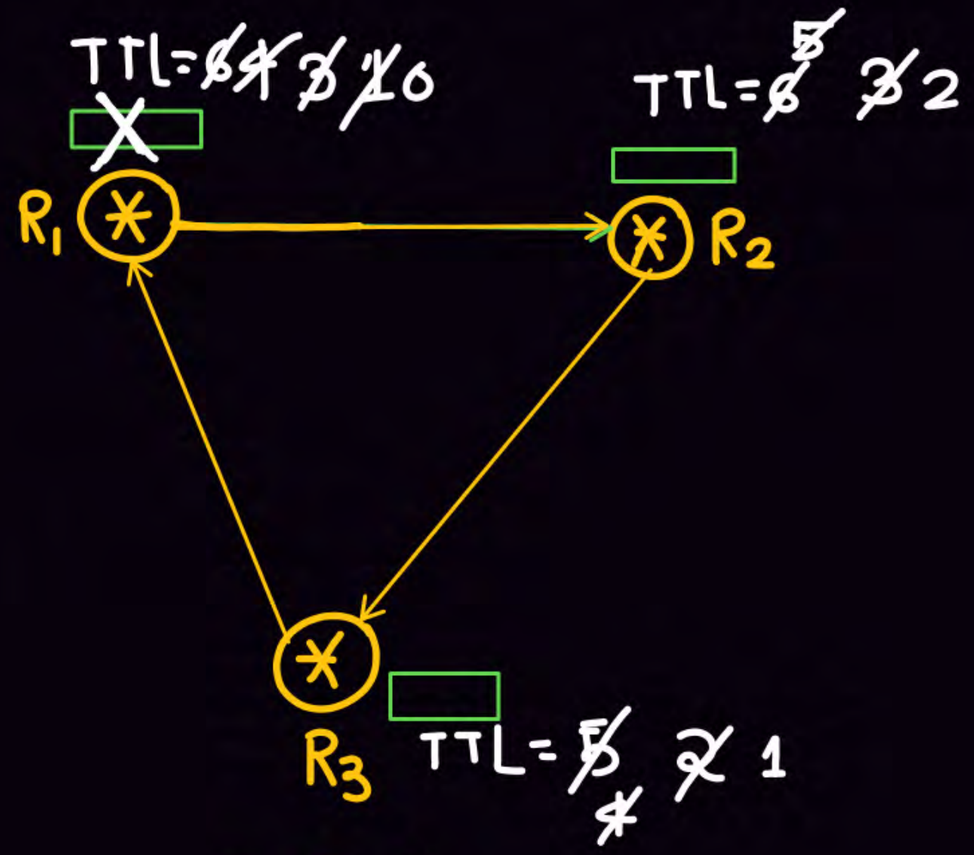
→ Default entry

Any IP Add

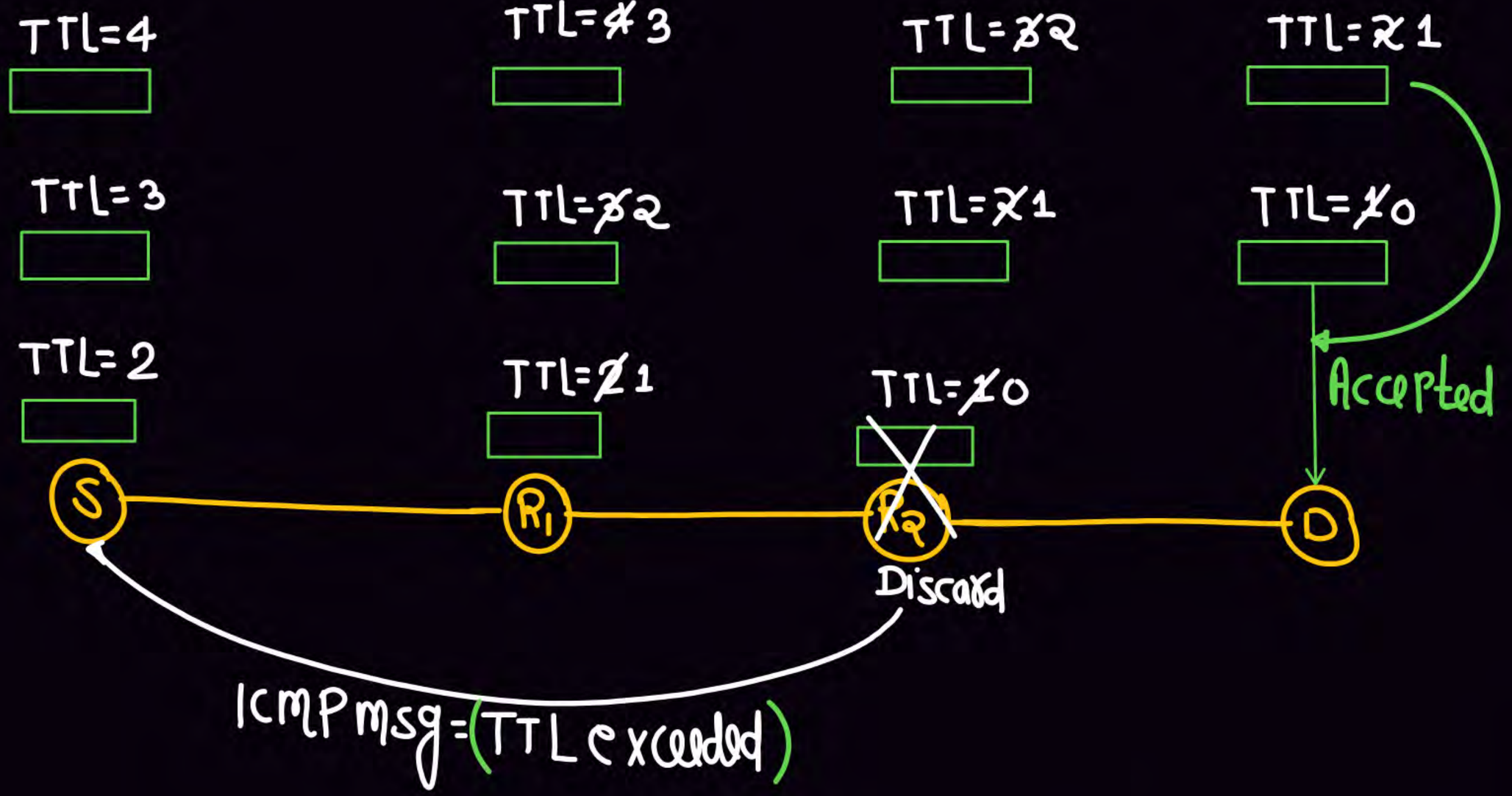
AND

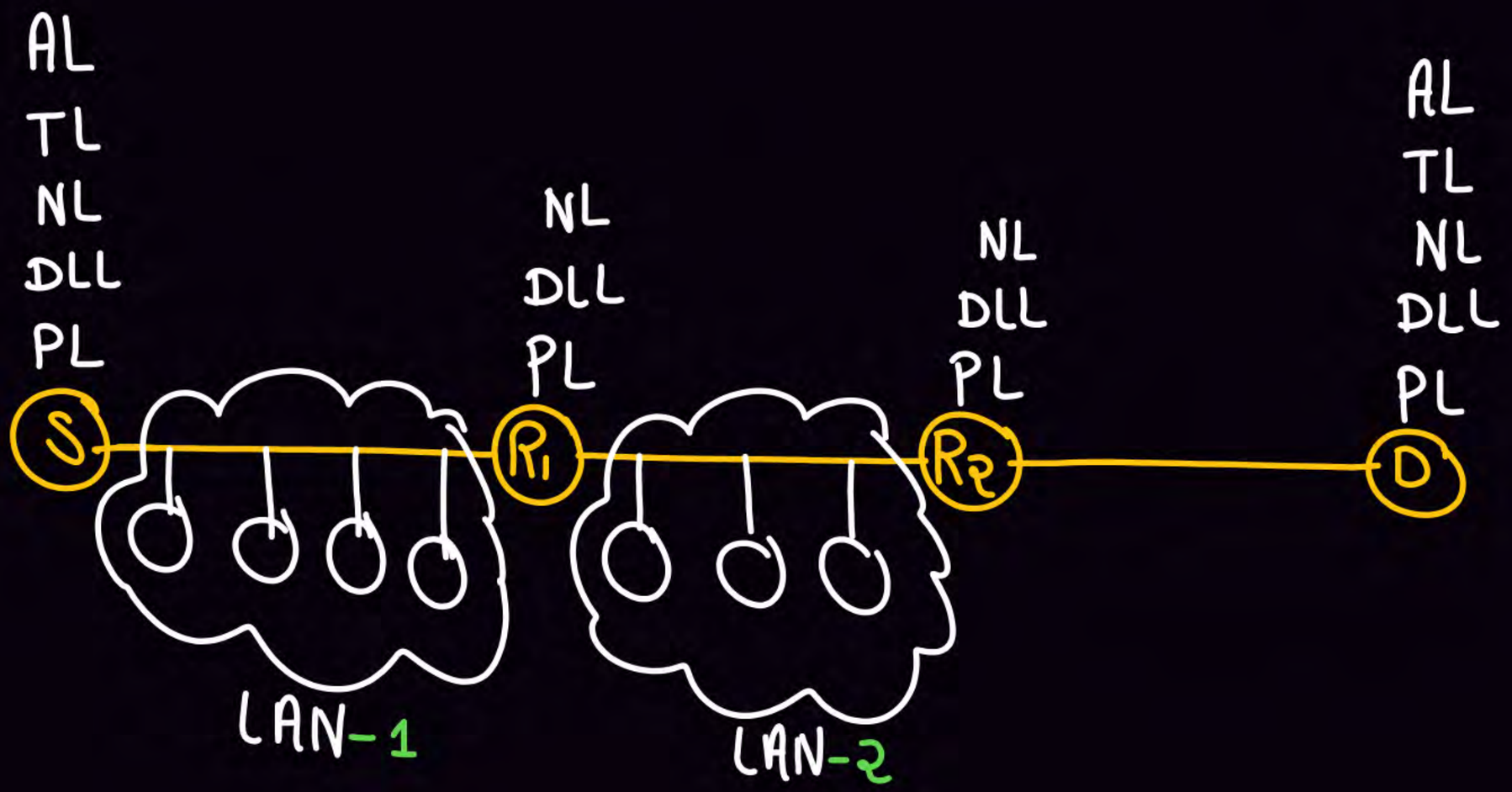
0.0.0.0

0.0.0.0



Infinite Looping

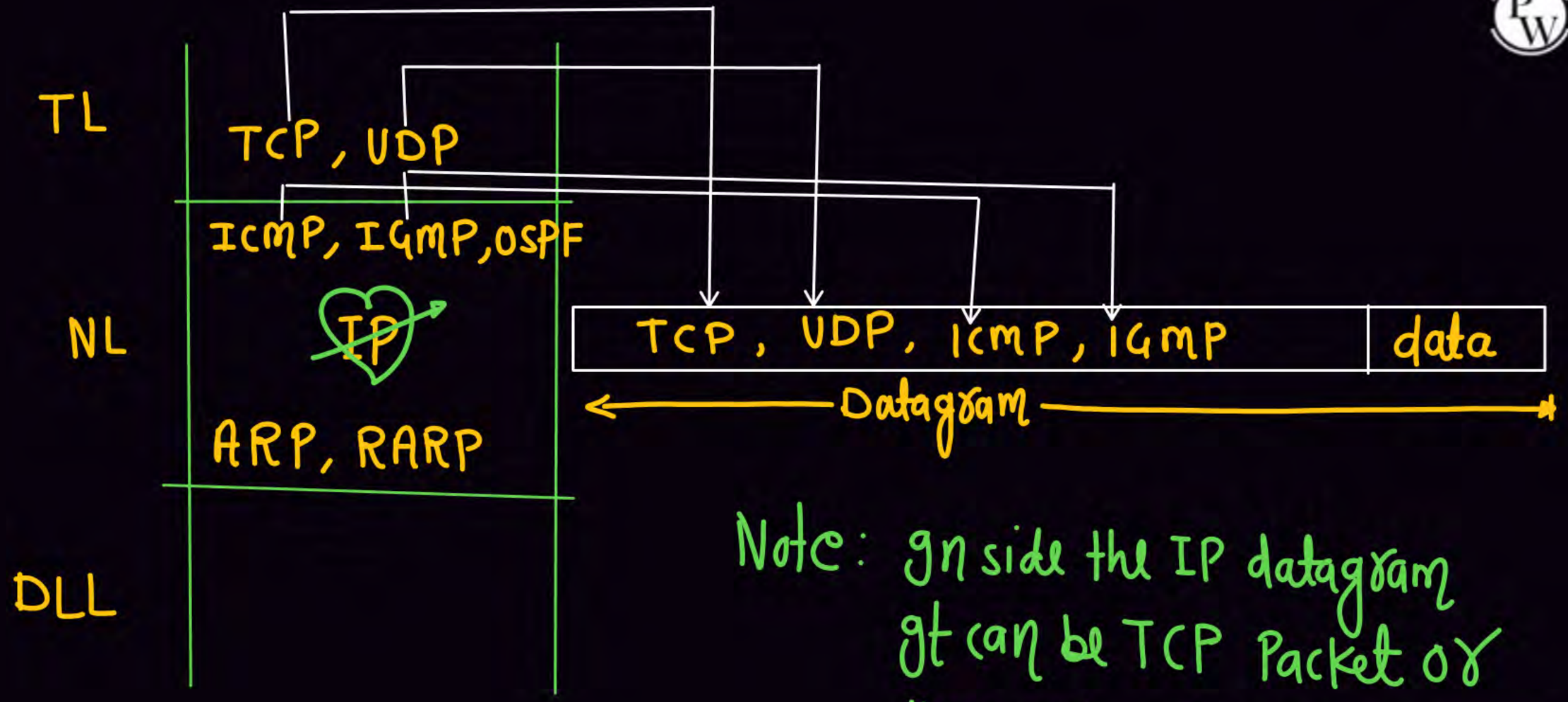

TTL=4
TTL=3
TTL=2
TTL=3
TTL=2
TTL=1
TTL=2
TTL=1
TTL=0
TTL=1
TTL=0
Accepted
S
R1
R2
D
Discard
ICMP msg=(TTL exceeded)


AL
TL
NL
DLL
PL
S
NL
DLL
PL
R1
NL
DLL
PL
R2
AL
TL
NL
DLL
PL
D
LAN-1
LAN-2

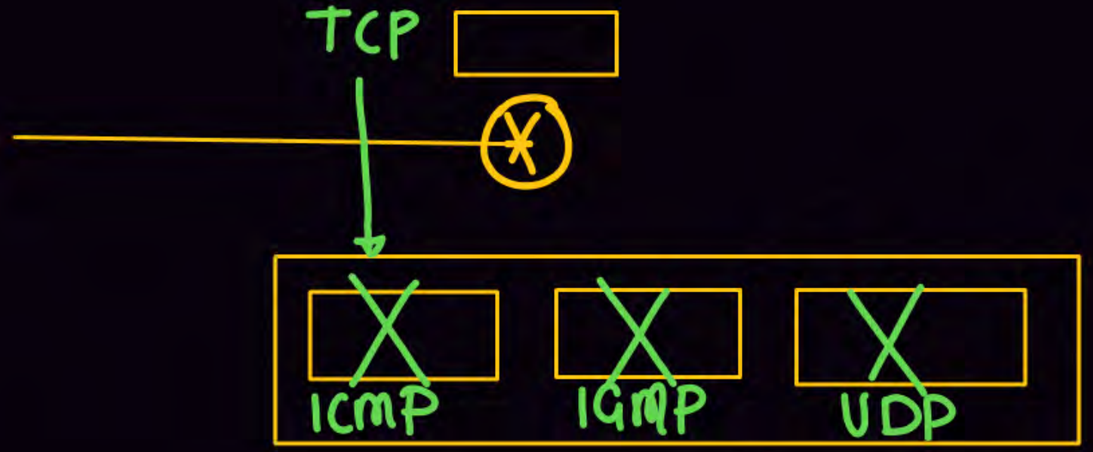
Protocol : (8 bit)

1. This 8 bit field tell us which protocol is encapsulated in the IP packet.
2. At the time of traffic , some packets must be discarded. In this case it will be advantageous to know which protocol data it contains.
3. The order in which router eliminate the datagram from buffer is-

ICMP> IGMP>UDP>TCP



Note: Inside the IP datagram it can be TCP Packet or UDP PKt or ICMP or IGMP



OSPF → (89)

① ICMP (01)

↓

② IGMP (02)

↓

③ UDP (17)

↓

④ TCP (06)

Checksum

checksum = (4bit, 8bit, 16bit, 32bit)

(TCP & IP)

THANK YOU
GW
SOLDIERS !