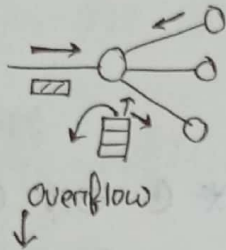


☐ Congestion (network layer)

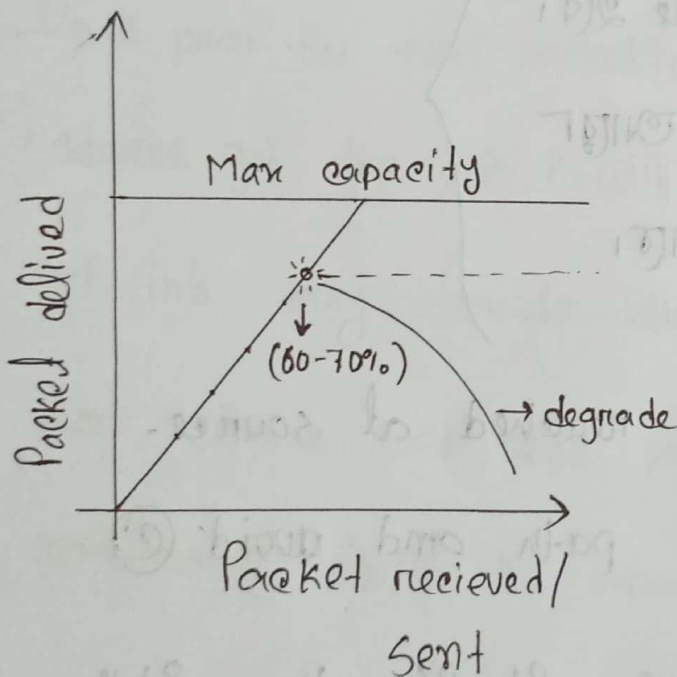
☐ Final



60-70% Buffer full and network degrades very slowly and this is congestion.

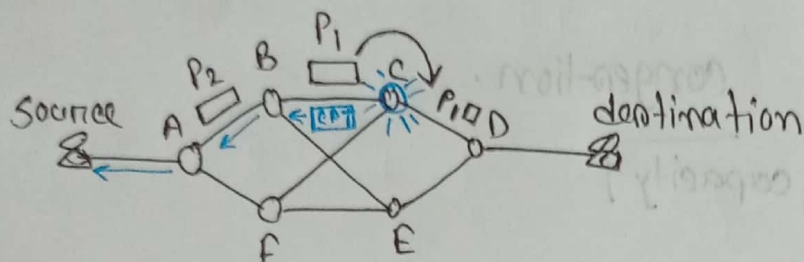
incoming packets > delivering capacity

→ Congestion and we'll lose packets.



❑ Congestion control (algorithm):

① Choke packet technique.



* ৩ তার, CPT

এ নিষ্কৃত identity

— নিষ্কৃত source থেকে packet পাঠাবে. So,

others will avoid ①.

→ P₁ ☐

P₂ ☐

P₃ ☐

P₄ ☐

P₅ ☐

→ P₆ ☐

P₇ ☒

* problem solve না হওয়া লক্ষ্যে

continuous CP generate হবে.

CP source লক্ষ্যে যেতে আরম্ভ

packet generate হয়ে থাকবে.

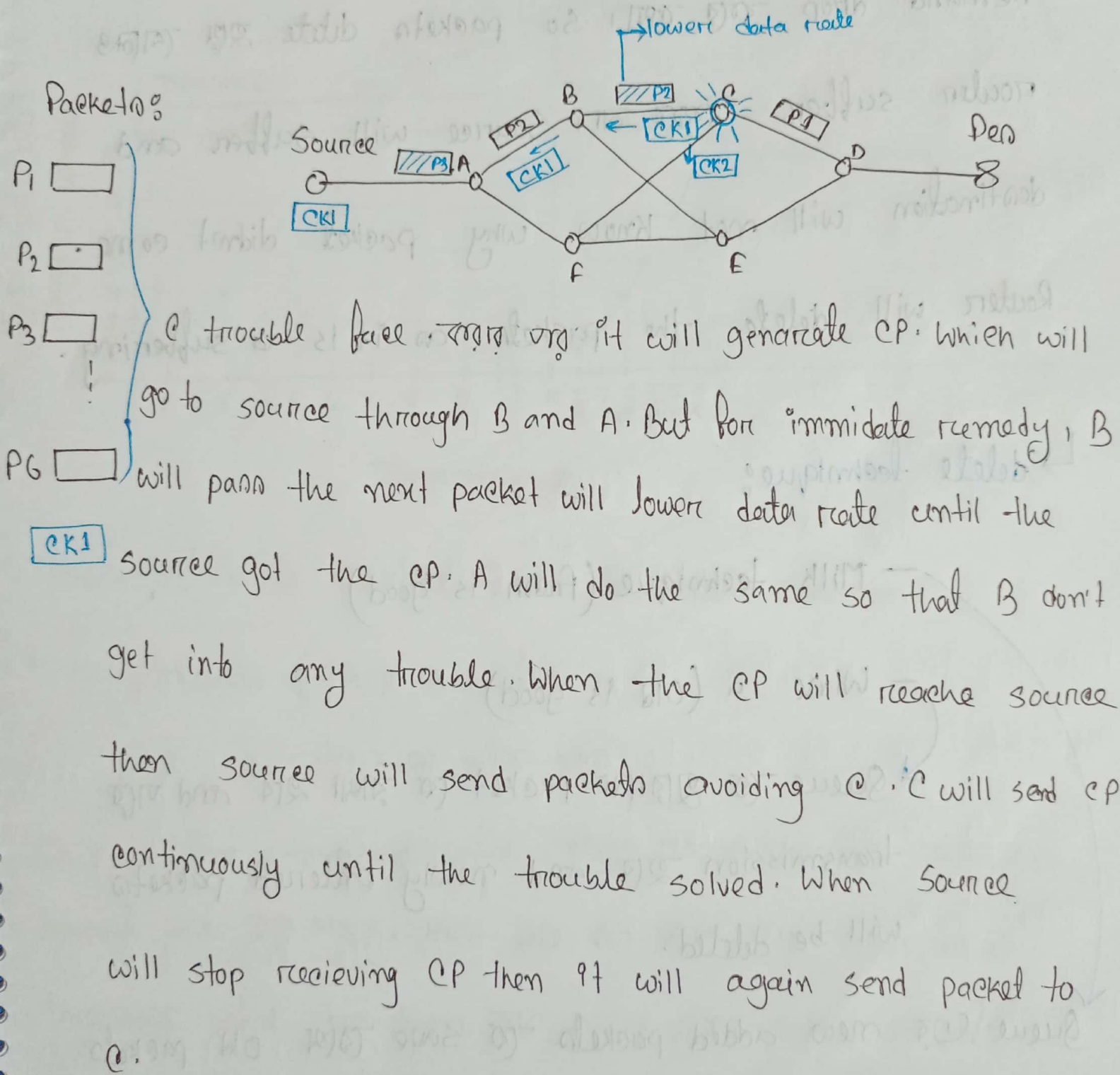
→ P₇ generated after CP reached at source.

So it'll take another path and avoid ①.

If the router survive P₁-P₆, then it'll back to normal state after receiving CP by source.

□ Hop by hop choke packet technique

↳ improvement of CPT.



② Load - Shedding:

Demand drop করে নেয়া। So packets delete হয়ে গেলে router subvert করে না। Source will subvert and destination will not know why packet didn't come.

Router will delete the packets as it is a subverting.

↳ delete technique:

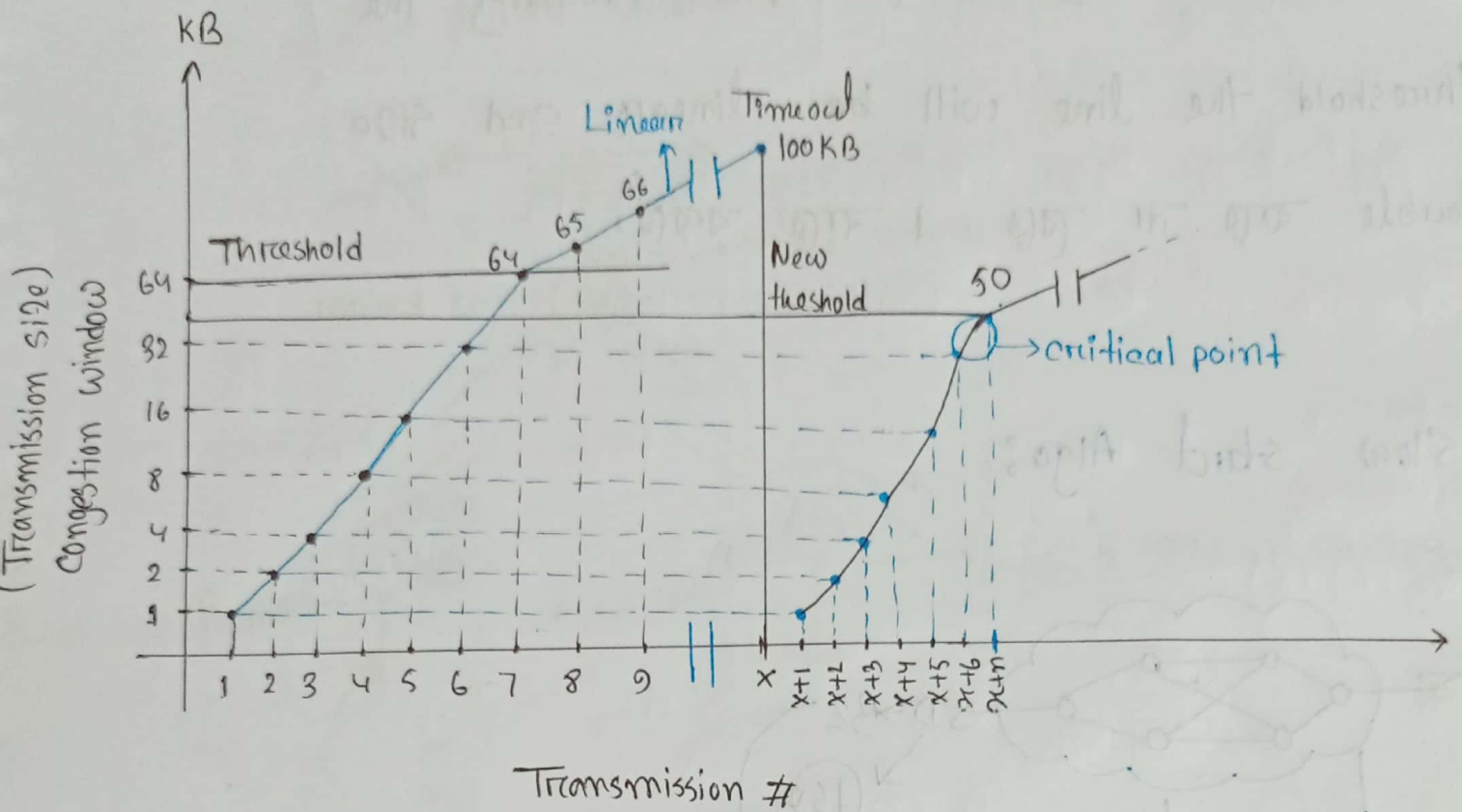
— Milk technique (Fresh is good)

— Wine (Old is good)

Queue তে প্রাপ্ত packet কে রাখা হবে and গতি transmission হবে and newly entered packets will be deleted.

Queue তে new added packets কে save রাখা old packets delete করে নেয়া হবে।

Congestion control (Transport layer)



Threshold: It's a baseline to monitor data collection.

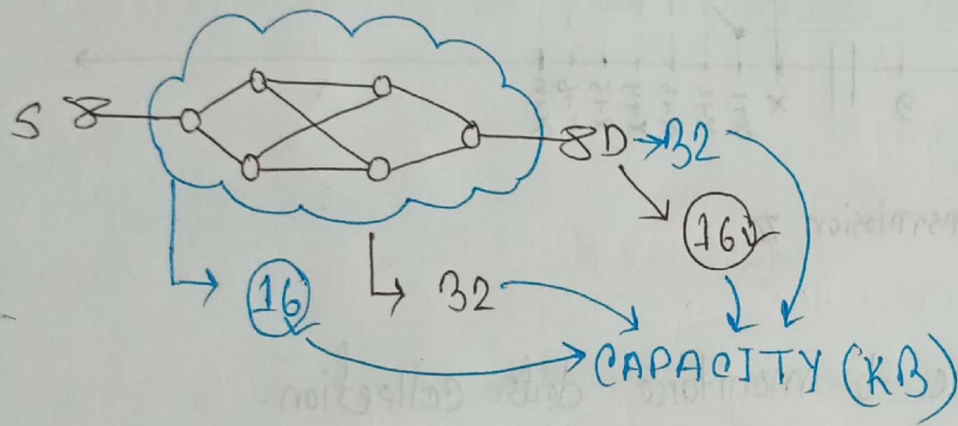
* New threshold = $\frac{1}{2} \times \text{time out}$

= $\frac{1}{2} \times 100 = 50 \rightarrow \text{NT}$

It's not like threshold value কমাতে থাকবে, Network ভালো হলে timeout নাও হতে পারে, অথবা late হতে পারে, যা কারণে new threshold value up-down হতে পারে। X position-এ ক্ষেত্র- size এর data got time out, তা (X+1) থেকে বার 1KB করে

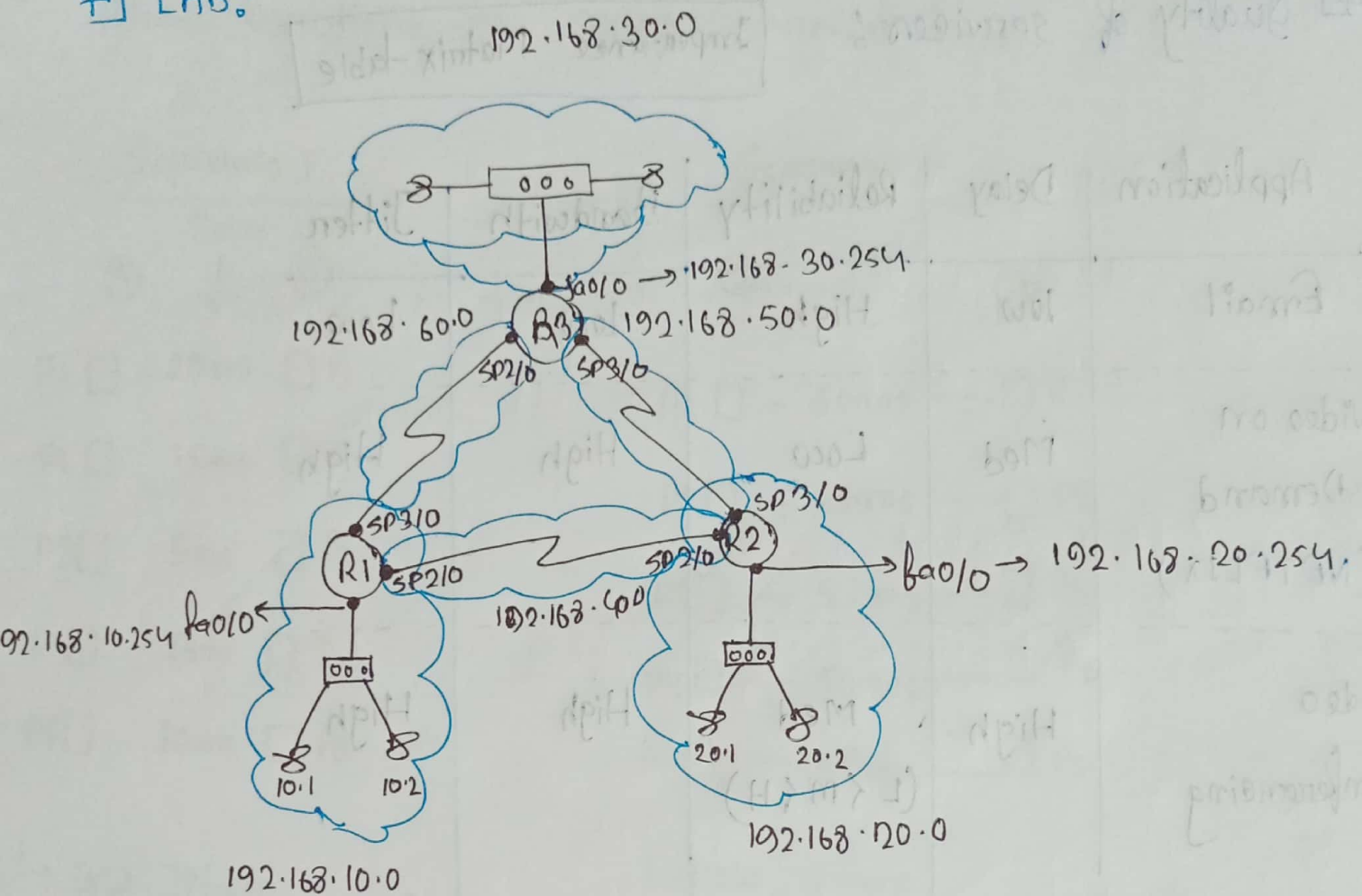
transmission (ଅନୁପ୍ରାପ୍ତି) କରିବା। After crossing the threshold the line will be linear and size double କରିବା 1 କରିବା କରିବା।

❏ Slow start Algo:



Following this algorithm data/packets are being transmitted.
 Network/source ଏବଂ capacity ଯଦି ଥିବା ତାହା ଲେଖି starting - 1 KB
 ଯଦି data ପାରିବା ହେବ, 1 KB data ଏବଂ ଏହା Acknowledgment
 ଆସିବା transmission size double ହେବ ଥିବା like 1, 2, 4, 8, 16, 32...
 Destination capacity 32 KB ଏବଂ Network capacity 16 KB ଥିବା
 16 KB amount ଏବଂ data-ଟି transmit ହେବ।
 ↪ vice-versa

LAB:



* Link State routing algorithm: OSPF

→ Open shortest path first.

$$\begin{array}{r} 255.255.255.255 \\ (-) 255.255.255.0 \\ \hline 0.0.0.255 \end{array}$$

router OSPF (1) → process id (1-65,535)

network 192.168.10.0 0.0.0.255 → wild card mask

area 1.

☐ Quality of services :

Importance Matrix table

Application	Delay	Reliability	Bandwidth	Jitter
Email	low	High	Low	Low
Video on Demand (NETFLIX)	Med	Low	High	High
Video Conferencing	High	Med ($L < m < H$)	High	High

per application, importance can be different. Base on the app. we can set the importance to low or high.

Jitter: Variations in packets arrival time.

Scenario 1

Delay

⑤ ↓ ①

P1 □ - 20ms □ P1

P2 □ - 15ms □ P2

P3 □ - 5ms □ P3

P4 □ - 1ms □ P4

P5 □ - 10ms □ P5

Scenario 2

Delay

⑤ ↓ ①

P1 □ - 50ms □ P1

P2 □ - 45ms □ P2

P3 □ - 51ms □ P3

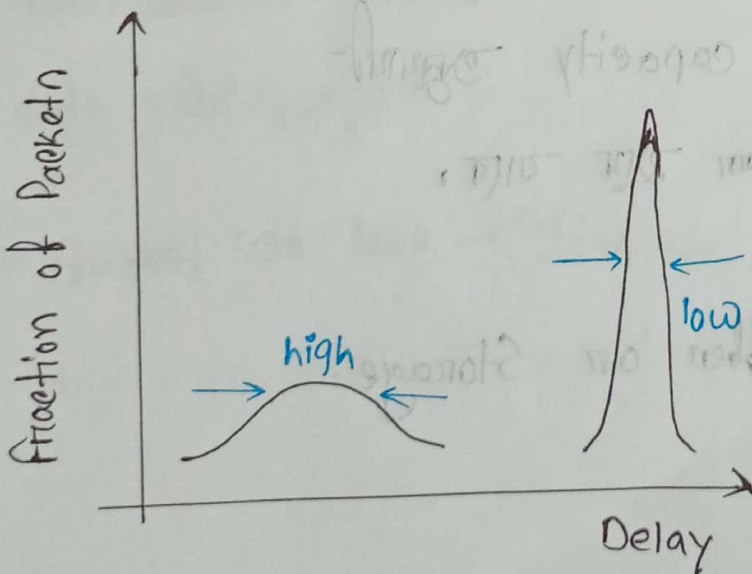
P4 □ - 50ms □ P4

P5 □ - 49ms □ P5

↳ low jitter
High ↑

↳ low jitter

* multimedia communication - (a) jitter low



☐ Techniques to improve QoS :

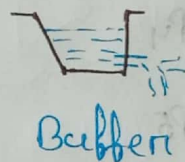
→ over provisioning

or নতুনকৈ তথ্য আৱণ্ট হ'ব পাৰে। So problem

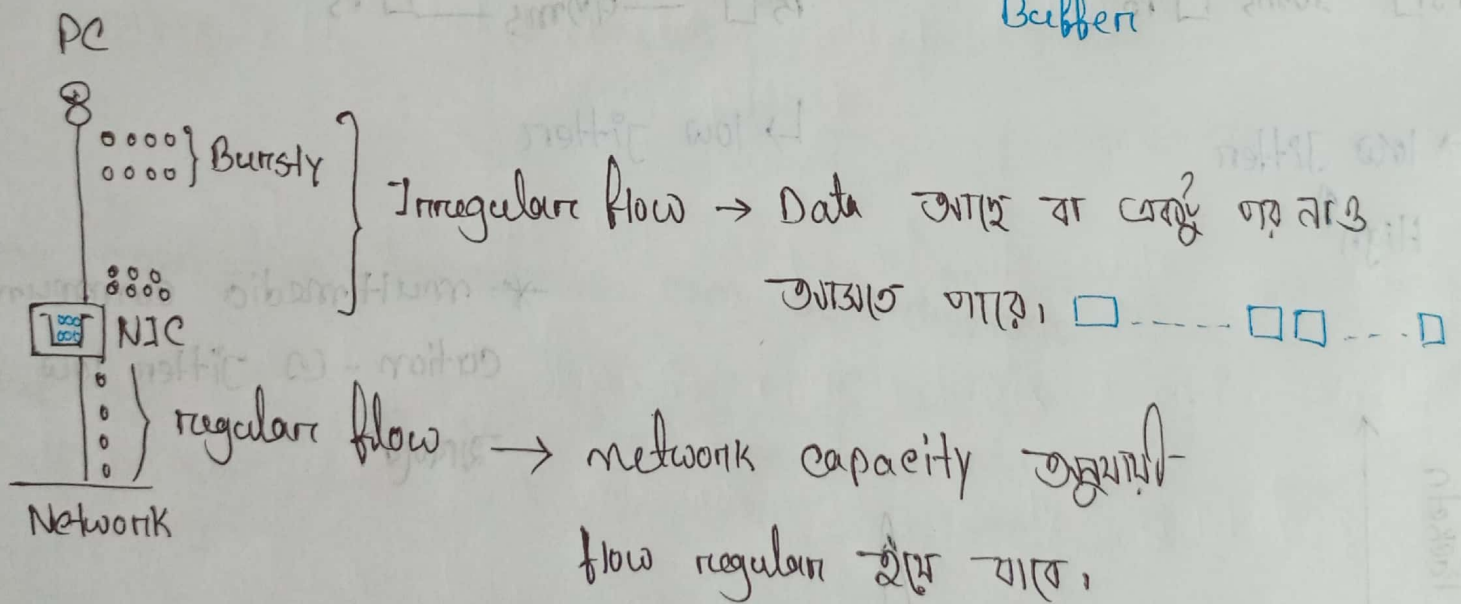
Solution ☐ চান্চ ☐ high but costly.

→ Flow control

☐ * Leaky bucket algorithm



Buffer



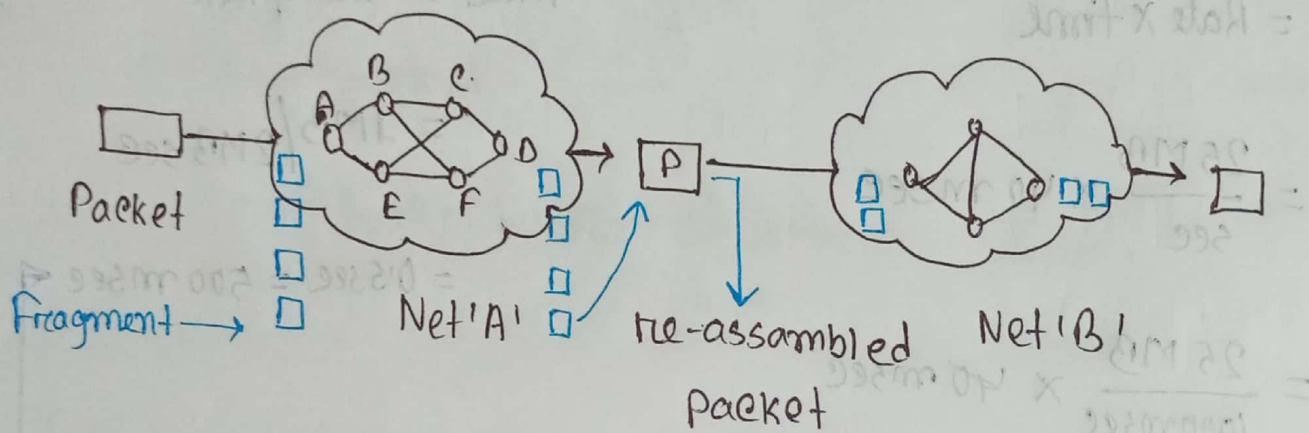
* Bucket is nothing but a buffer or Storage.

Fragmentation:

① Transparent fragmentation

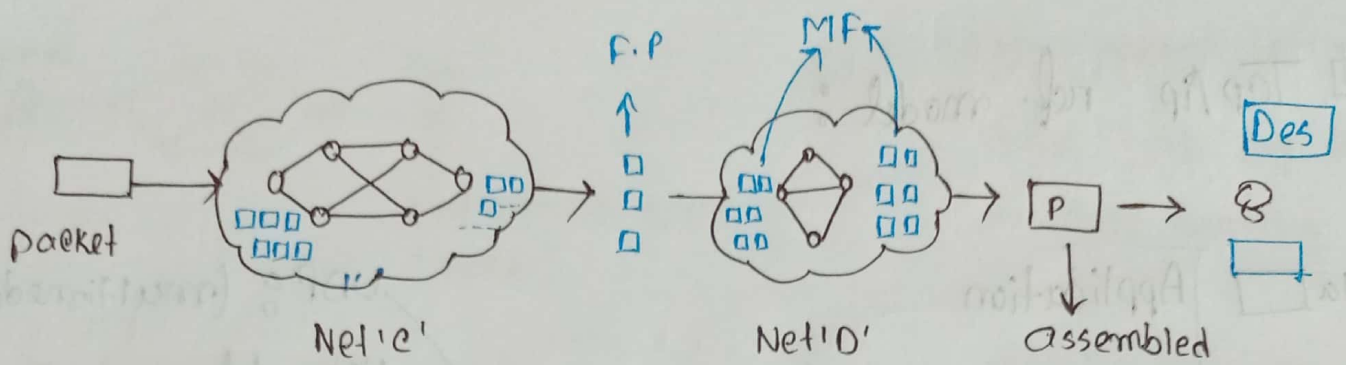
② Non-transparent

①



Packet go through one to many network while generating from source to destination. So, this network is enter and if fragment needed then network is capacity and fragment is network leave and fragmented packets are re-assembled. This is, and this network is assembled and leave and destination is reach.

②



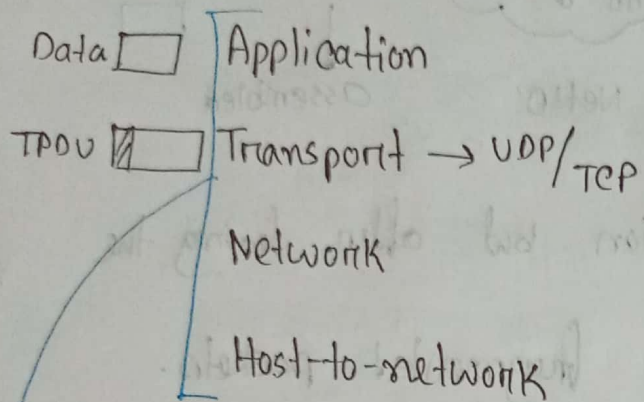
packets will go through fragmentation but after leaving the network will not re-assembled the fragmented packets.

Fragmented packets এর অর্থাৎ fragment হতে পারে। Like 3 to 6 or more. For this it have to make sure that fragmented packet এর header থাকবে। Destination -এ packet reach করে পরে fragmented packet এর assembled হতে।

Till then fragment অবস্থা থাকবে।

Fragment ID	Fragment Size	Fragment Offset	Fragment Length	Fragment Flag	Fragment Priority	Fragment Type	Fragment Status
1	1024	0	1024	0	1	1	1
2	1024	1024	1024	0	1	1	1
3	1024	2048	1024	0	1	1	1
4	1024	3072	1024	0	1	1	1
5	1024	4096	1024	0	1	1	1
6	1024	5120	1024	0	1	1	1
7	1024	6144	1024	0	1	1	1
8	1024	7168	1024	0	1	1	1
9	1024	8192	1024	0	1	1	1
10	1024	9216	1024	0	1	1	1
11	1024	10240	1024	0	1	1	1
12	1024	11264	1024	0	1	1	1
13	1024	12288	1024	0	1	1	1
14	1024	13312	1024	0	1	1	1
15	1024	14336	1024	0	1	1	1
16	1024	15360	1024	0	1	1	1
17	1024	16384	1024	0	1	1	1
18	1024	17408	1024	0	1	1	1
19	1024	18432	1024	0	1	1	1
20	1024	19456	1024	0	1	1	1
21	1024	20480	1024	0	1	1	1
22	1024	21504	1024	0	1	1	1
23	1024	22528	1024	0	1	1	1
24	1024	23552	1024	0	1	1	1
25	1024	24576	1024	0	1	1	1
26	1024	25600	1024	0	1	1	1
27	1024	26624	1024	0	1	1	1
28	1024	27648	1024	0	1	1	1
29	1024	28672	1024	0	1	1	1
30	1024	29696	1024	0	1	1	1
31	1024	30720	1024	0	1	1	1
32	1024	31744	1024	0	1	1	1
33	1024	32768	1024	0	1	1	1
34	1024	33792	1024	0	1	1	1
35	1024	34816	1024	0	1	1	1
36	1024	35840	1024	0	1	1	1
37	1024	36864	1024	0	1	1	1
38	1024	37888	1024	0	1	1	1
39	1024	38912	1024	0	1	1	1
40	1024	39936	1024	0	1	1	1
41	1024	40960	1024	0	1	1	1
42	1024	41984	1024	0	1	1	1
43	1024	43008	1024	0	1	1	1
44	1024	44032	1024	0	1	1	1
45	1024	45056	1024	0	1	1	1
46	1024	46080	1024	0	1	1	1
47	1024	47104	1024	0	1	1	1
48	1024	48128	1024	0	1	1	1
49	1024	49152	1024	0	1	1	1
50	1024	50176	1024	0	1	1	1
51	1024	51200	1024	0	1	1	1
52	1024	52224	1024	0	1	1	1
53	1024	53248	1024	0	1	1	1
54	1024	54272	1024	0	1	1	1
55	1024	55296	1024	0	1	1	1
56	1024	56320	1024	0	1	1	1
57	1024	57344	1024	0	1	1	1
58	1024	58368	1024	0	1	1	1
59	1024	59392	1024	0	1	1	1
60	1024	60416	1024	0	1	1	1
61	1024	61440	1024	0	1	1	1
62	1024	62464	1024	0	1	1	1
63	1024	63488	1024	0	1	1	1
64	1024	64512	1024	0	1	1	1
65	1024	65536	1024	0	1	1	1
66	1024	66560	1024	0	1	1	1
67	1024	67584	1024	0	1	1	1
68	1024	68608	1024	0	1	1	1
69	1024	69632	1024	0	1	1	1
70	1024	70656	1024	0	1	1	1
71	1024	71680	1024	0	1	1	1
72	1024	72704	1024	0	1	1	1
73	1024	73728	1024	0	1	1	1
74	1024	74752	1024	0	1	1	1
75	1024	75776	1024	0	1	1	1
76	1024	76800	1024	0	1	1	1
77	1024	77824	1024	0	1	1	1
78	1024	78848	1024	0	1	1	1
79	1024	79872	1024	0	1	1	1
80	1024	80896	1024	0	1	1	1
81	1024	81920	1024	0	1	1	1
82	1024	82944	1024	0	1	1	1
83	1024	83968	1024	0	1	1	1
84	1024	84992	1024	0	1	1	1
85	1024	86016	1024	0	1	1	1
86	1024	87040	1024	0	1	1	1
87	1024	88064	1024	0	1	1	1
88	1024	89088	1024	0	1	1	1
89	1024	90112	1024	0	1	1	1
90	1024	91136	1024	0	1	1	1
91	1024	92160	1024	0	1	1	1
92	1024	93184	1024	0	1	1	1
93	1024	94208	1024	0	1	1	1
94	1024	95232	1024	0	1	1	1
95	1024	96256	1024	0	1	1	1
96	1024	97280	1024	0	1	1	1
97	1024	98304	1024	0	1	1	1
98	1024	99328	1024	0	1	1	1
99	1024	100352	1024	0	1	1	1
100	1024	101376	1024	0	1	1	1

Tcp/ip ref. model.:



UDP: (multimedia)
User datagram protocol
(8 Byte header)

TCP:
Transmission control
protocol
(20 Byte header)

* type wise header structure

Change after

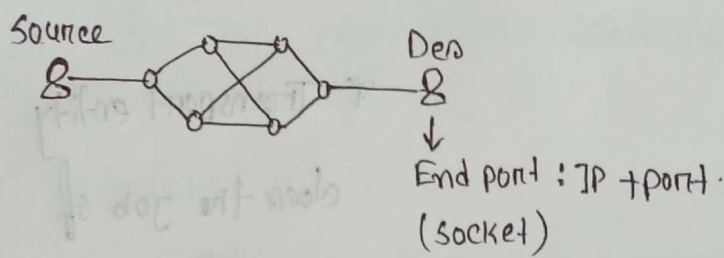
Header

Source port	Destination port
UDP length	Checksum (cre)

TCP header:

16 Bits	
Source Port	Destination port
Sequence #	
Acknowledgement #	
header long- in	Window size
Checksum	Urgent pointer

20 Byte



* Reply packet to yahi
Aek # - milti hai then
→ piggy backing.

URG: Urgent

ACK: Acknowledgement

PSH: Push. Queue me data rakha jayega

RST: Reset. Connection disconnect hai isliye reset hai

SYN: Synchronization. Use for new connection.

FIN: Finish. Disconnect hai.

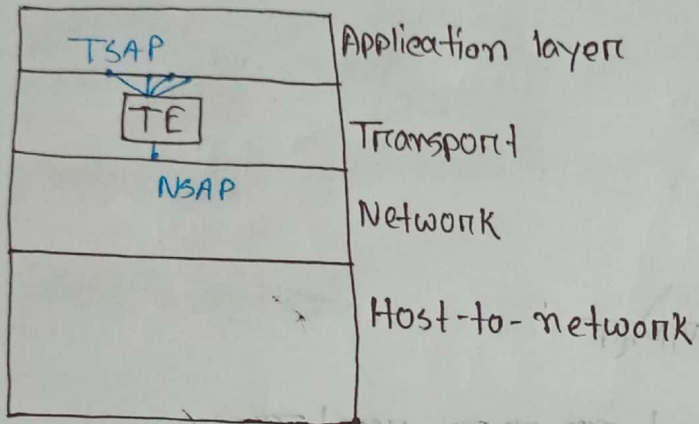
* Size of the buffer is window size

* URG yahi 1 hai aur uska urgent pointer. - 1 hai aur ye
what kind of urgency is here.

* socket create hai at End point.

□ TCP/IP Ref Model

CNN Web Server



* Transport entity
Does the job of
transport layer.

Network service access
point. (IP)
Transport (Port)

* Client-1

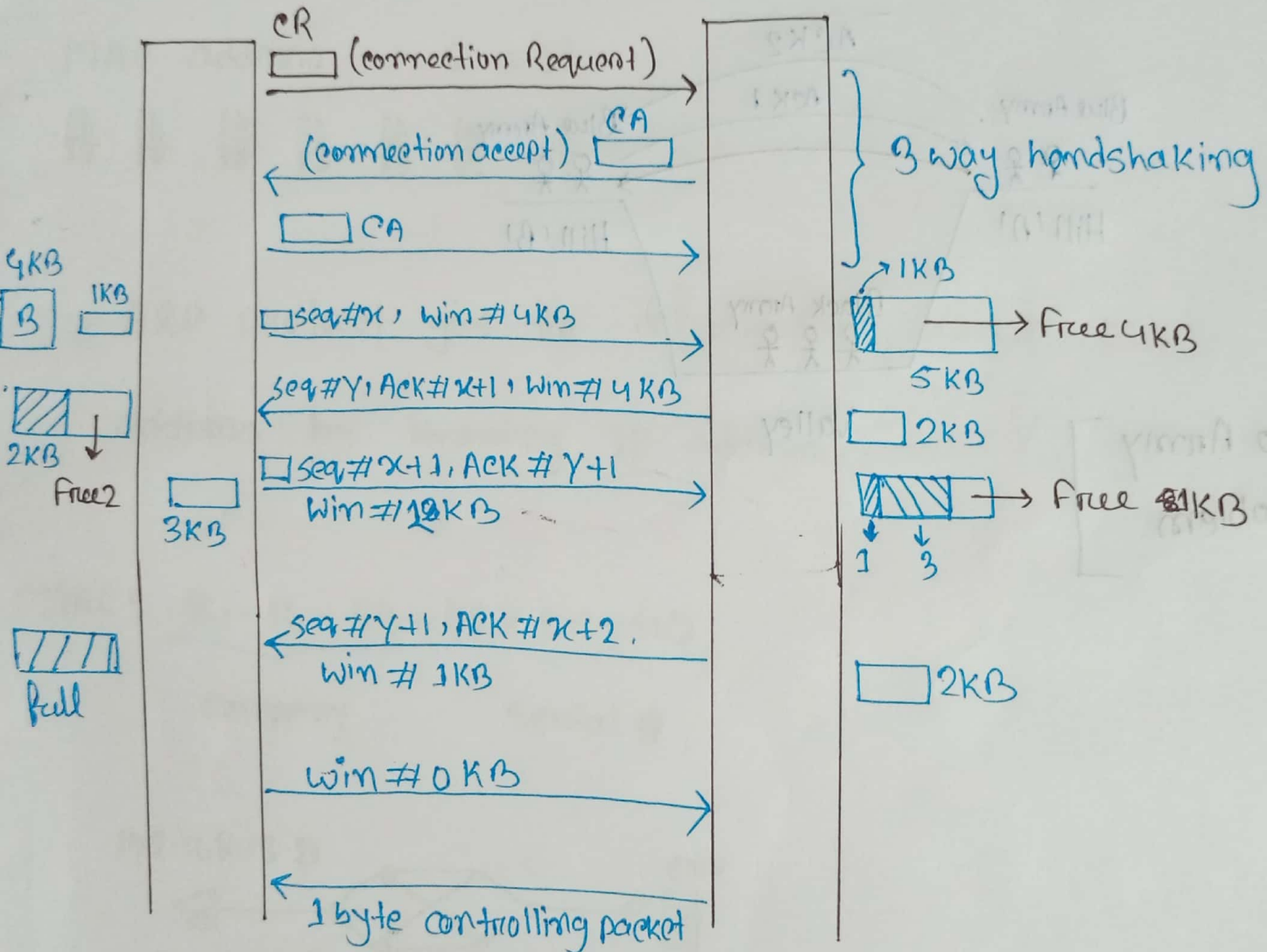
http:// www.cnn.com → endpoint

protocol host
(80) name

□ TCP connection establishment + Data transmission

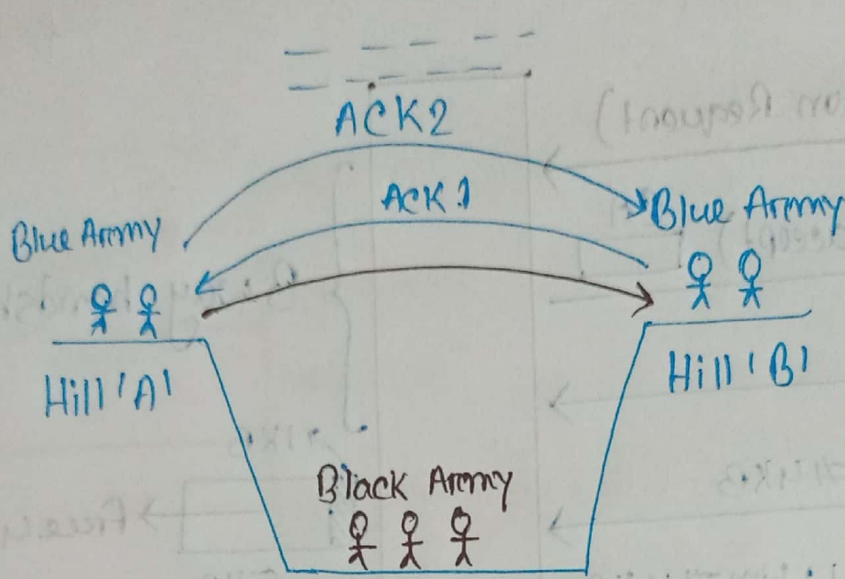
HOST 'A'

HOST 'B'



↓
 Buffer full 2 for 1 byte controlling packet
 - फिर to let know → clear the buffer.
 Otherwise data p. jankar hoga.

TCR connection release



Two Army Problem

Ballot box full 24h 1pdr 20 controlled basket
- try to let know -> clear the paper

LAB:

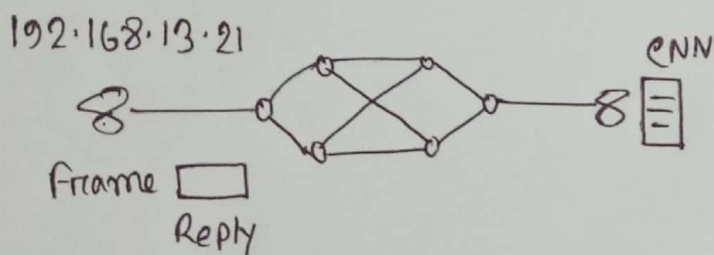
* Wireshark.

MAC address \rightarrow 6 octet

BB BB BB BB BB BB (48 bit)

* ARP protocol give the information about MAC address by knowing IP address.

MAC% 84-16-F9-05-0C-40
 company Serial #



Dest mac: 84 - - - - 40

Source mac: CNN \rightarrow (X) last router \rightarrow address 21000.