Compito 39

Ussenova Assel v2 2223 - part 4

Quesito 3

A server is connected to a trunk port of an Ethernet switch over a VLAN. The line rate is 1Gb/s.

The server sends a file of size S [MB] using UDP and the length of packets at IP level is L. The IP+UDP header length is 28 bytes. The information about Ethernet Frames and Layer 1 Ethernet packets is shown in the figure below.

1) How many bytes L_eth needs to be considered at Layer 1 Ethernet level (i.e. including the Interpacket Gap – IPG) to transfer each packet?

2) How many packets N_tot are needed to tranfer the file?

3) Evaluate the total transmission time of the file T_file [s], if the full capacity of the link is used for the file transfer.

Layer	Preamble	Start of frame delimiter	MAC destination	MAC source	802.1Q tag (optional)	Ethertype (Ethernet II) or length (IEEE 802.3)	Payload	Frame check sequence (32-bit CRC)	Interpacket gap
	7 octets	1 octet	6 octets	6 octets	(4 octets)	2 octets	46-1500 octets	4 octets	12 octets
Layer 2 Ethernet frame			← 64–1522 octets →						
Layer 1 Ethernet packet & IPG	← 72–1530 octets →								← 12 octets →

S 100 MBytes
L 1000 bytes

Quesito 2

Consider a stream of IP packets, which is controlled by a Two Rate Three Color Marker (trTCM), with parameters CIR, CBS, PIR, PBS.

An application needs to send a burst of S kbytes (at IP level) every T ms.

The application sends the burst at a rate R1. Evaluate the time T1 [ms] needed to send each burst.

At t=0 the bucket is full of tokens and the application starts sending the first burst at rate R1. Evaluate the time Te when the bucket becomes empty.

Evaluate G1 [kB], the number of bytes of the first burst that are marked green until Te.

Evaluate G2 [kb], the number of bytes of the first burst that are marked green in the interval from Te to T1.

Quesito 2B

With the same CIR, evaluate the CBS_min [kB] so that all packets of the burst transmitted at rate R1 can be marked green.

Using the evaluated CBS_min, if the application is sending the burst at a rate R2, evaluate the tokens remaining in the bucket when the burst has been transmitted.

S	500 KB
CIR	500 KB/s
CBS	100 KB
PIR	16 MB/s
T	4000 ms
R1	5 MB/s
R2	4 MB/s

Part 4 question 3 call 1 & call 2.

=> ① Calculate leth.

As in question Nothing is mention about Vlan tag. so dont add 802.1q tag.

also MPLS Packets are not given.

so 7 + 1 + 6 + 6 + 2 + (Payload) = 1000 + 4 + 12

① = leth = 1038 bytes.

② => Number of Packets = NoP = $\frac{S}{L-28} = \frac{100mb}{1000-28} = \frac{100mb}{972} =$ 102880 Packets

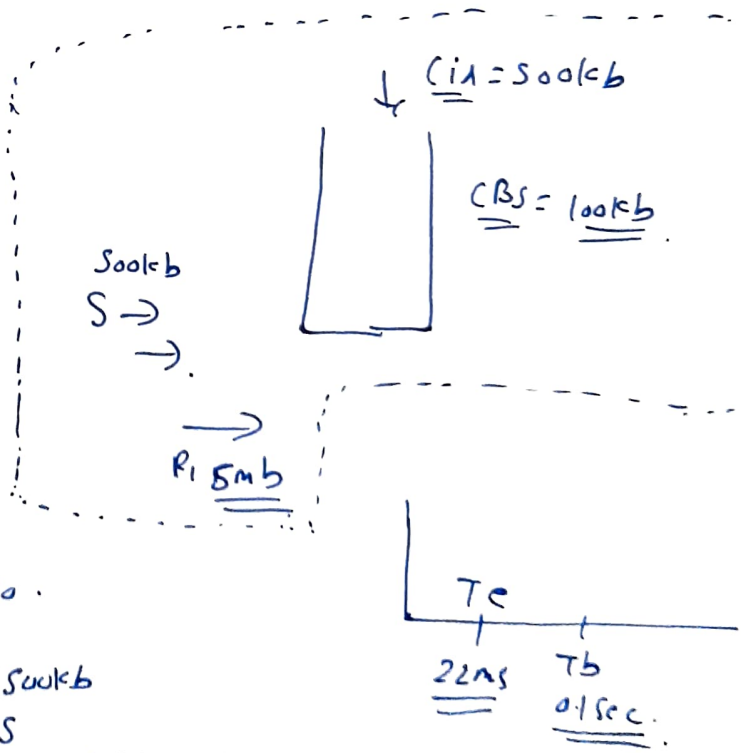
Now calculate total bytes = Leth x NoP

= 1038 x 102880

Total bytes = 106790123 bytes.

③ Total time to Tx Tfile = $\frac{\text{Total bytes} \times 8}{\text{Line rate (given 1Gb/s)}} =$ 0.854(sec) or 854 ms.

Q2 Exam call 1. Tg TCM.



=> $Tb = \frac{S}{R_1} = \frac{500kb}{5mb} =$ 0.1 sec or 100ms

$Te = \frac{CBS}{R_1 - Cir} = \frac{100k}{5mb - 500kb} =$ 22ms

As now Te < Tb

So all flow will be mark in Profile. So.

Flow marked as green = $\frac{22ms \times 500kb}{Te \times S}$

= 111kb ← in Profile or green

marked as yellow = (Te - Tb) x (R1 - Cir)

= 78ms x 4.5 mb

= 351 x10^3

= 351 kb marked as yellow.

So if we adapts to the bucket rate C_{in} so.

Market green from T_e to T_1 = $(T_b - T_e) \times C_{in}$

= 78 ms x 500kb

In Profile = = 39kb or market as green.

Question 2B :

$CBS_{min} = T_b \times (R_1 - C_{in})$

= 100ms x 4.5mb

= 450kb

CBS_{min} at R_2 = $T_b \times (R_2 - C_{in})$

= 100ms x 3.5mb

= 350kb