CS & IT ENGINEERING

Computer Network

1500 Series

Lecture No.- 08

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Recap of Previous Lecture

Topic

Topic

Questions Practice

Topics to be Covered

- Topic — Common Data Questions
- Topic

Suppose nodes A and B are on the same Ethernet bus, and the propagation delay between the two nodes is 225-bit times. Suppose both A and B send frames of 1,500 bits (including all headers and preambles) exactly at the same time, the frames collide, and then A and B choose different values of K (A = 0 and B = 1) in the CSMA/CD algorithm. Assume the transmission rate is 10 Mbps; CSMA/CD with backoff intervals of multiples of 512-bits is used. If a node detect collision, then it sends a 48-bit jam signal of inform other nodes. Assuming no other node is active and transmission time of a data frame is negligible

H.W

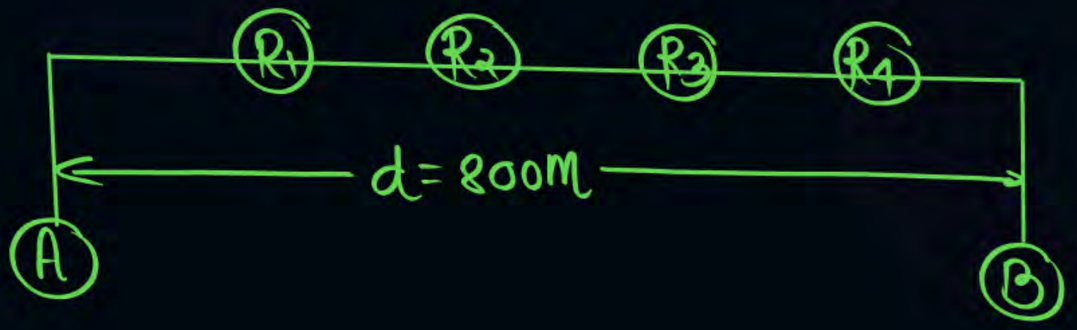
#Q. At what time (in microseconds) does A begin retransmission?

_____

#Q. At what time (in microseconds) does A's signal reach B?_____

[NAT]

Suppose two nodes, A and B, are attached to opposite ends of an 800m cable, and that they each have one frame of 1,500 bits (including all headers and preambles) to send to each other. Both nodes attempt to transmit at time t = 0. Suppose there are four repeaters between A and B, each inserting a 20-bit delay. Assume the transmission rate is 100 Mbps, and CSMA/CD with backoff intervals of multiples of 512 bits is used. After the first collision, A draws K = 0 and B draws K = 1 in the exponential backoff protocol. Assume that the signal propagation speed is 2×10^8 m/sec. What is the one-way propagation delay (including repeater delays) between A and B in microseconds (4.84 μsec)



Repeater delay = 20 bit

$v = 2 * 10^8$ m/sec

$$\text{Propagation delay} = \frac{d}{v} + \text{Repeater delay}$$

$$= \frac{800\text{m}}{2*10^8\text{m/sec}} + \frac{4*20\text{bits}}{100*10^6\text{bits/sec}}$$

$$= 4*10^{-6}\text{sec} + 0.8*10^{-6}\text{sec}$$

$$= 4\mu\text{sec} + 0.8\mu\text{sec} = 4.8\mu\text{sec}$$

Common Data Questions

The figure below illustrates a switched network. Consider a message that is $7.5 * 10^6$ bits long to be sent from the source to the destination. (Assume header size is negligible relative to the entire message size). Suppose each link is 1.5 Mbps and the propagation delay of each link is 10 milliseconds. Consider only transmission delays and propagation delay. Assume all other delay components are negligible and each switch uses store- and-forward packet switching.

msg size = $7.5 * 10^6$ bits

B = $1.5 * 10^6$ bits/sec

P_d = 10 msec

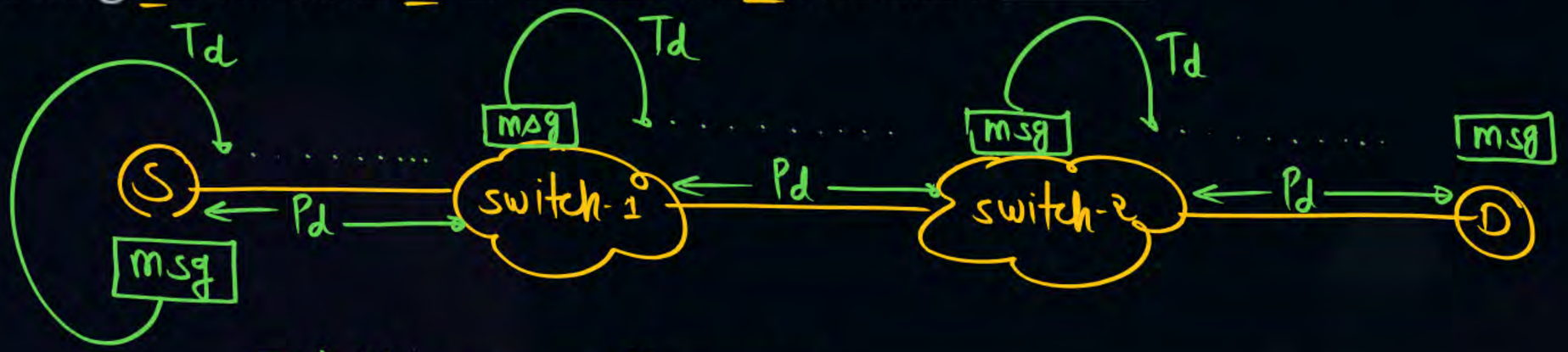
$$T_d = \frac{7.5 * 10^6 \text{ bits}}{1.5 * 10^6 \text{ bits/sec}}$$

T_d = 5 sec

T_d = 5000 msec

[NAT]

#Q. Consider sending the message from source to the destination without dividing into packets. What is the total time (in milliseconds) to move the message from source to the destination host?_____



Total time = 3*Td + 3*Pd

= 3*5000 + 3*10

15000 + 30 = 15,030

[NAT]

#Q. Now suppose that the message is divided into 5000 packets, with each packet being 1500 bits long. How long (in milliseconds) does it take to move the file from source host to destination host when message segmentation is used ? _____

No. of PKt (N) = 5000

PKt size = 1500 bit

$T_d(PKt) = \frac{1500 \text{ bits}}{1.5 * 10^6 \text{ bits/sec}}$

$= 1000 * 10^{-6}$ sec

$= 1$ msec

X → Hop & 'N' PKt

Total time $= X[T_d + P_d] + X-1(Q_d + P_{rd}) + (N-1)T_d$

$= 3[1 + 10] + 4999 * 1$

$= 33 + 4999 = 5032$ msec

[MCQ]

#Q. Assume that there are only two stations, A and B, in a CSMA/CD network. The distance between the two stations is 2000 meter, the propagation speed is 2×10^8 meter/sec, the transmission rate of a link is 100 Mbps ($1K = 10^3$, $1M = 10^6$ and $1G = 10^9$) and both stations have one frame of 2000 bits to send to each other. If station A starts transmission at time t1 then which of the following statement is/are true?

S1: The protocol does not allow station B to start transmitting at time t1 + 10μs. (False)

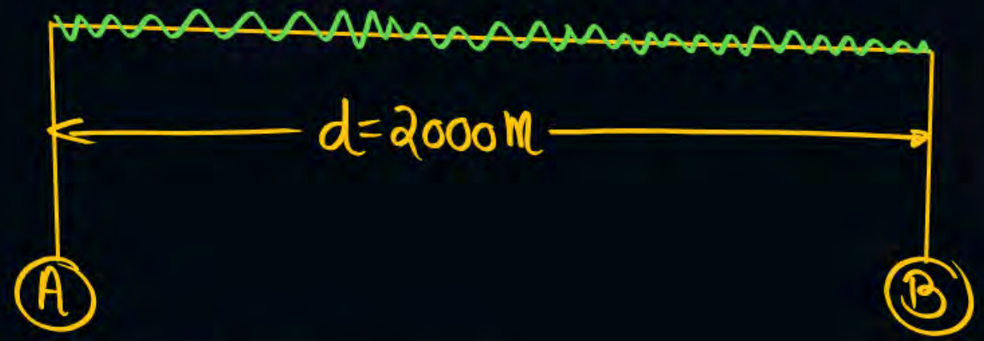
S2: The protocol does not allow station B to start transmitting at time t1+30μs. (T)

A Only S1

B Only S2

C Both S1 and S2

D Neither S1 nor S2



$t_1 \rightarrow$ A start transmission

$t_1 + 20\mu sec \rightarrow$ 'A' Finish its transmission

$t_1 + 20\mu sec + 10\mu sec \rightarrow$ 'A' Complete Packet reached at 'B'

$t_1 + 30\mu sec \longrightarrow$ " " " " " "

$V = 2 * 10^8$ m/sec, $B = 100 * 10^6$ bits/sec

$P_d = \frac{d}{v} = \frac{2000\,m}{2 * 10^8\,m/sec}$

$= 10 * 10^{-6}$ sec $= 10\mu sec$

Frame size = 2000 bits

$T_d(Frame) = \frac{2000\ bits}{100 * 10^6\ bits/sec}$

$= 20 * 10^{-6}$ sec $= 20\mu sec$

one bit transmission delay

$$T_d(\text{one bit}) = \frac{1 \text{ bits}}{100 * 10^6 \text{ bits/sec}}$$

$$= 0.01 * 10^{-6} \text{ sec}$$

$$= 0.01 \mu\text{sec}$$

At $t_1 + 0.01\mu\text{sec} + 10\mu\text{sec} = t_1 + 10.01\mu\text{sec}$ → 'A' First bit will reach at 'B'

[MCQ]

Sat → (20-25 Question)
(AL, RAlgorithm, IP Protocal)

#Q. The File Transfer Protocol (FTP) uses:

A. A persistent TCP connection on port 21 for a control session, and a separate non persistent TCP connection on port 20 for each data file transfer

B. A non-persistent TCP connection on port 21 for a control session, and a separate non persistent TCP connection on port 20 for each data file transfer

C. A persistent TCP connection on port 21 for a control session, and a single persistent TCP connection on port 20 for all of the data file transfers

D. A non-persistent TCP connection on port 21 for a control session, and a single persistent TCP connection on port 20 for all of the data file transfers.

[MCQ]

#Q. Consider the following protocols:

P_1 : TCP

P_2 : UDP

P_3 : ICMP

P_4 : IGMP

The order in which router eliminate the datagram from it's buffer is?

(P3) ICMP
↓
(P4) IGMP
↓
(P2) UDP
↓
(P1) TCP

$P_3 > P_4 > P_2 > P_1$

A $P_1 > P_2 > P_3 > P_4$

B $P_2 > P_1 > P_3 > P_4$

C $P_3 > P_4 > P_1 > P_2$

D $P_3 > P_4 > P_2 > P_1$ ✓

[MCQ]

#Q. A TCP connection is using a window size of 10,000 bytes, and the previous acknowledgement number was 22,001. It receives a segment with acknowledgement number 24,001 and window size advertisement of 10,000. What is the range of sequence number in the window after receiving acknowledgement segment?

A 22001 – 24000

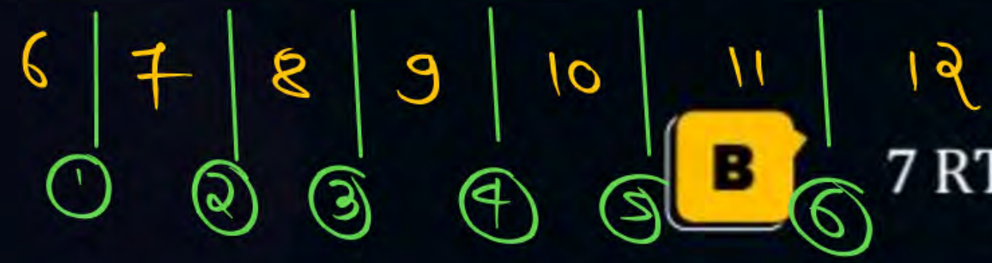
B 22001 – 32000

C 24001 – 34000

D 24001 – 36000

[MCQ]

#Q. Consider sending a large file from a host to another over a TCP connection that has no loss. Suppose TCP uses AIMD for its congestion control without slow start. Assuming cwnd increases by 1 MSS every time a batch of ACKs is received and assuming approximately constant round-trip times, how many RTTs would it take for cwnd increase from 6 MSS to 12 MSS (assuming no loss events)?



A 6 RTTs

B 7 RTTs

C 3 RTTs

D 12 RTTs

[MCQ]

Data for the next two question, timeline showing exchange of some segments between TCP A and TCP B during connection termination. X indicates that ACK segment was lost.

#Q. What are the states of TCP A at (1), (3) and (5) respectively?

A FIN_WAIT1, TIME_WAIT, FIN_WAIT2.

B FIN_WAIT1,CLOSE_WAIT, TIME_WAIT.

C FIN_WAIT1, FIN_WAIT2, TIME_WAIT.

D FIN_WAIT1, FIN_WAIT2, CLOSE_WAIT.

[MCQ]

#Q. What are the states of TCP B at (2) and (4) respectively?

A FIN_WAIT1, FIN_WAIT2

B CLOSE_WAIT, FIN_WAIT2

C CLOSE_WAIT, TIME_WAIT

D CLOSE_WAIT, LAST_ACK


closed
Starting Point
Passive open
Listen
Active open
Sent SYN
Rcvd SYN
Send SYN+Ack
Rcvd SYN
Send SYN+Ack
SYN-Sent
close (Timeout)
SYN-Rcvd
FIN(close)
Rcvd Ack
Send <Nothing>
data transfer
Rcvd SYN+Ack
Send Ack
established
Send FIN
Rcvd FIN
Send Ack
Rcvd FIN
Send Ack
FIN-Wait-1
closing
close-wait
simultaneous close
Rcvd Ack
Send <Nothing>
3 way Handshake
Rcvd FIN+Ack
Send Ack
Rcvd Ack
Send FIN
FIN-Wait-2
Rcvd FIN
Send Ack
Time wait
2*MSL
Last-Ack
Rcvd Ack

[MSQ]

#Q. The first Few Hexadecimal digits of TCP Header are given

S Port | D Port | S No

5EFA | 00 FD | 001C 3297

Which of the following statement is/are correct ?

A. Source port =24314 & Destination port =253

B. Source port =20480 & Destination port =253

C. Packet is going from client to server

D. Packet is going server to client

$S.Port = (5EFA)_{16}$

$16^3\ 16^2\ 16^1\ 16^0$

$= 5*16^3 + 14*16^2 + 15*16^1 + 10*16^0$

$= 24314$

$D.Port = (00FD)_{16}$

$16^1\ 16^0$

$15*16 + 13 = 253$

Well Know Port No (0-1023)

[NAT]

#Q. Consider the 1 Gbps CSMA/CD broadcasts star in which no two hosts are now more than 500m apart, The CSMA/CD specification requires that if a collision occurs, it must detect the collision before it finishes transmitting a packet.
What is the size of the minimum packet in above network (in bytes)? (Assume the speed of propagation is 2×10^8 m/s.)_____

2 mins Summary

Topic One

Topic Two

Topic Three

Topic Four

Topic Five

Common Data Questions

THANK - YOU