AUTUMN RE-MID SEMESTER EXAMINATION-2023

School of Computer Engineering
Kalinga Institute of Industrial Technology, Deemed to be University
Computer Network
[IT-3009]

Time: 1 1/2 Hours **Full Mark: 40**

Answer All the Questions.

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

1. Answer all the questions. [2 x 5]

a) If WAN link is 2 mbps and RTT between source and destination is 300 msec, what would be the optimal TCP window size needed to fully utilize the line?

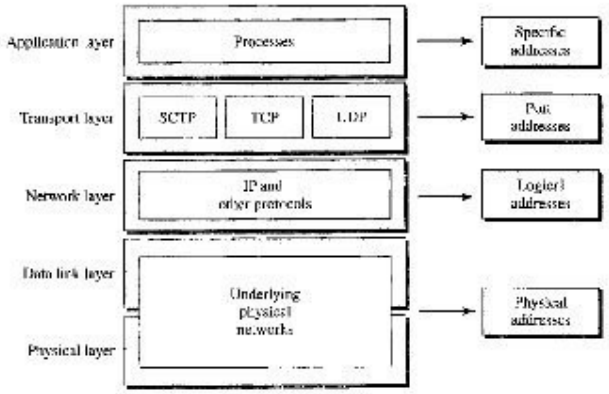
ANS: Fully utilize the line = Max amount data that can be sent in 1 RTT = 300 msec X 2 mbps = 600 X 10^3 bits = 600000 bits = 75000 bytes

b) On a TCP connection, current congestion window size is 4 KB, The window advertise by the receiver is 6 KB. The last byte sent by the sender is 10240 and the last byte acknowledged by the receiver is 8192. The current window size at the sender is ……..

ANS: Current window size at the sender = Min(CWND, RWND) = Min(4kb, 6kb) = 4kb

c) Define the different addresses and Packet names used in various layer of TCP/IP Suite.

ANS:



d) Consider a Stop-and-Wait communication system with a line bandwidth of 1 Mbps. The round trip time for a signal is 20 milliseconds. Calculate the bandwidth-delay product for this system. If the data packets to be transmitted are 1,000 bits each, determine the link utilization percentage.

ANS: The bandwidth-delay product is (1 × 10^6) × (20 × 10^-3) = 20,000 bits.

The system can send 20,000 bits during the time it takes for the data to go from the sender to the receiver and the acknowledgment to come back.

However, the system sends only 1,000 bits. We can say that the link utilization is only 1,000/20,000, or 5 percent

e) What DNS cache issues are involved in changing the IP address of a web server host name?
ANS: DNS spoofing

2. [5+5 Marks]

A) Discuss the need for name resolution and the process of it with example. Illustrate the domain name hierarchy and the steps in resolution. Explain recursive and iterative resolution.

ANS: Refer to text book [1+2+2 Marks]

B) Host A wants to send a large file to host B. The path from host A to host B has two links, of rates R1=3 Mbps and R2=400 kbps. Assuming no other traffic in the network, find out the throughput for the file transfer. If R1 become half, then what is the throughput?

ANS: The throughput for the file transfer=min{R1,R2}
=min{3 Mbps, 400 kbps}
=400 kbps
So, the throughput for the file transfer=400 kbps, 400 kbps [5 Marks]

3. [5+5 Marks]

A) Illustrate and explain the TCP State transition diagram. Write down the significance of TIME_WAIT state and 2MSL timeout.

ANS: Refer to text book [3+2 Marks]

B) The ssthresh value for a Reno TCP station is set to 8 MSS. The station is now in the slow-start state with cwnd = 5 MSS and ssthresh = 8 MSS. Show the values of cwnd, sstresh, and the current and the next state of the station after the following events: three consecutive non-duplicate ACKs arrived, followed by five duplicate ACKs, followed by two non-duplicate ACKs, and followed by a time-out.

ANS: After three consecutive nonduplicate ACKs arrive, the cwnd value increases by 3, becoming 8 MSS. After five duplicate ACKs, the cwnd value becomes 10 MSS and the ssthresh value becomes half of the cwnd, which is 5 MSS.

In the slow-start state, the cwnd (congestion window) is the number of packets the TCP station can send without receiving an ACK. Initially, the cwnd value is 5 MSS (Maximum Segment Size) and the ssthresh (slow-start threshold) value is 8 MSS.

When three consecutive nonduplicate ACKs arrive, the cwnd value increases by the number of ACKs received, which is 3. Thus, the cwnd becomes 8 MSS, which is equal to the ssthresh value.

After five duplicate ACKs, a TCP station assumes that a packet has been lost. In this case, the cwnd value increases by 1 for each duplicate ACK received. Therefore, the cwnd value becomes 10 MSS. Additionally, the ssthresh value is set to half of the cwnd, which is 5 MSS.

Next, when two nonduplicate ACKs arrive, the cwnd value increases by the number of ACKs received, which is 2. Thus, the cwnd becomes 12 MSS. The ssthresh value remains the same at 5 MSS. [5 Marks]

[5+5 Marks]

A) In SMTP, a sender sends un-formatted text. Write and explain the MIME header for his message.

ANS: Refer to text book [5 Marks]

B) Consider sending a packet from a source host to a destination host over a fixed route. List and explain the delay components in the end-to-end delay. Which of this delays are constant and which are variable?

ANS: Refer to text book [4+1 Marks]

*** Best of Luck ***