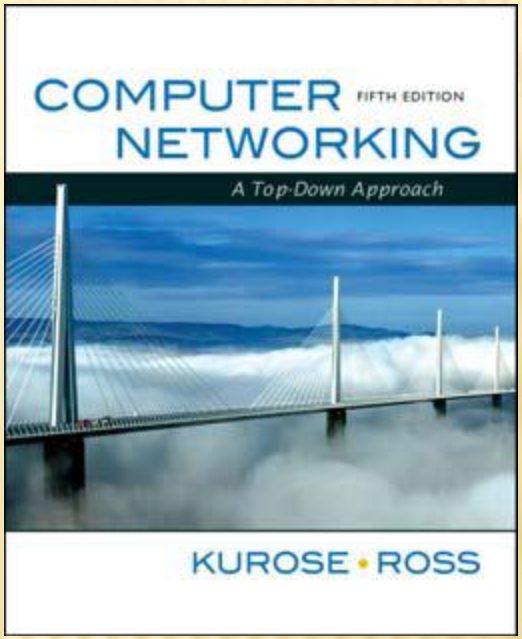

Computer Networking

LAB 3 – TCP

TCP IN DETAIL

- Reliable data transfer
  - Sequence,
  - Acknowledgement numbers
- Flow control mechanism
- TCP connection setup
- Performance (throughput and round-trip time)

CAPTURING A BULK TCP TRANSFER

- transfer the file *Alice in Wonderland* to a Web server using the HTTP POST method:
  - Go the http://gaia.cs.umass.edu/wiresharklabs/alice.txt and retrieve an ASCII copy of *Alice in Wonderland*
  - Next go to http://gaia.cs.umass.edu/wireshark-labs/TCP-wireshark-file1.html
  - Use the *Browse* button in the form to enter the name of the file. Press the "*Upload alice.txt file"* button.

QUESTIONS - 1

1. What is the IP address and TCP port number used by the client computer (source) that is transferring the file to gaia.cs.umass.edu?
2. What is the IP address of gaia.cs.umass.edu? On what port number is it sending and receiving TCP segments for this connection?

- show information about the TCP segments containing the HTTP messages:
  - select *Analyze->Enabled Protocols*
  - uncheck the HTTP box and select *OK*

QUESTIONS - 2

3. What is the sequence number of the TCP SYN segment that is used to initiate the TCP connection between the client computer and gaia.cs.umass.edu? What is it in the segment that identifies the segment as a SYN segment?
4. What is the sequence number of the SYNACK segment sent by gaia.cs.umass.edu to the client computer in reply to the SYN? What is the value of the ACKnowledgement field in the SYNACK segment? What is it in the segment that identifies the segment as a SYNACK segment?

QUESTIONS - 3

5. What is the sequence number of the TCP segment containing the HTTP POST command?
6. What are the sequence numbers of the first six segments in the TCP connection (including the segment containing the HTTP POST)? At what time was each segment sent? When was the ACK for each segment received? What is the RTT value for each of the six segments? What is the EstimatedRTT value after the receipt of each ACK?

- to plot the RTT: *Statistics->TCP Stream Graph->Round Trip Time Graph.*

QUESTIONS - 4

7. What is the length of each of the first six TCP segments?
8. What is the minimum amount of available buffer space advertised at the received for the entire trace? Does the lack of receiver buffer space ever throttle the sender?
9. Are there any retransmitted segments in the trace file? What did you check for (in the trace) in order to answer this question?

QUESTIONS - 5

10. How much data does the receiver typically acknowledge in an ACK? Can you identify cases where the receiver is ACKing every other received segment?
11. What is the throughput (bytes transferred per unit time) for the TCP connection? Explain how you calculated this value.