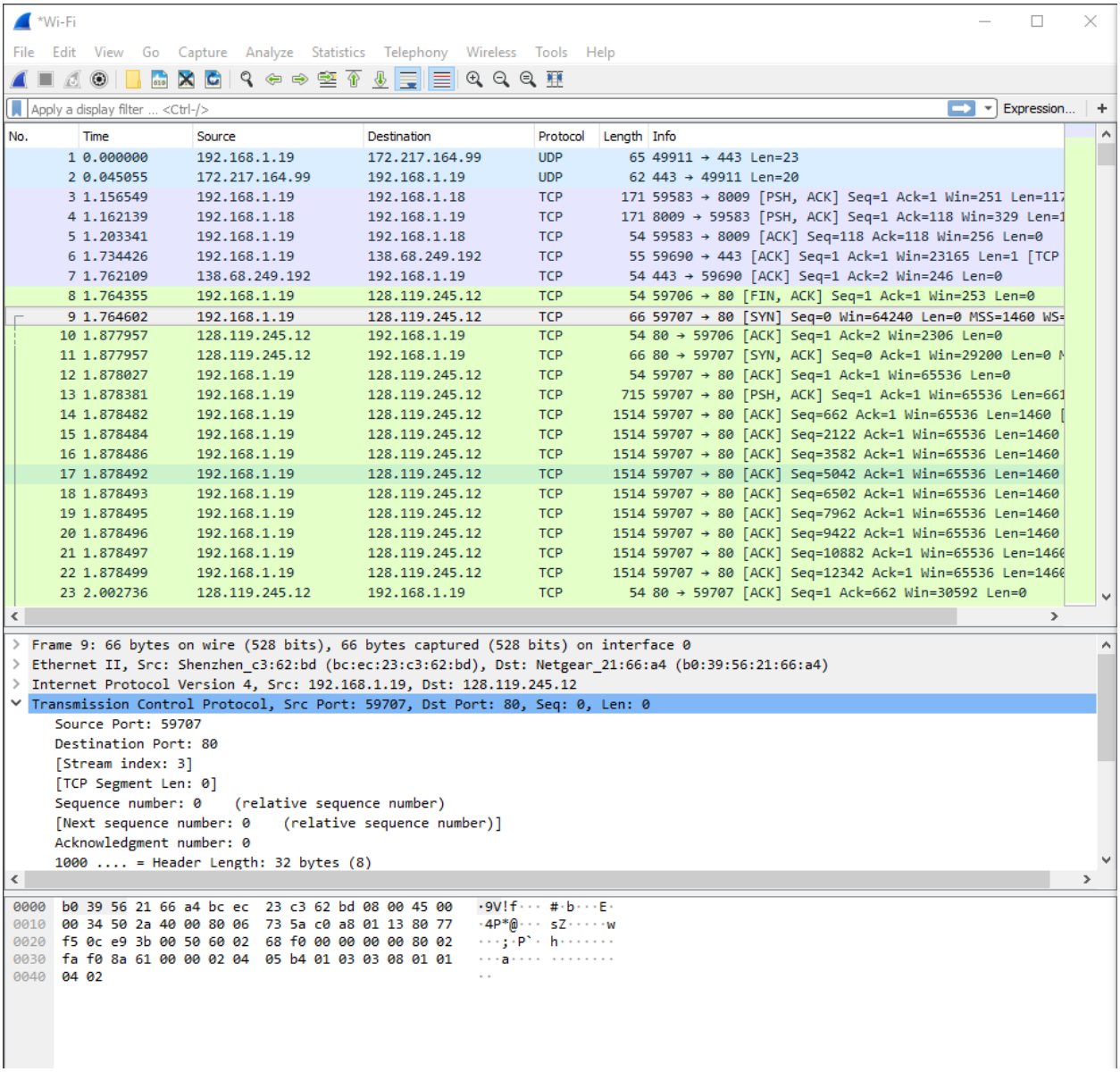
Pawan Chandra

CSC 138

LAB: 3



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? To answer this question, it's probably easiest to select an HTTP message and explore the details of the TCP packet used to carry this HTTP message, using the "details of the selected packet header window" (refer to Figure 2 in the "Getting Started with Wireshark" Lab if you're uncertain about the Wireshark windows.

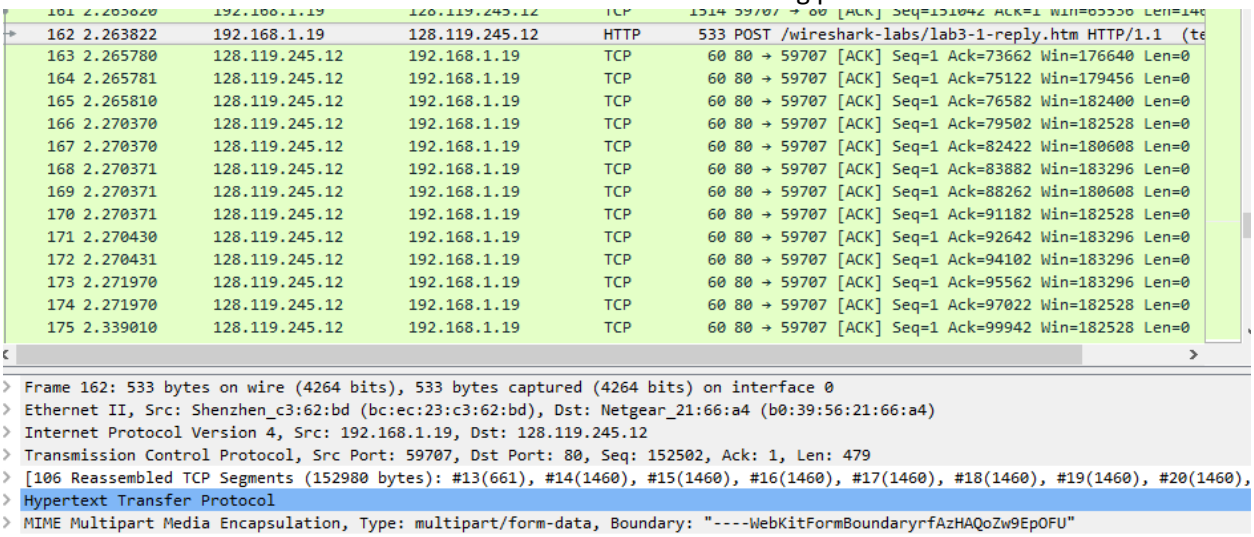
Answer: IP address 192.168.1.19 using port 59707

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? If you have been able to create your own trace, answer the following question:

Answer: IP address 128.119.245.12 using port 80

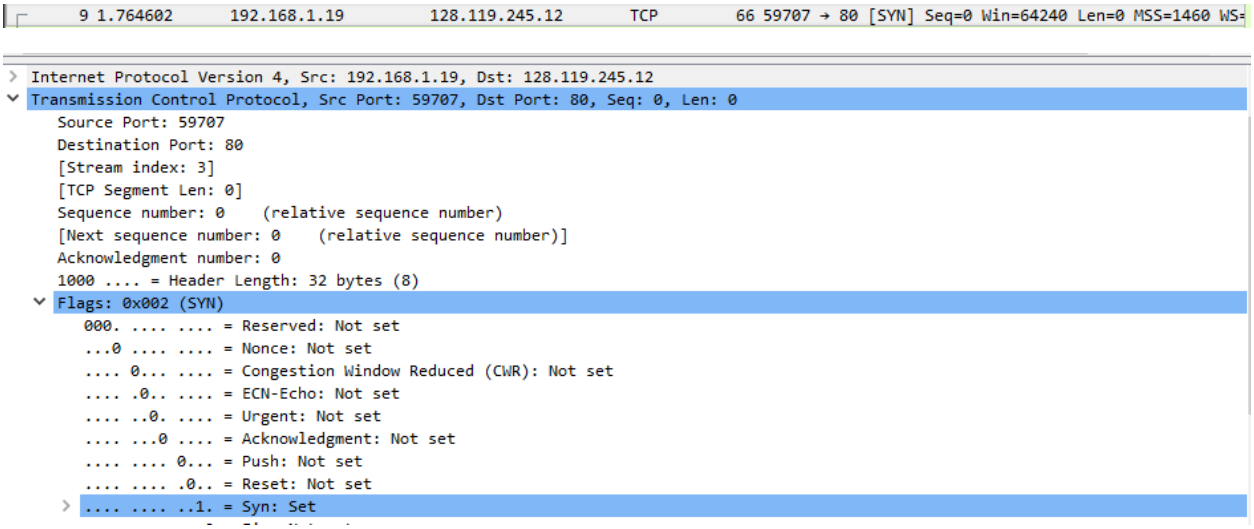
3. What is the IP address and TCP port number used by your client computer (source) to transfer the file to gaia.cs.umass.edu?

Answer: In this case I am the client so IP address 192.168.1.19 using port 59707



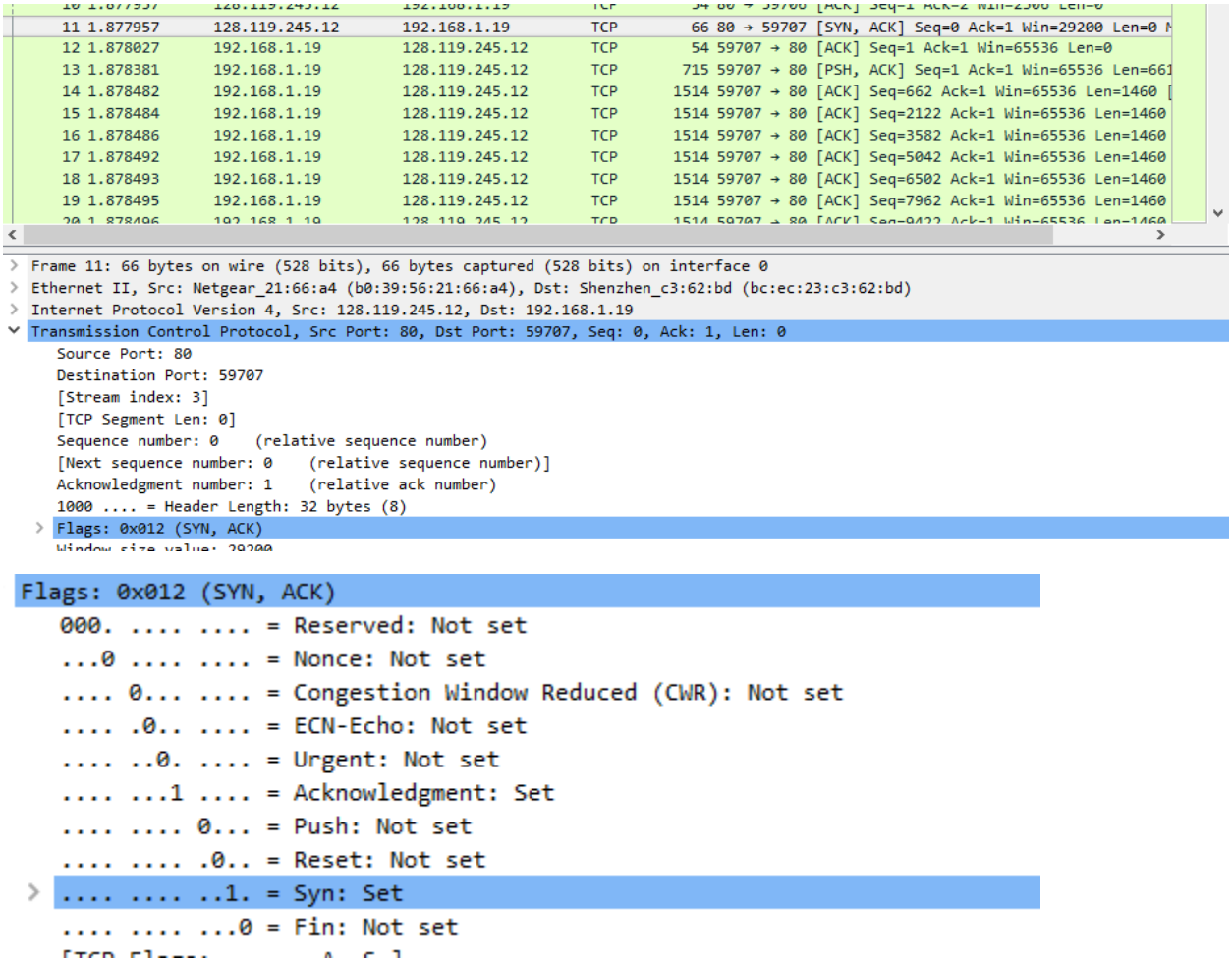
4. What is the sequence number of the TCP SYN segment that is used to initiate the TCP connection between the client computer and gaia.cs.umass.edu? What is it in the segment that identifies the segment as a SYN segment?

Answer: Sequence number is 1 and the Flag is what identifies the connection as you can see in the picture below stating if SYN is set.



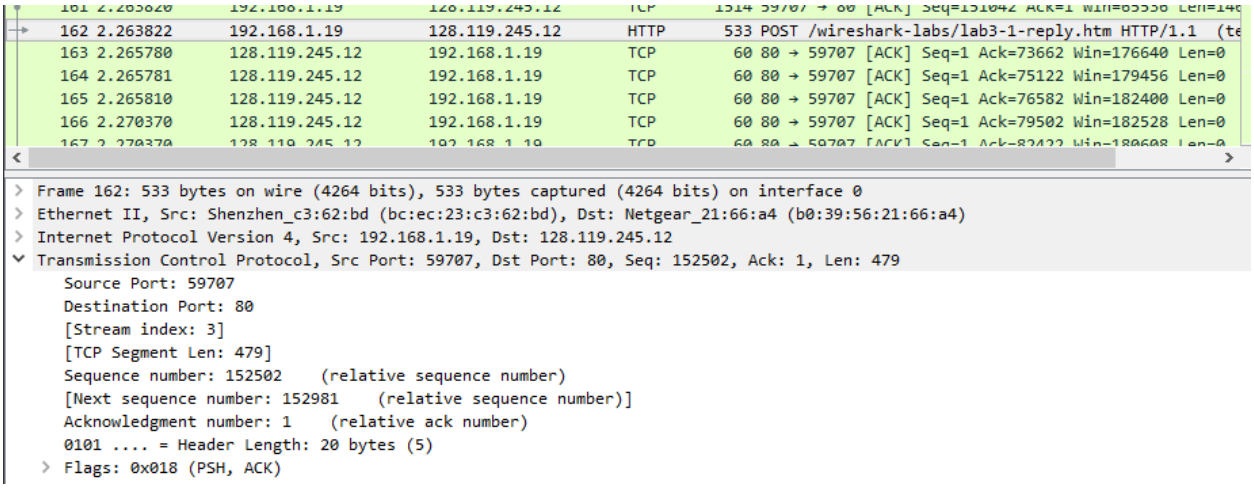
5. What is the sequence number of the SYNACK segment sent by gaia.cs.umass.edu to the client computer in reply to the SYN? What is the value of the Acknowledgement field in the SYNACK segment? How did gaia.cs.umass.edu determine that value? What is it in the segment that identifies the segment as a SYNACK segment?

Answer: The sequence number is 0 for [SYN,ACK] and the Acknowledgement is 1 which determined by the sequence number. Looking at the flag field you can see the acknowledgment field and syn is set to 1 stating it is an SYN ACK message,



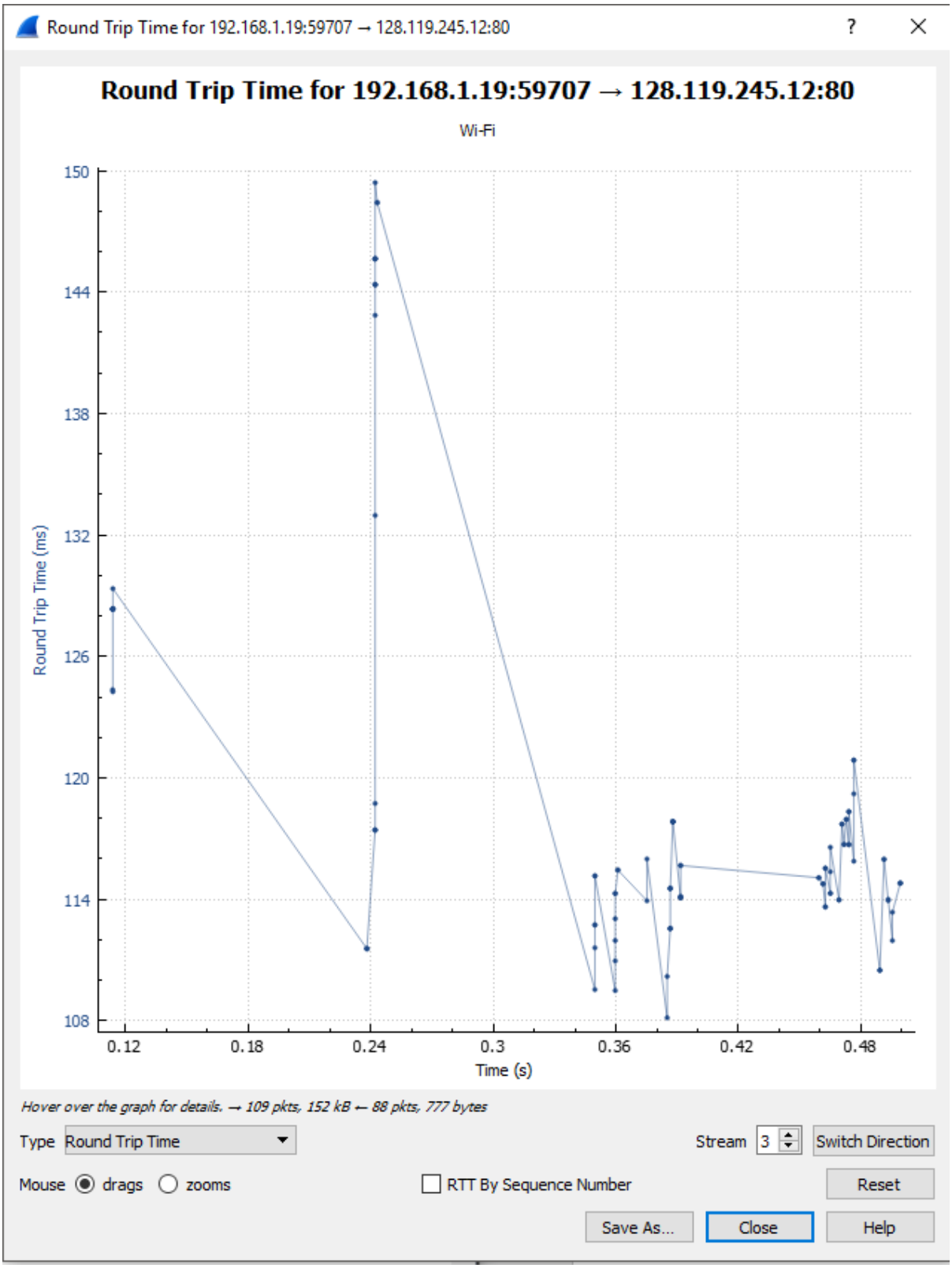
6. What is the sequence number of the TCP segment containing the HTTP POST command? Note that in order to find the POST command, you'll need to dig into the packet content field at the bottom of the Wireshark window, looking for a segment with a "POST" within its DATA field.

Answer: The sequence number of the TCP containing Post Command is 152502



7. Consider the TCP segment containing the HTTP POST as the first segment in the TCP connection. 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? Given the difference between when each TCP segment was sent, and when its acknowledgement was received, what is the RTT value for each of the six segments? What is the EstimatedRTT value (see Section 3.5.3, page 242 in text) after the receipt of each ACK? Assume that the value of the EstimatedRTT is equal to the measured RTT for the first segment, and then is computed using the EstimatedRTT equation on page 242 for all subsequent segments.

Note: Wireshark has a nice feature that allows you to plot the RTT for each of the TCP segments sent. Select a TCP segment in the "listing of captured packets" window that is being sent from the client to the gaia.cs.umass.edu server. Then select: Statistics->TCP Stream Graph- >Round Trip Time Graph.


Round Trip Time for 192.168.1.19:59707 → 128.119.245.12:80
Round Trip Time for 192.168.1.19:59707 → 128.119.245.12:80
Wi-Fi
Round Trip Time (ms)
150
144
138
132
126
120
114
108
0.12
0.18
0.24
0.3
0.36
0.42
0.48
Time (s)
Hover over the graph for details. → 109 pkts, 152 kB ← 88 pkts, 777 bytes
Type
Round Trip Time
Stream
3
Switch Direction
Mouse
drags
zooms
RTT By Sequence Number
Reset
Save As...
Close
Help

8. What is the length of each of the first six TCP segments?

Answer: The length is 54 and 66 for the TCP segment.

9. 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?

Answer: The minimum buffer space is determined by the calculated window which is 65536 bytes. In the HTTP POST, the SEQ/ACK analysis indicates Bytes sent last was 4859 which is nowhere near the minimum buffer size therefore there should be no throttling.

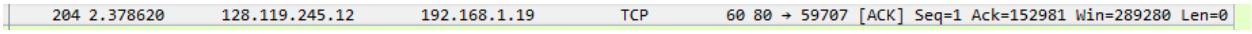
10. Are there any retransmitted segments in the trace file? What did you check for (in the trace) in order to answer this question?

Answer: There aren't any retransmissions based on the Sequence numbers and ACK number. If there were then the ack number would have resent

11. How much data does the receiver typically acknowledge in an ACK? Can you identify cases where the receiver is ACKing every other received segment (see Table 3.2 on page 250 in the text).

Answer: Typical size is 432 bits for acknowledge in an ACK.

12. What is the throughput (bytes transferred per unit time) for the TCP connection? Explain how you calculated this value.



Answer: Last Ack – First Sequence Number / time (last-first frame) = (152981 – 1)/(2.378620)= 63,314.6 = 63Kbyte/sec.

13. Use the Time-Sequence-Graph(Stevens) plotting tool to view the sequence number versus time plot of segments being sent from the client to the gaia.cs.umass.edu server. Can you identify where TCP's slowstart phase begins and ends, and where congestion avoidance takes over? Comment on ways in which the measured data differs from the idealized behavior of TCP that we've studied in the text.

Answer: Slow start phase begins around 8000 and ends before 18000. Congestion avoidance takes over at 18000. This graph assumes TCP senders are aggressive and cause a lot of traffic. It is also important to understand that TCP depends on application which affects the flow of traffic.