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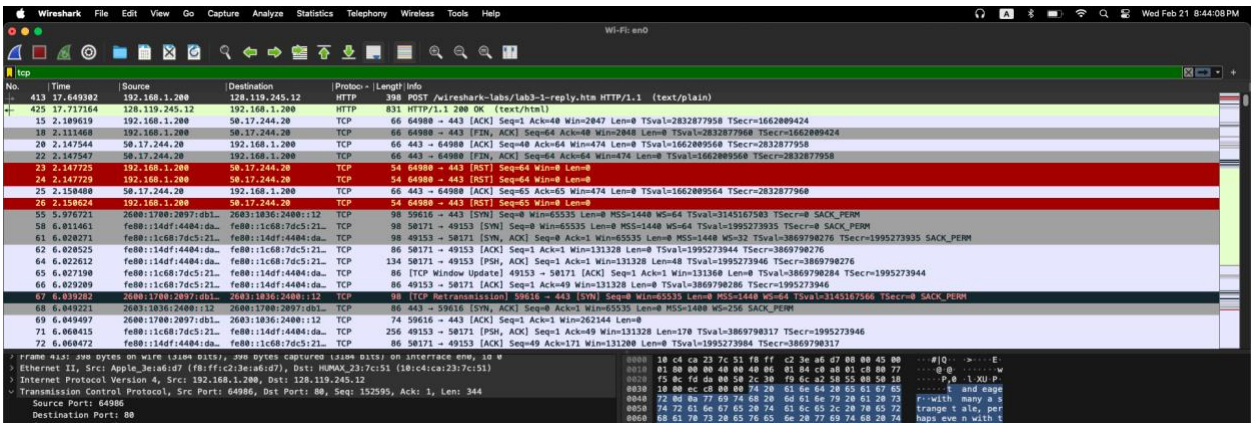
CSE 4344-002

Lab 2

Due date: March 1st, 11:59pm

1. Capturing a bulk TCP transfer from your computer to a remote server

2. A first look at the captured trace



1)
What is the IP address and TCP port number used by the client computer (source) that is transferring the alice.txt file to gaia.cs.umass.edu?

- IP address: 192.168.1.200
- TCP port number: 64986 (Source Port)

2)
What is the IP address of gaia.cs.umass.edu?

- The IP address of gaia.cs.umass.edu: 128.119.245.12.

On what port number is it sending and receiving TCP segments for this connection?

- The port number it is sending and receiving TCP segments for this connection: 80 (Destination Port)

3. TCP Basics

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?

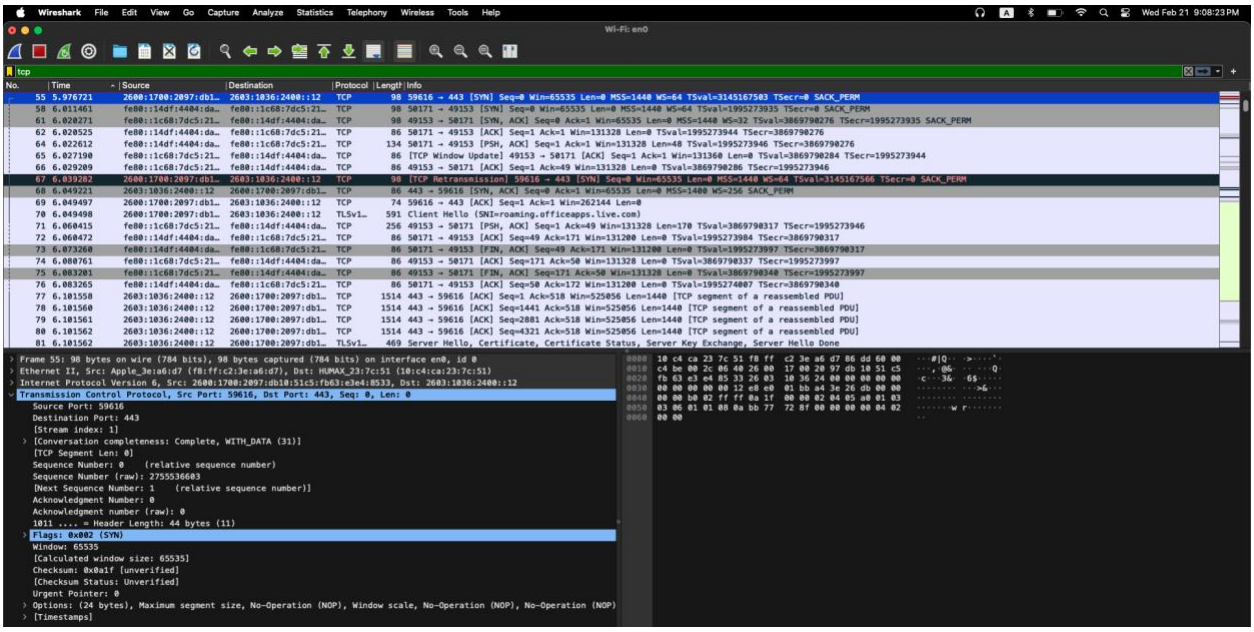
- Sequence Number (raw): 2755536603

What is it in this TCP segment that identifies the segment as a SYN segment?

- There is a SYN flag message under TCP which indicates that it is a SYN segment.

Will the TCP receiver in this session be able to use Selective Acknowledgments?

- The TCP receiver in this session will not be able to use Selective Acknowledgements.



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?

- The sequence number of the SYNACK segment sent by gaia.cs.umass.edu to the client computer in reply to the SYN is: Sequence Number (raw): 2383925913

What is it in the segment that identifies the segment as a SYNACK segment?

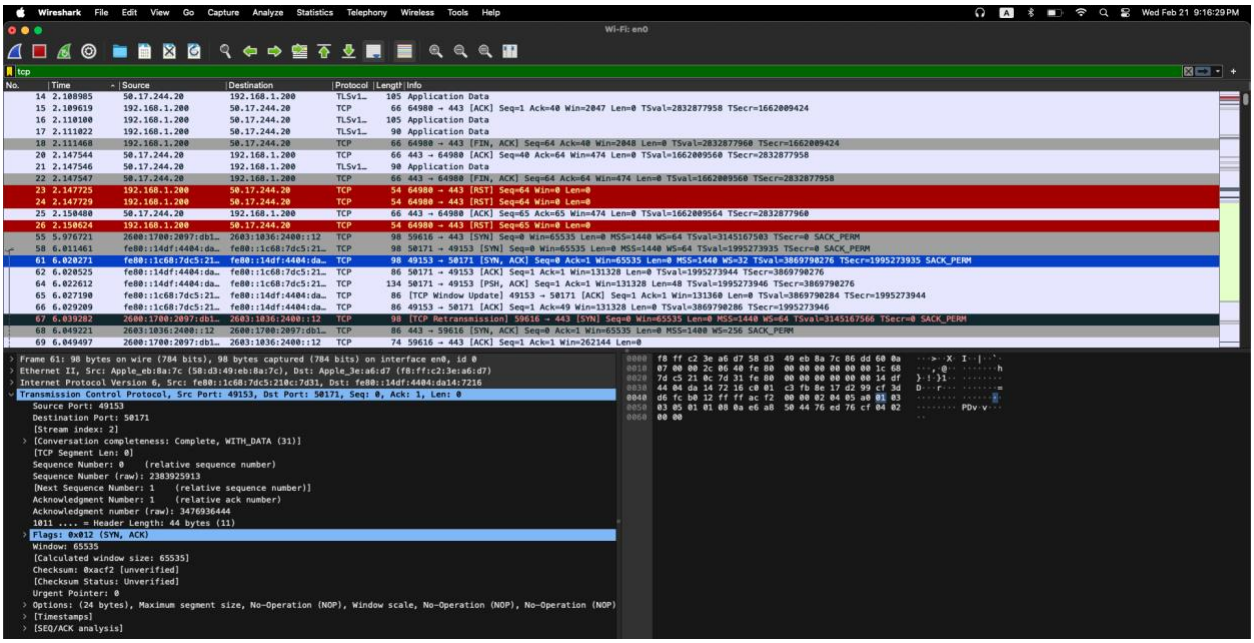
- There is a SYNACK flag message under TCP which indicated that it is a SYN segment.

What is the value of the Acknowledgement field in the SYNACK segment?

- Acknowledgement Number: 1 (relative ack number)
- Acknowledgement (raw): 3476936444

How did gaia.cs.umass.edu determine that value?

- Gaia.cs.umass.edu determined that value by adding one to the initial sequence number.



5)

What is the sequence number of the TCP segment containing the header of the HTTP POST command?

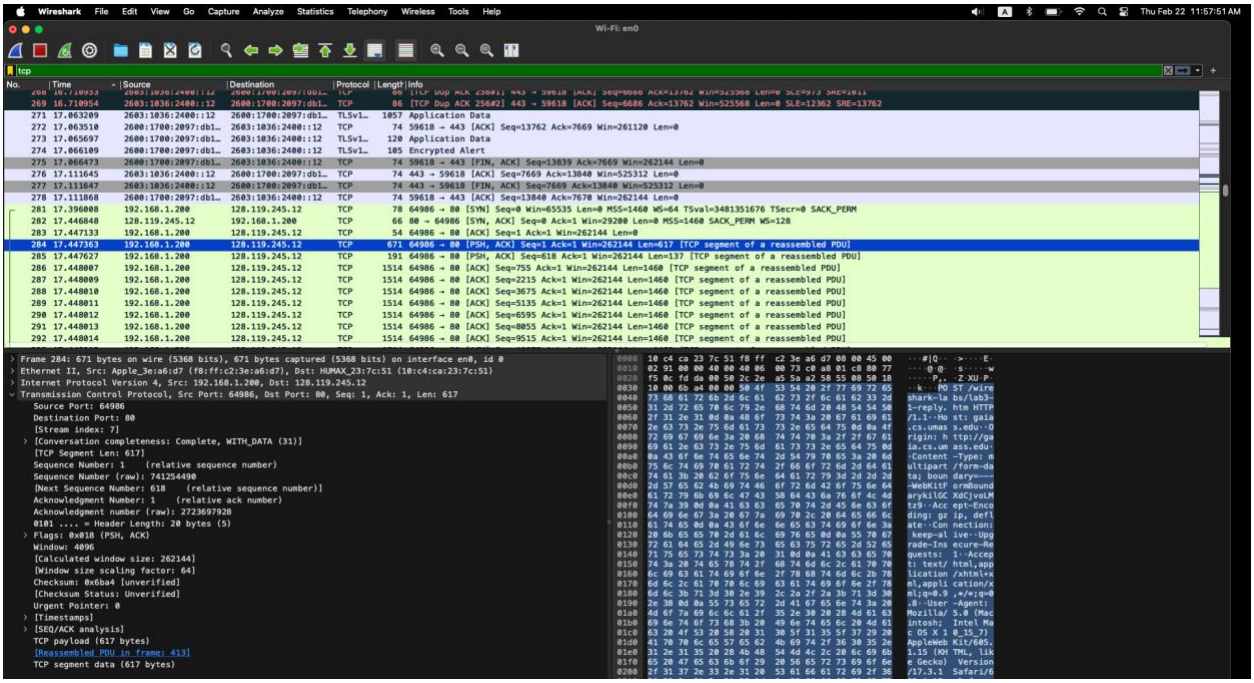
- Sequence Number (raw): 741254490

How many bytes of data are contained in the payload (data) field of this TCP segment?

- TCP payload: 617 bytes.

Did all of the data in the transferred file alice.txt fit into this single segment?

- Yes, all the data in the transferred file alice.txt was fit into this single segment.



6)

Consider the TCP segment containing the HTTP “POST” as the first segment in the data transfer part of the TCP connection.

At what time was the first segment (the one containing the HTTP POST) in the data-transfer part of the TCP connection sent?

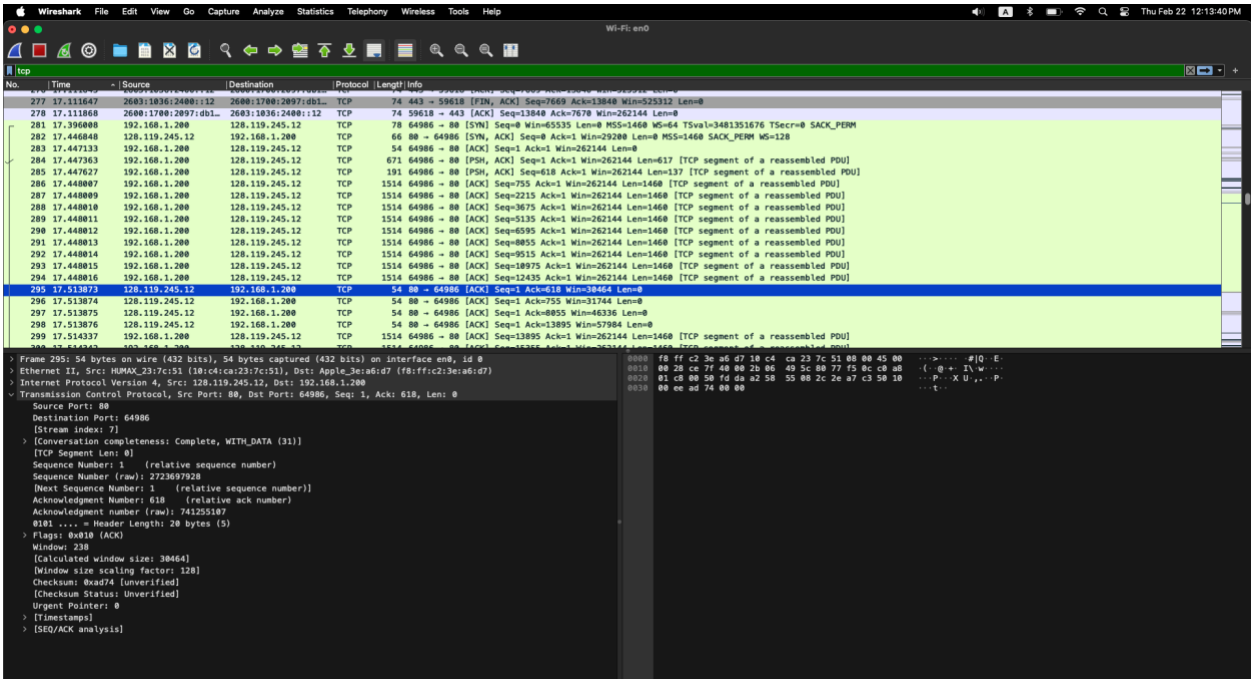
- The time the first segment (the one containing the HTTP POST) in the data transfer part of the TCP connection sent is 17.447363.

At what time was the ACK for this first data-containing segment received?

- The time the ACK for this first data-containing segment received is 17.513873.

What is the RTT for this first data-containing segment?

- RTT for this first data-containing segment = Receive Time – Sent Time = 17.513873 – 17.447363 = 0.06651

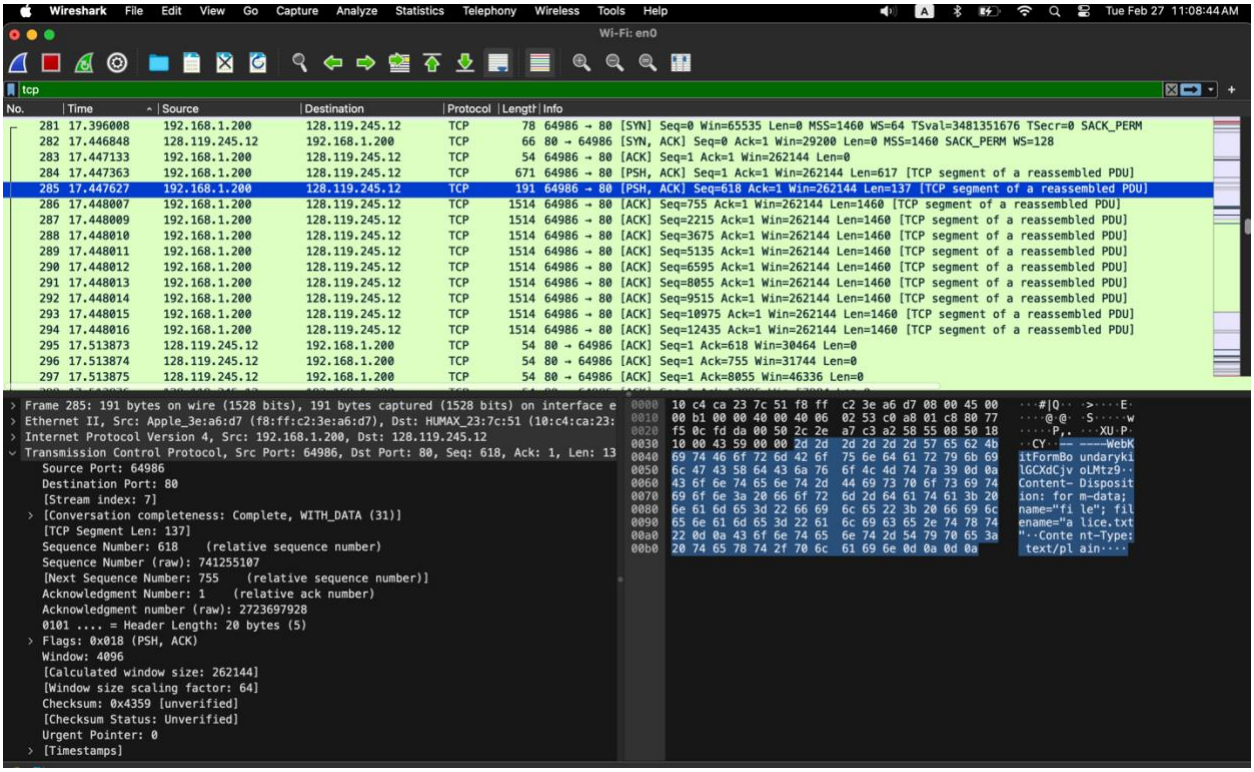


What is the RTT value the second data-carrying TCP segment and its ACK?

- The time the second segment (the one containing the HTTP POST) in the data transfer part of the TCP connection sent is 17.447627.
- The time the ACK for this second data-containing segment received is 17.513874.
- RTT value the second data-carrying TCP segment and its ACK: Receive Time – Sent Time = 0.066247

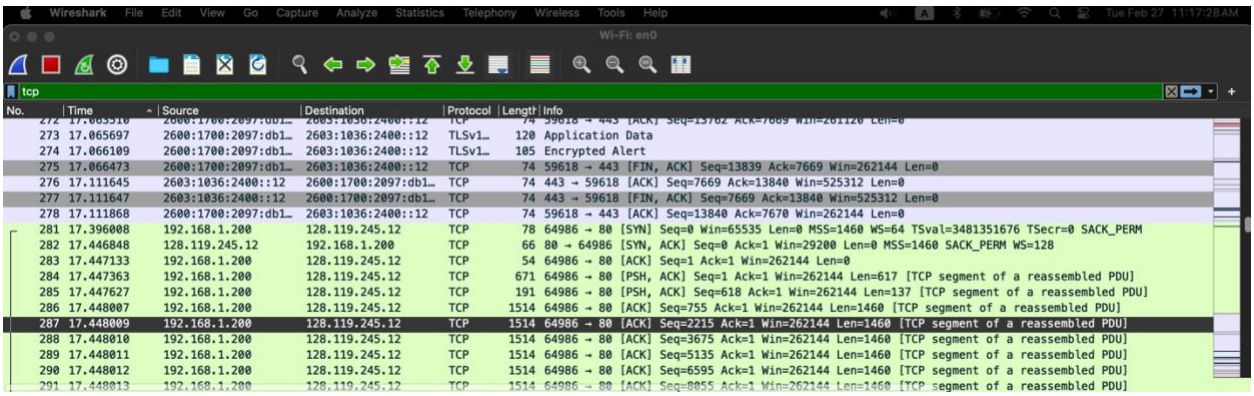
What is the EstimatedRTT value (see Section 3.5.3, in the text) after the ACK for the second data-carrying segment is received? Assume that in making this calculation after the received of the ACK for the second segment, that the initial value of EstimatedRTT is equal to the measured RTT for the first segment, and then is computed using the EstimatedRTT equation on page 242, and a value of a = 0.125.

- The Estimated RTT after the ACK for the second data-carrying segment is received: (1-alpha) * EstimatedRTT + alpha * SampleRTT = (1-0.125) * 0.06651 + 0.125 * 17.447627 = 2.239149625



7)
What is the length (header plus payload) of each of the first four data-carrying TCP segments?

First: 617
Second: 137
Third: 1460
Fourth: 1460

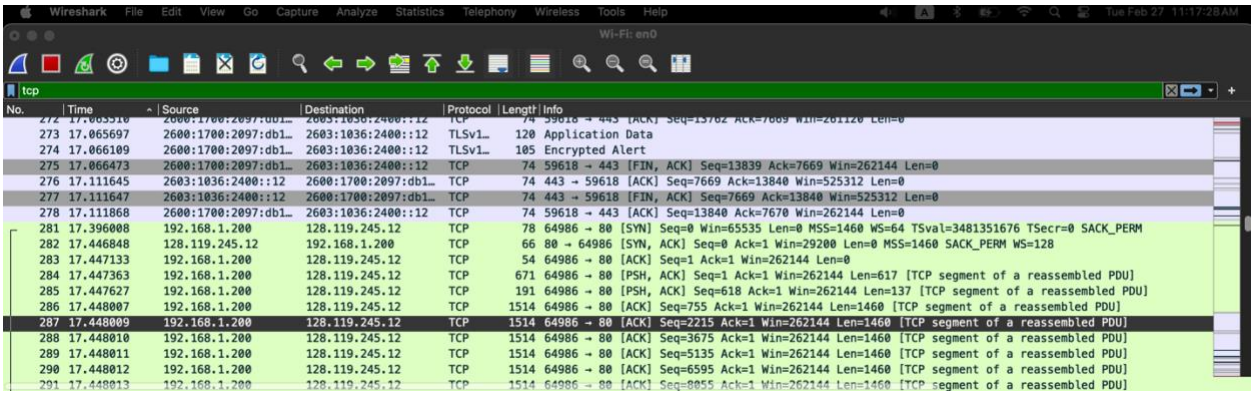


8)
What is the minimum amount of available buffer space advertised to the client by gaia.cs.umass.edu among these first four data-carrying TCP segments?

- 262144 bytes

Does the lack of receiver buffer space ever throttle the sender for these first four data-carrying segments?

- No, because segment length is less than window size.



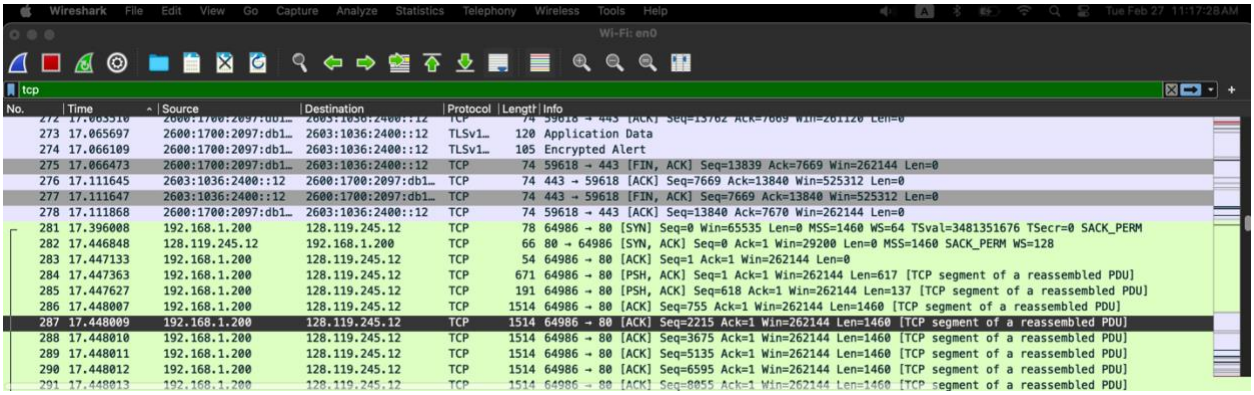
9)

Are there any retransmitted segments in the trace file?

- No there isn't.

What did you check for (in the trace) in order to answer this question?

- I checked the sequence number for each of the segments and the number increases without repeating. This means that no retransmitted segments occur.



10)

How much data does the receiver typically acknowledge in an ACK among the first ten data-carrying segments sent from the client to gaia.cs.umass.edu?

- 1460 bytes

Can you identify cases where the receiver is ACKing every other received among these first ten data-carrying segments?

- No

11)
What is the throughput (bytes transferred per unit time) for the TCP connection? Explain how you calculated this value.

- The first TCP segment is 1 byte.
- The last segment is 152939 bytes.
- Total data: 152939 – 1 = 152938 bytes
- Transmission time for first segment = 17.447363 seconds
- Transmission time for last segment = 17.717163 seconds
- Difference 17.717163 – 17.447363 = 0.2698 seconds
- Throughput = 152938 / 0.2698 = 566856.9311 MB/sec