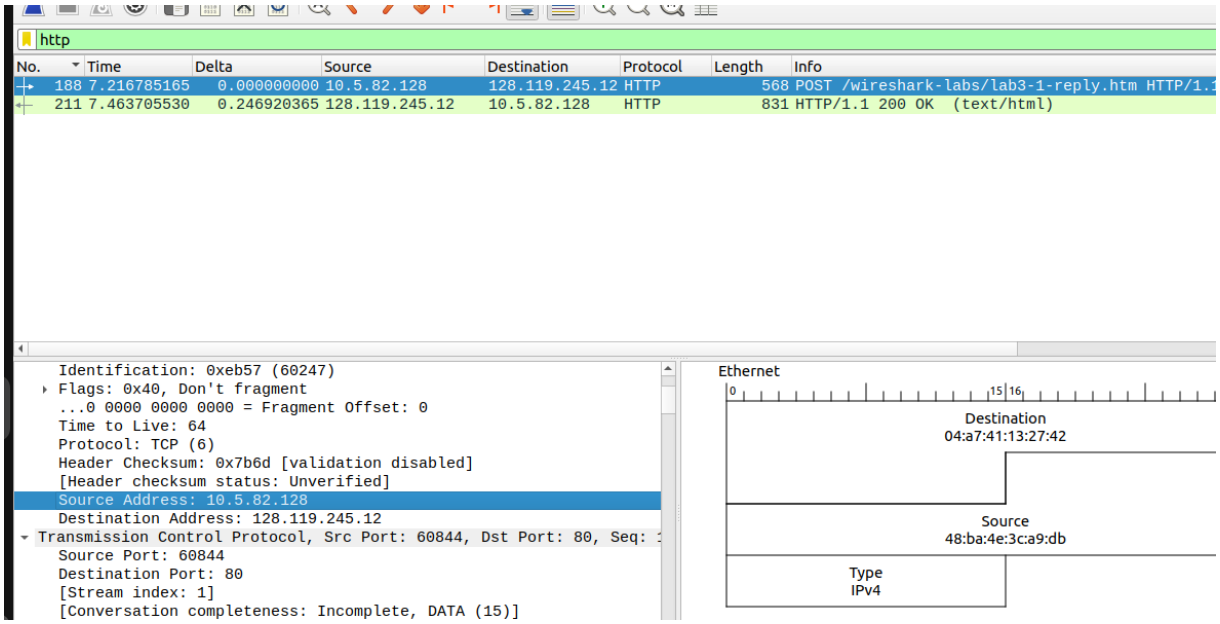
Part A:

Q1:

Ans: Client IP address: 10.5.82.128

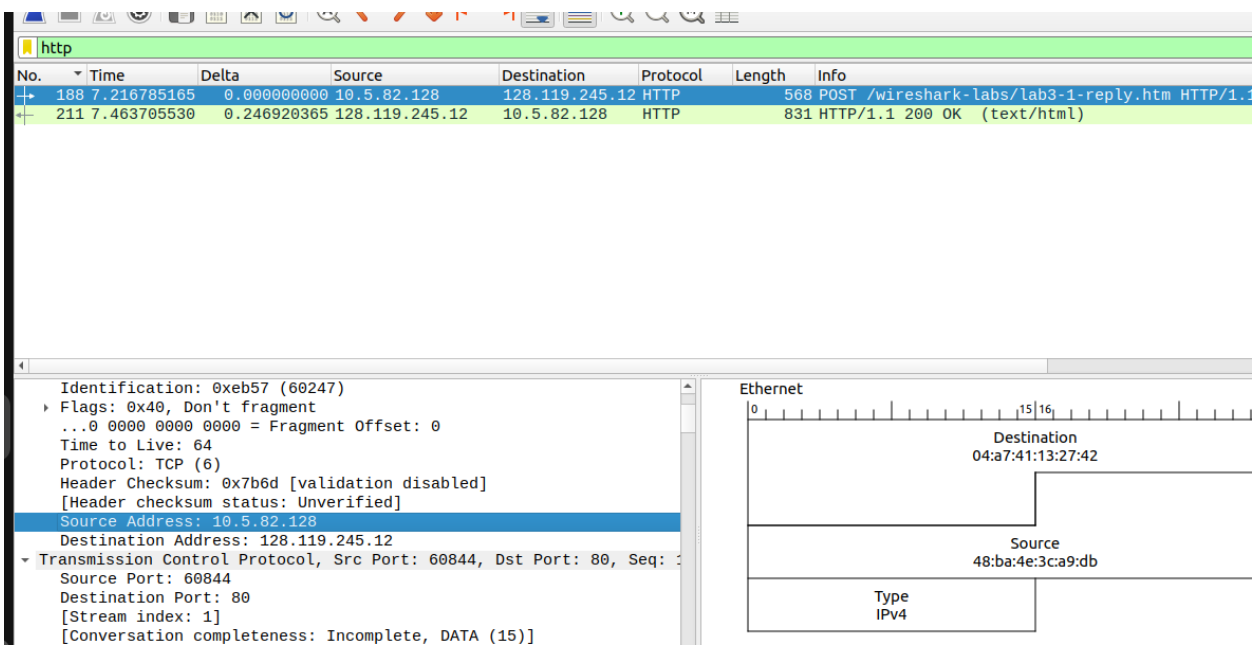
Port Number: 60844



Q2:

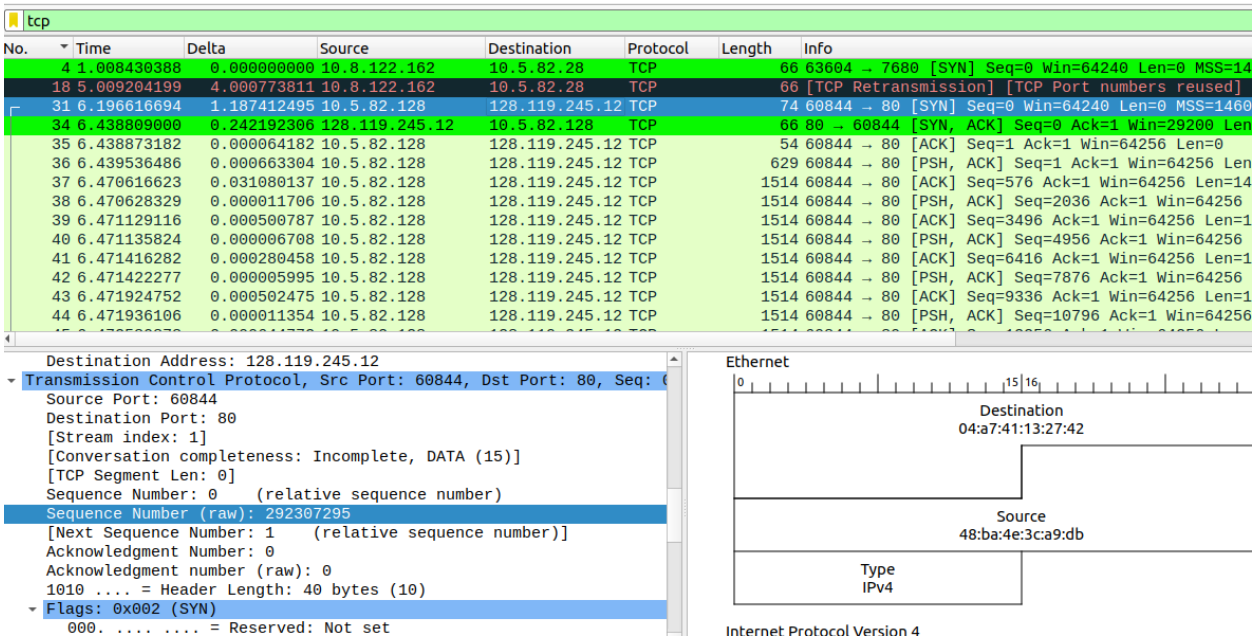
Ans: Destination IP Address: 128.119.245.12

Port no. : 80

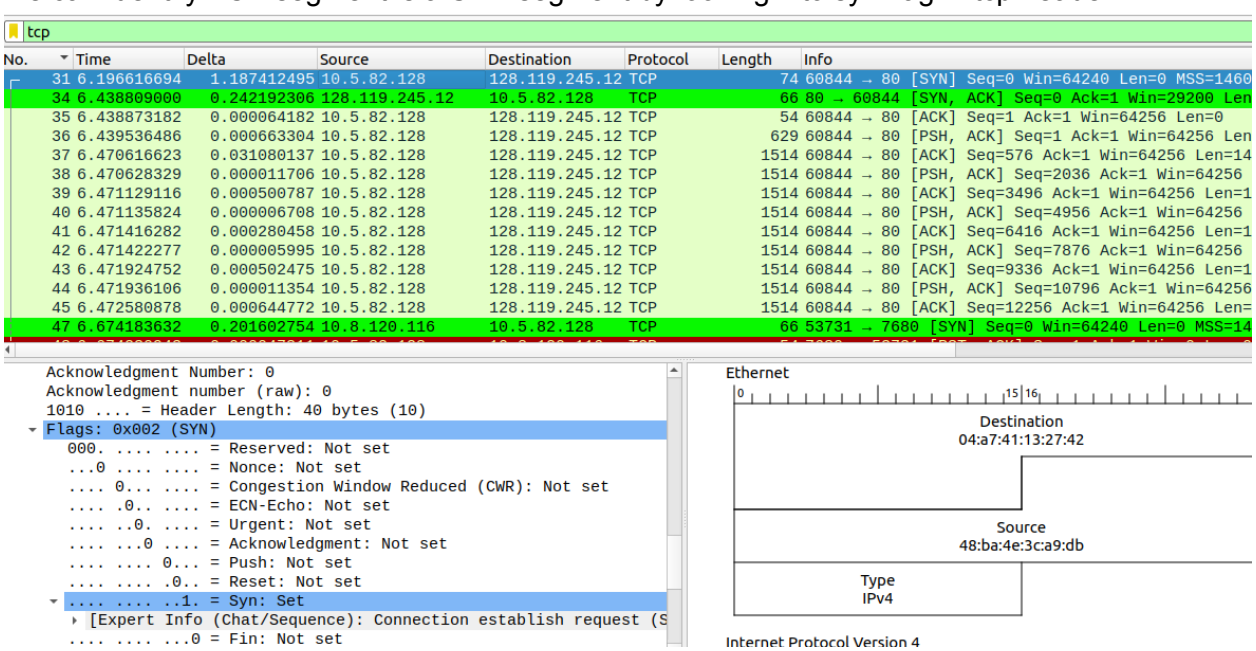


Q3:

Ans: Sequence number of TCP SYN segment : 292307295



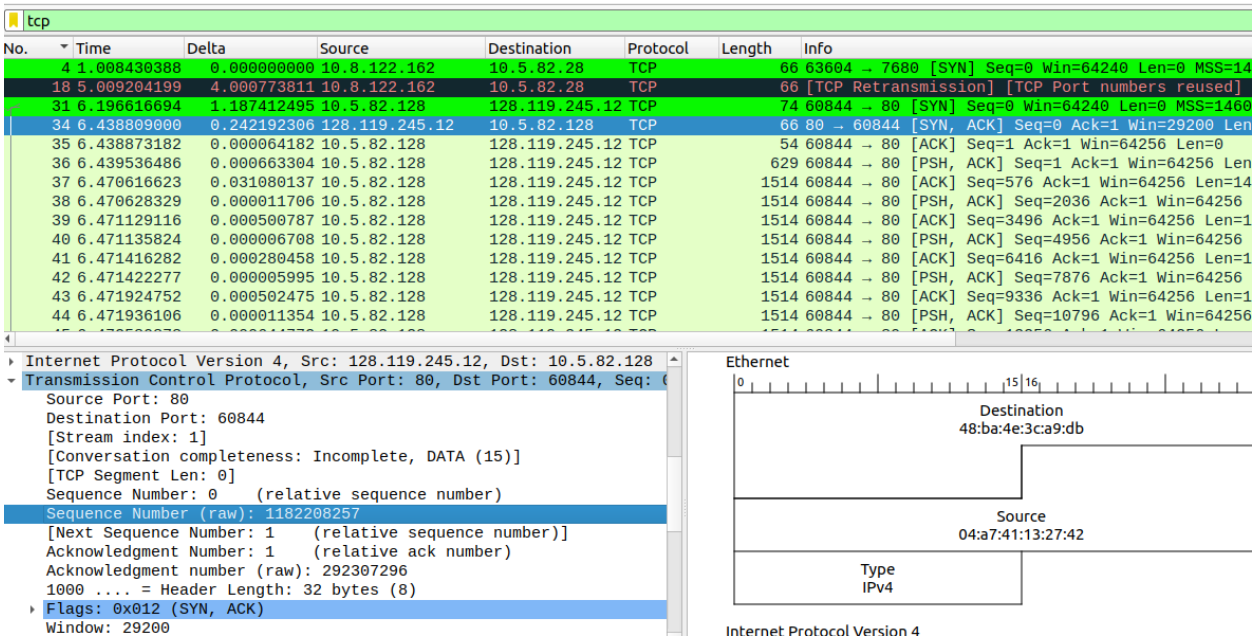
We can identify TCP segment is a SYN segment by looking into syn flag in tcp header



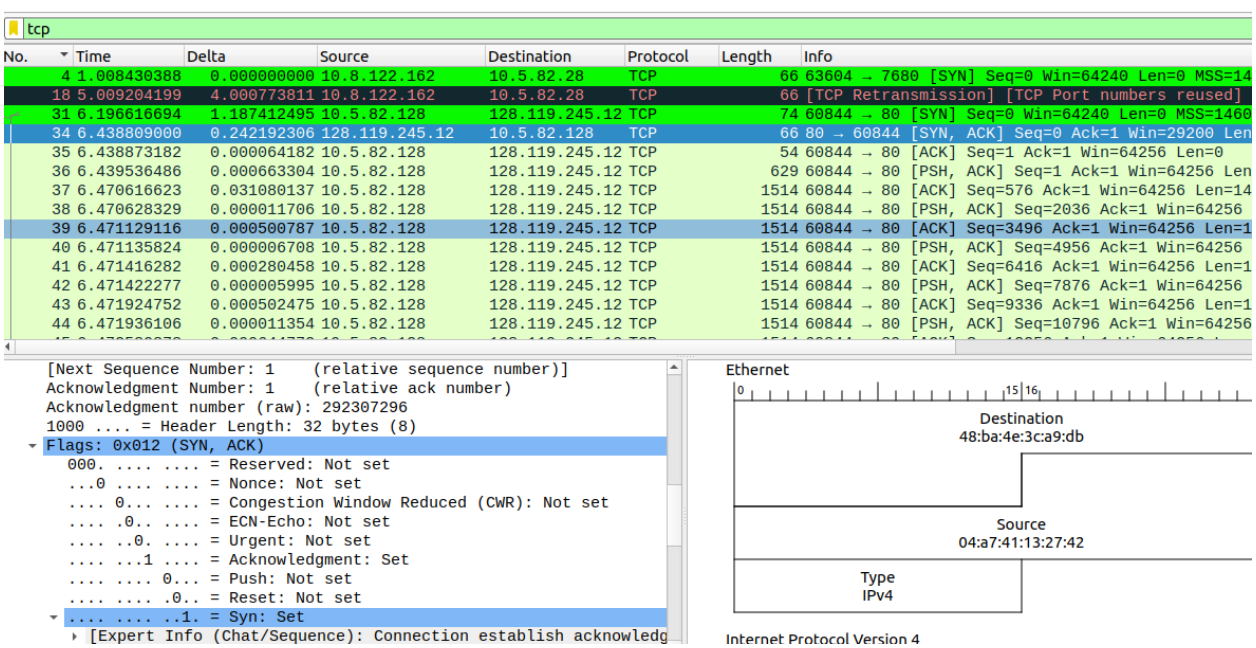
Yes, the TCP receiver in this session is able to use Selective Acknowledgments as we can see that acknowledgement as cumulative.

Q4:

Sequence number of SYNACK segment is : 1182208257



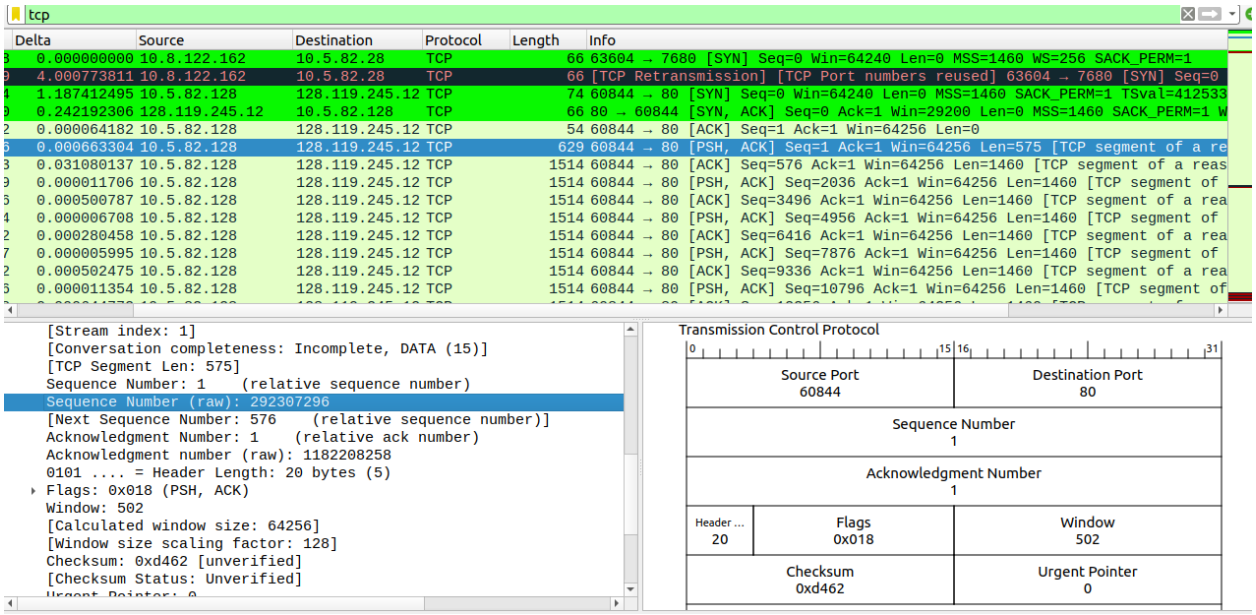
To identify the segment is SYNACK we can check the flags in tcp segment in which the ack and syn will be set to 1



The sequence number of acknowledgement field is 292307296, it is obtained by adding 1 to the syn segment sequence number sent by the source.

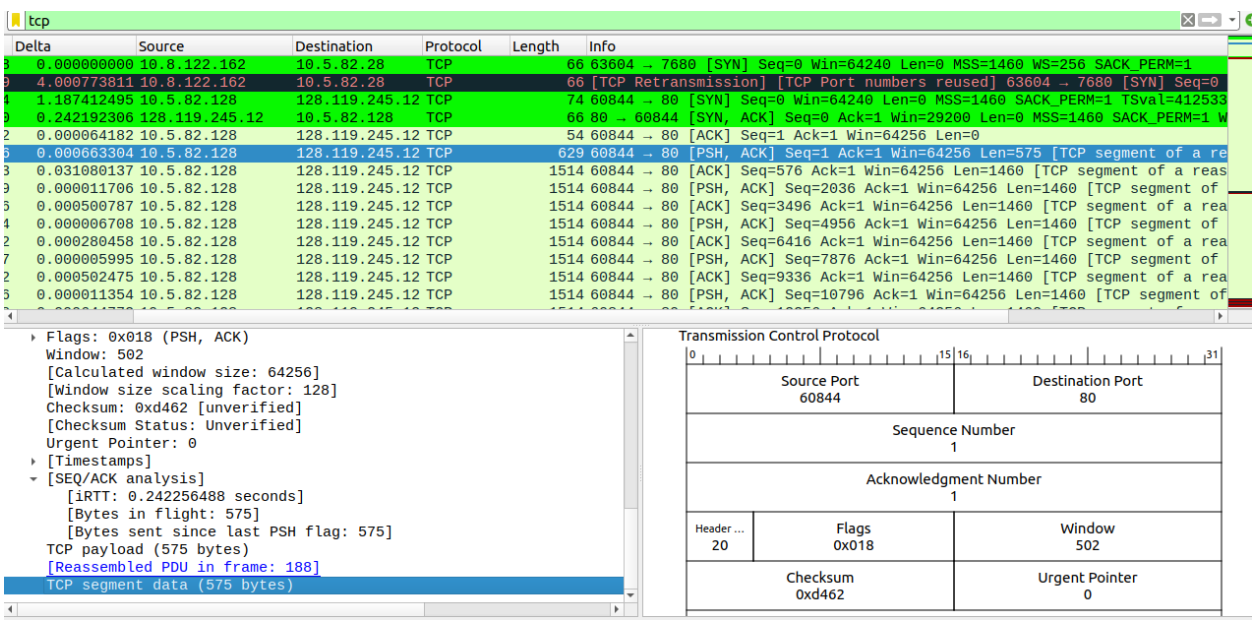
Q5:

Ans: Sequence number of TCP segment containing http post command is: 292307296



575 bytes of data is contained in this segment.

No, all the data is not transferred in this single segment

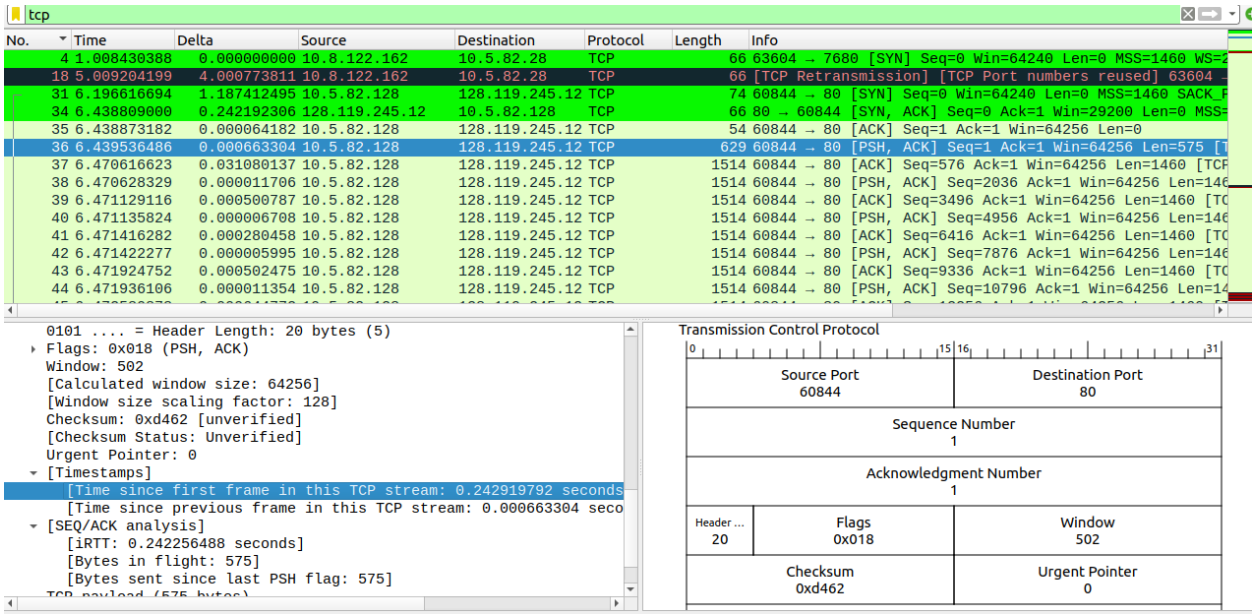


Q6:
Ans: The first segment in the data-transfer part of the TCP connection was sent at time 0.242919792 sec.

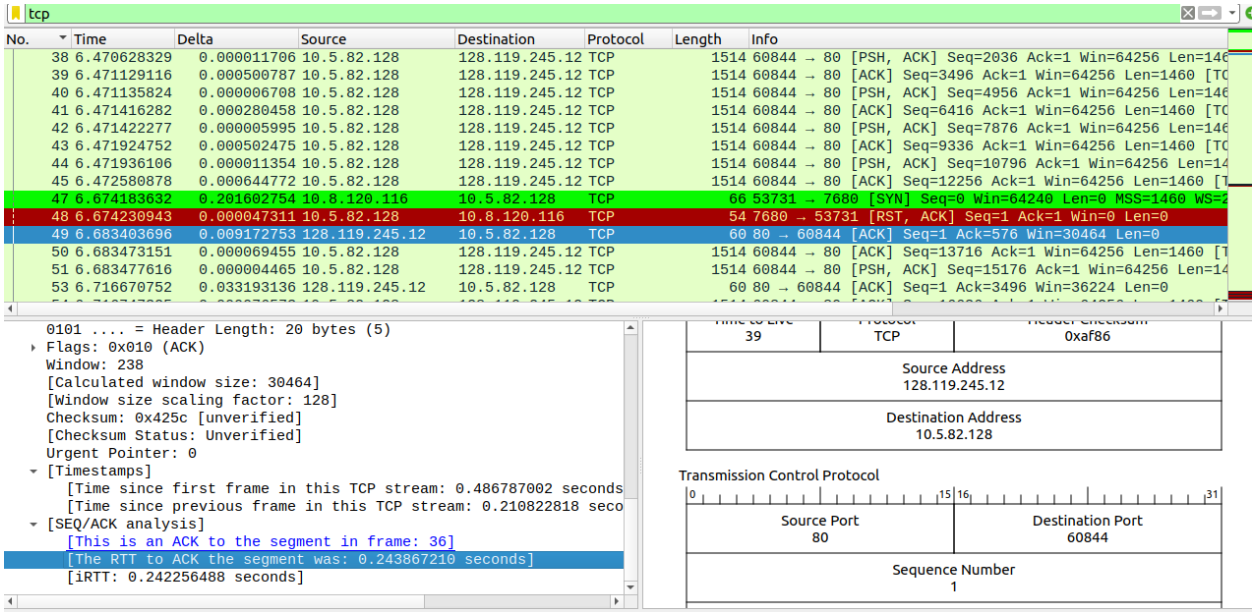
The ack was received at time 0.486787002 sec

RTT = 0.486787002-0.242919792
= 0.243867210 sec

Segment:



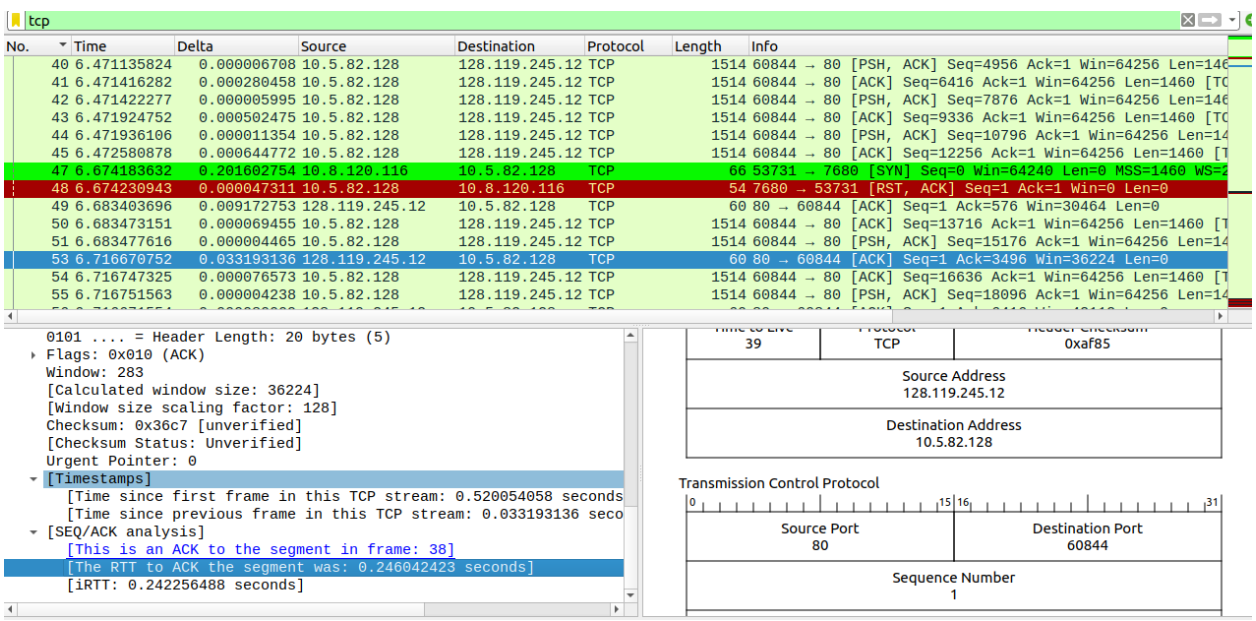
ACK:



For second segment:

Acknowledgment was received at time 0.520054058 sec. (Got ack for 2nd and 3rd segment)

RTT: 0.246042423 sec

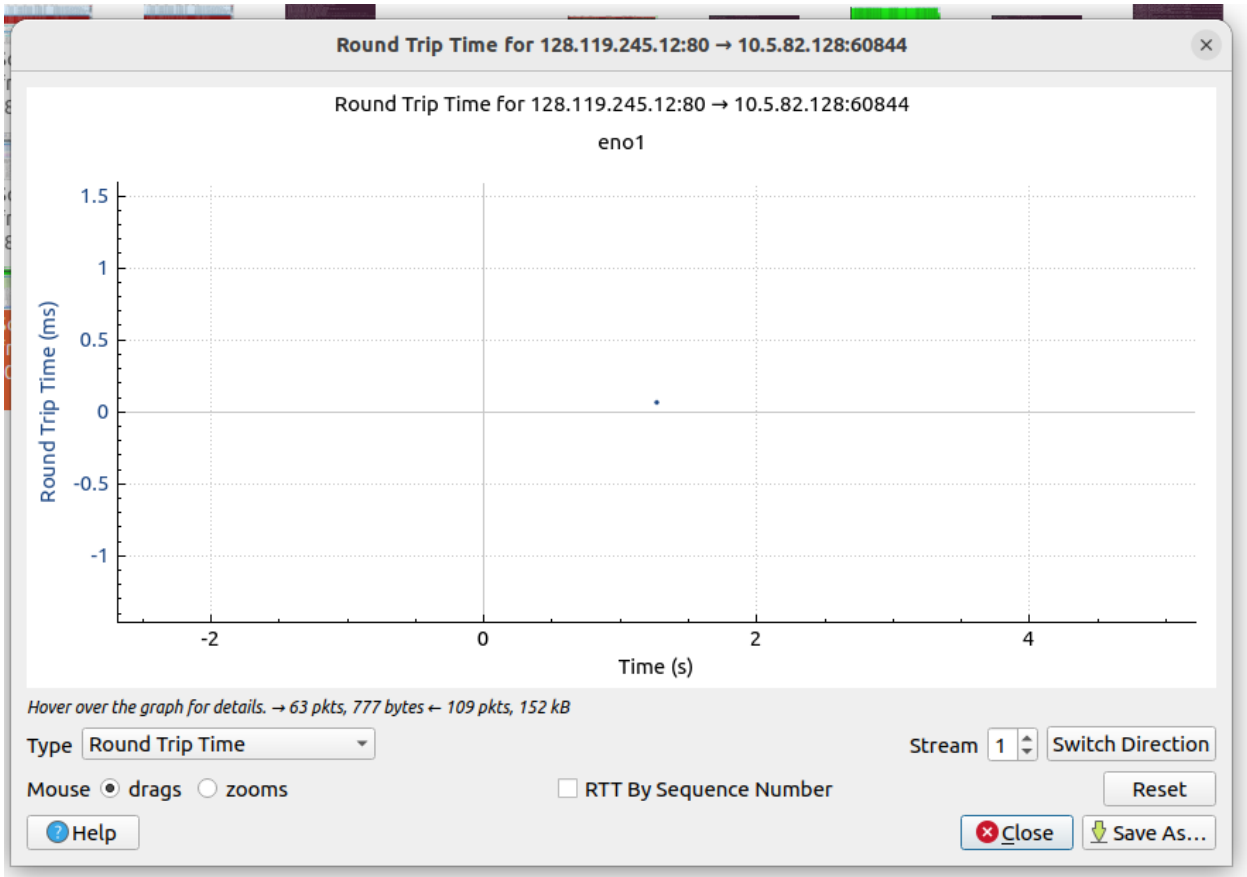


Calculating Estimated RTT after receiving 2nd segment:

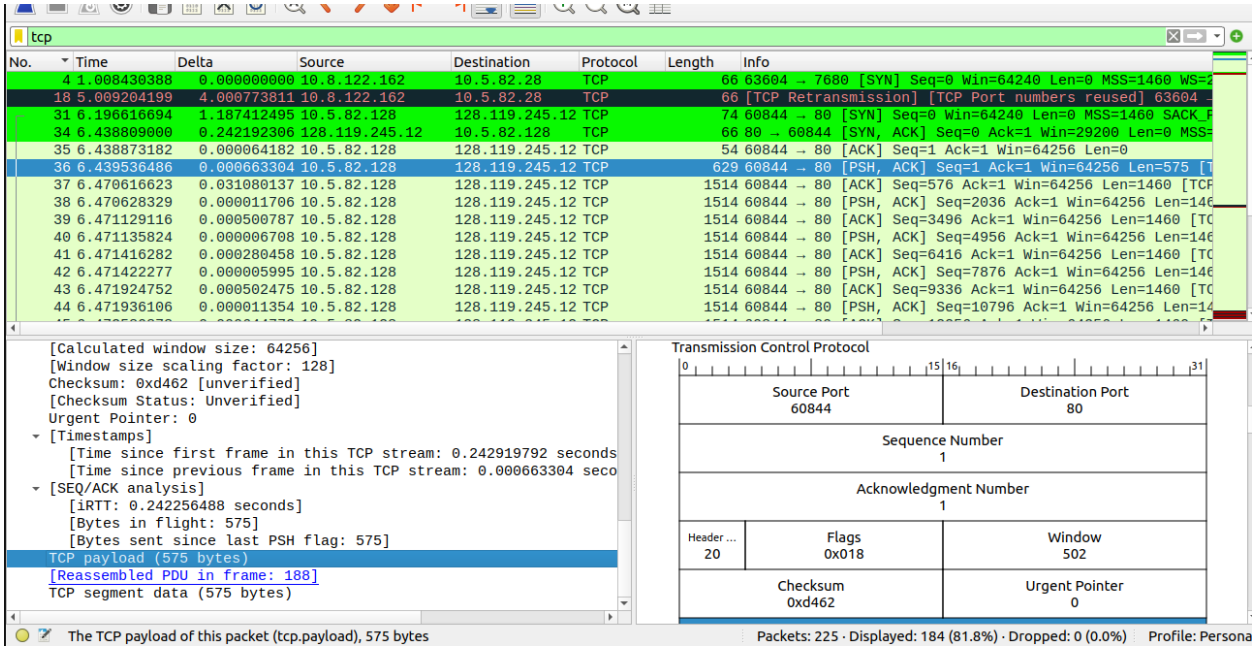
ERTT after 1st segment = 1st segment RTT = 0.243867210 sec

ERTT after 2nd segment = 0.875 * 0.243867210 + 0.125* 0.246042423

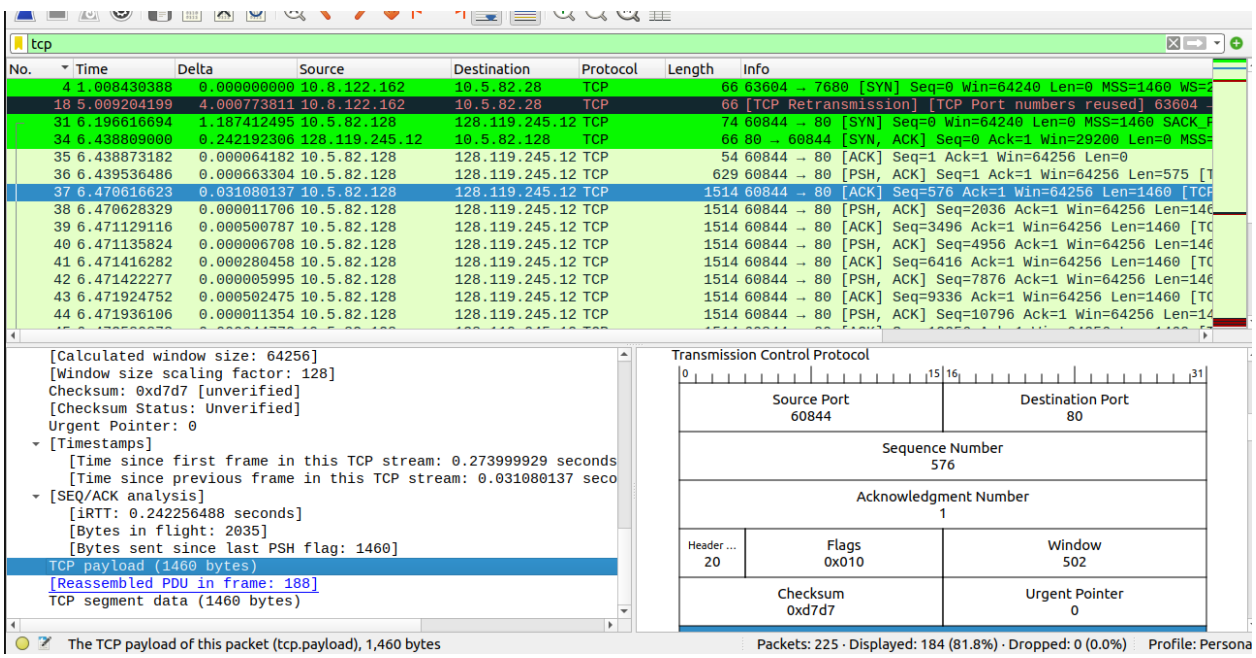
= 0.24413911 sec



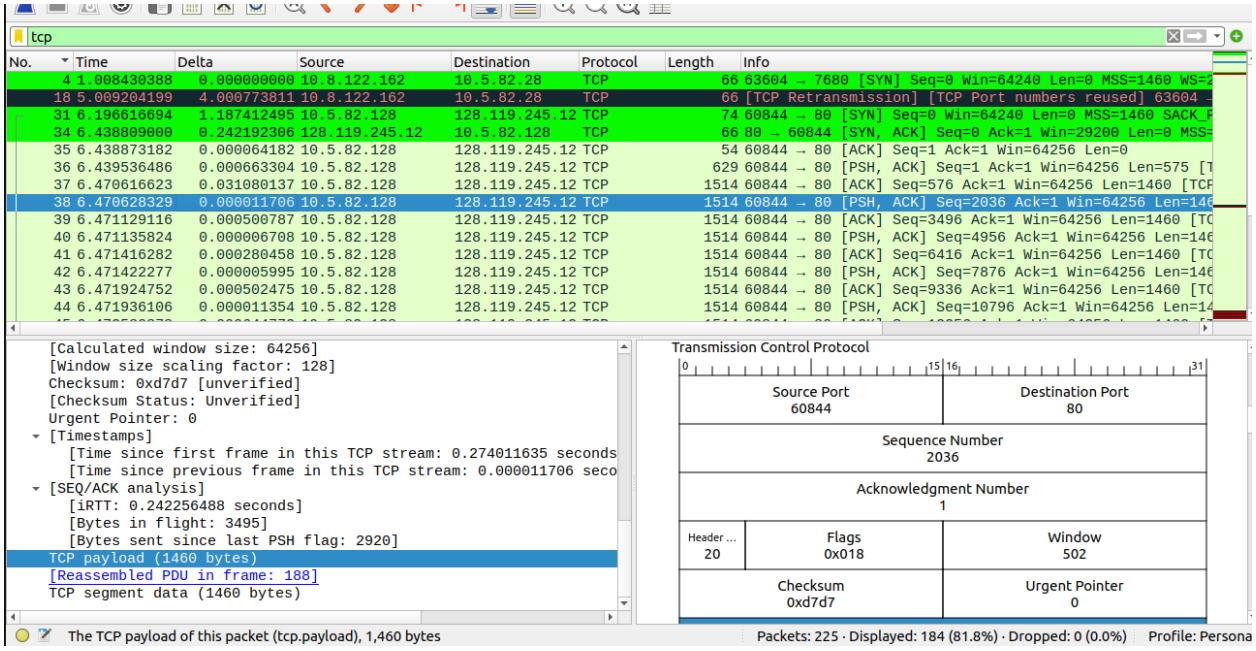
Q7:
Ans:
Length of 1st segment = 575+20 = 595 bytes



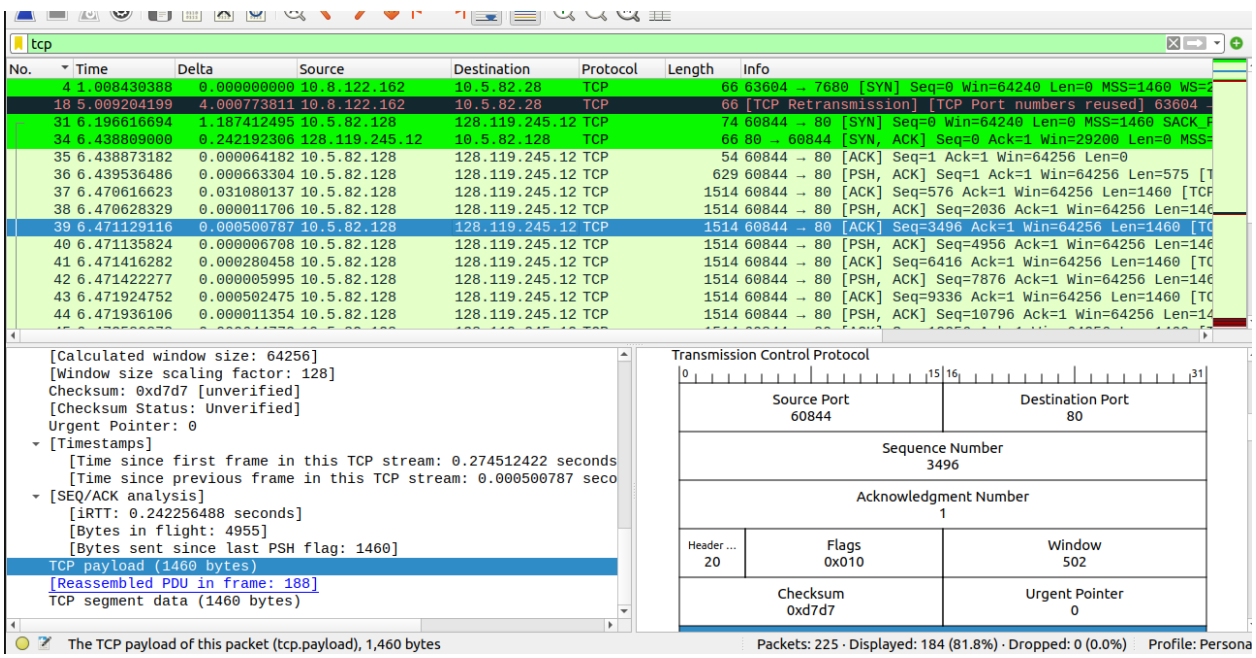
Length of 2nd segment = 1460+20 = 1480B



Length of 3rd segment = 1460+20 =1480B

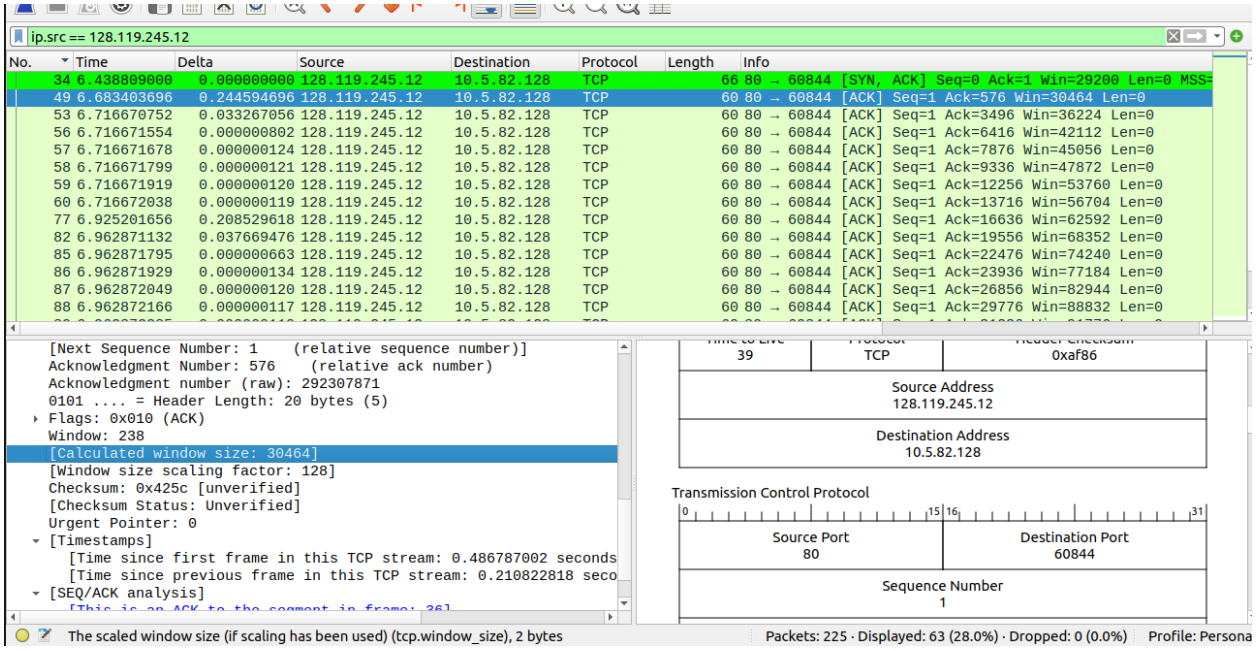


Length of 4th segment =1460+20 = 1480B



Q8:

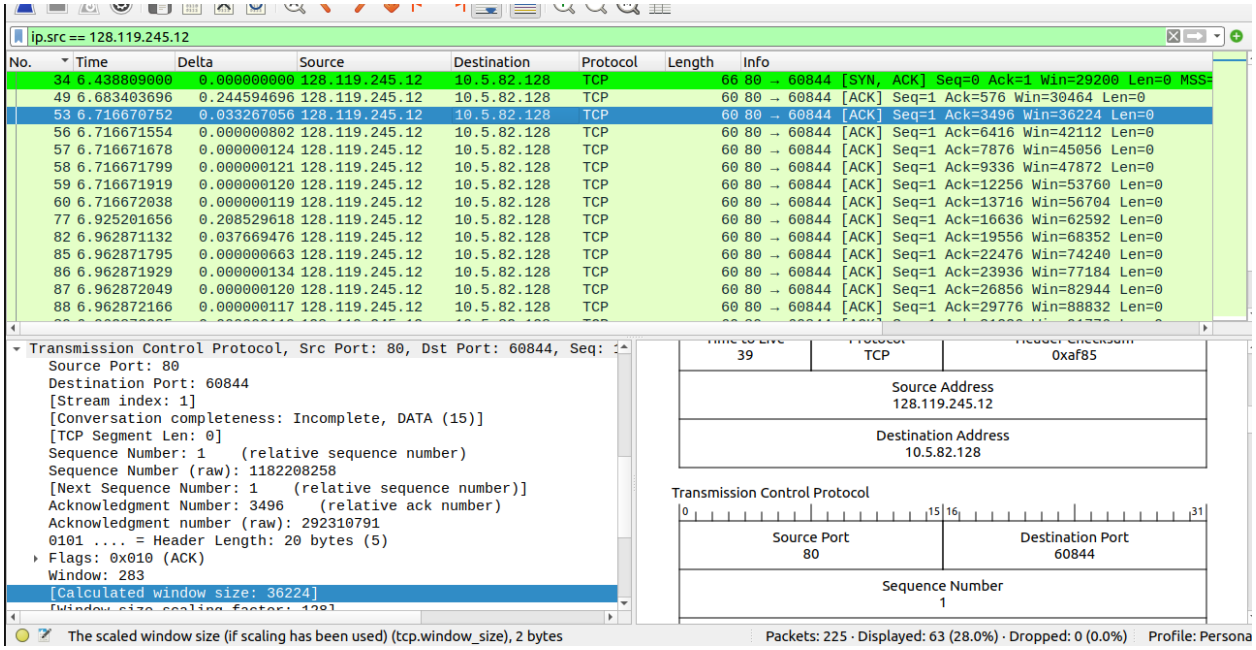
Ans: Minimum buffer space advertised to client was 30464B.
No, the sender never throttled for these first five data-carrying segments



Q9:
Ans: Minimum amount of buffer space advertised by client = 64240B.

Q10:
Ans: No there are no retransmitted segments in the trace file.
By using filter ‘ tcp.analysis.retransmission ‘ we can filter out the retransmitted segment.

Q11:
Ans: On an average in 1st 10 segments, receiver acknowledged for around 2920B, i.e for 2 segments client got the acknowledgement.
In 2, 3, 6 acknowledgement, receiver was Acking every other segment.



Q12:

Throughput is total bytes of data transferred over given period of time. So, we can calculate throughput by taking ratio of total no. of bytes transferred and total time taken by it.

Throughput= (152929 (last byte of last segment)- 0 (first byte of first segment))/ (1.265759078(last ack received)-0.242919792(when first byte was sent)

= 152929/1.022839286

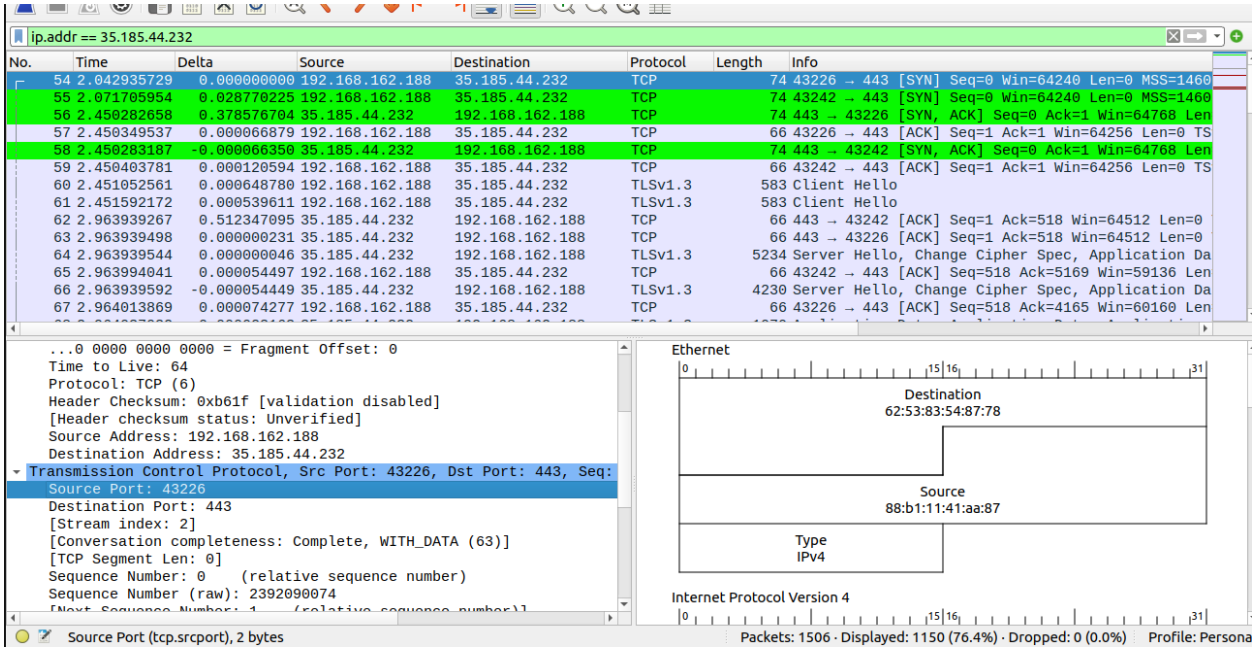
=149514.202 Bps

Part B:

Q1:

Ans: Client IP address: 192.168.162.188

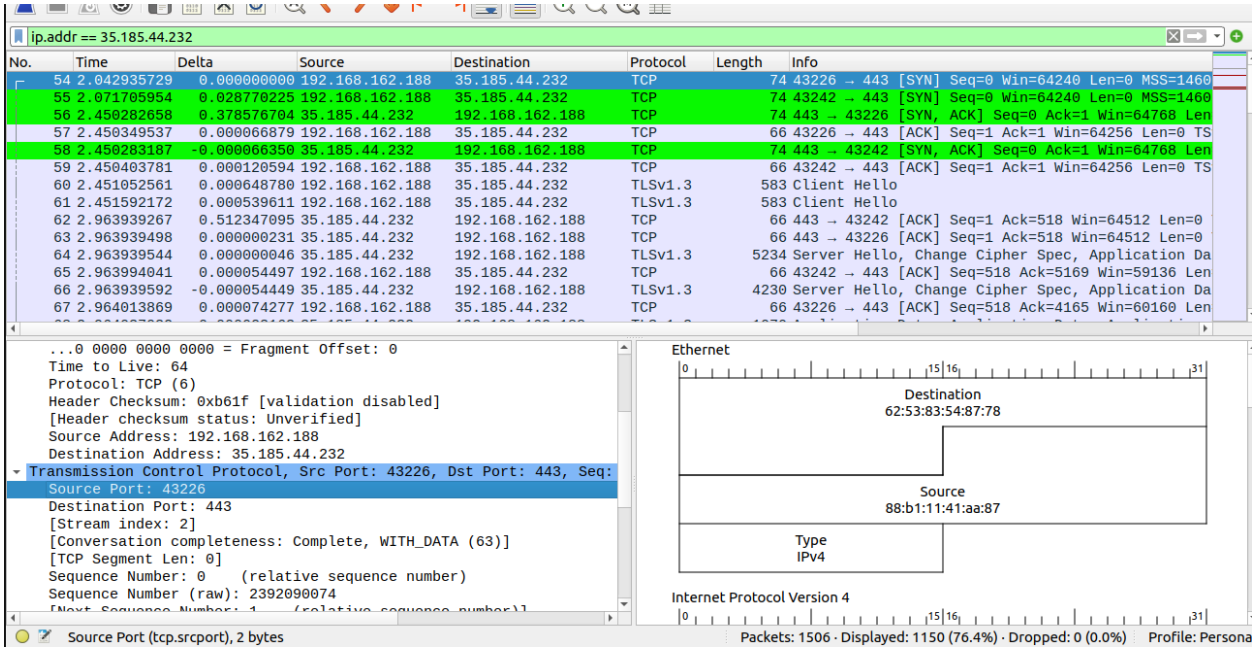
Port: 43226



Q2:

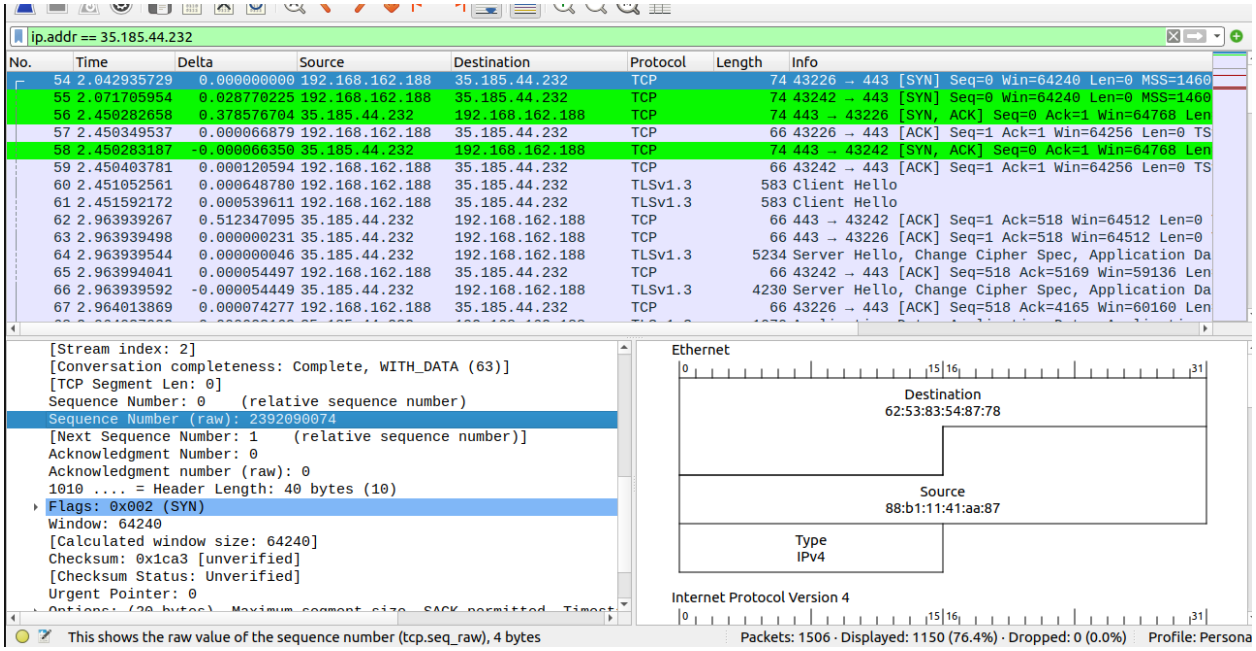
Ans: Server IP address:35.185.44.232

Port: 443

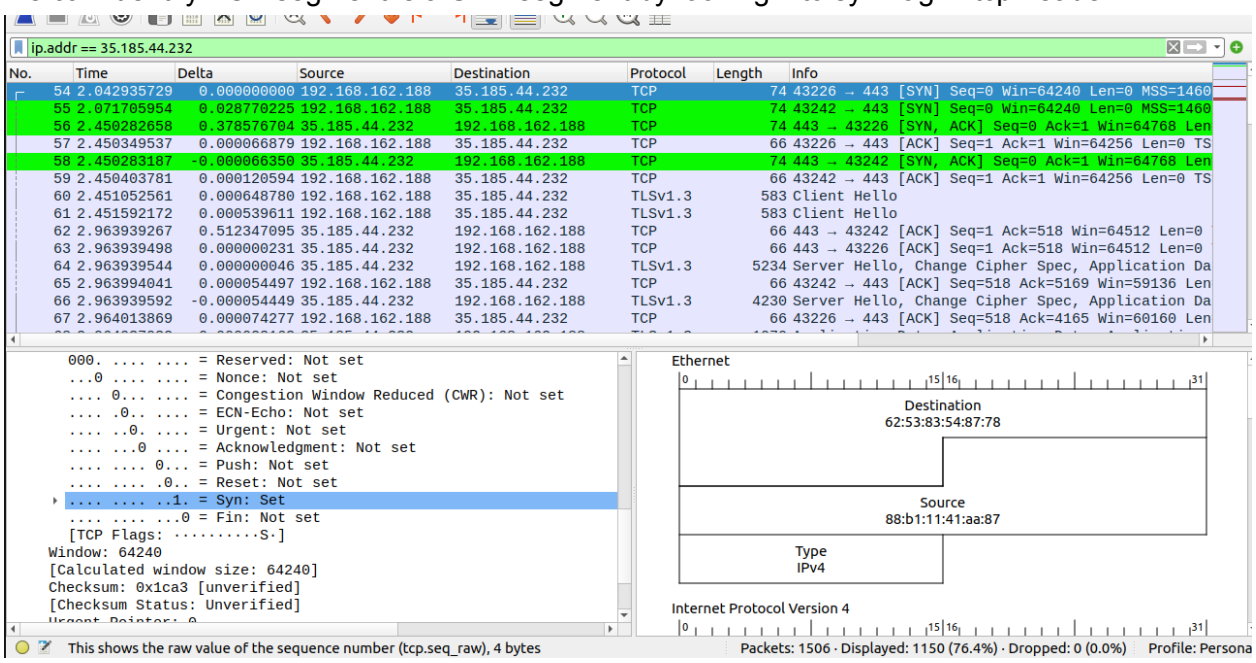


Q3:

Ans: Sequence Number of TCP SYN: 2392090074



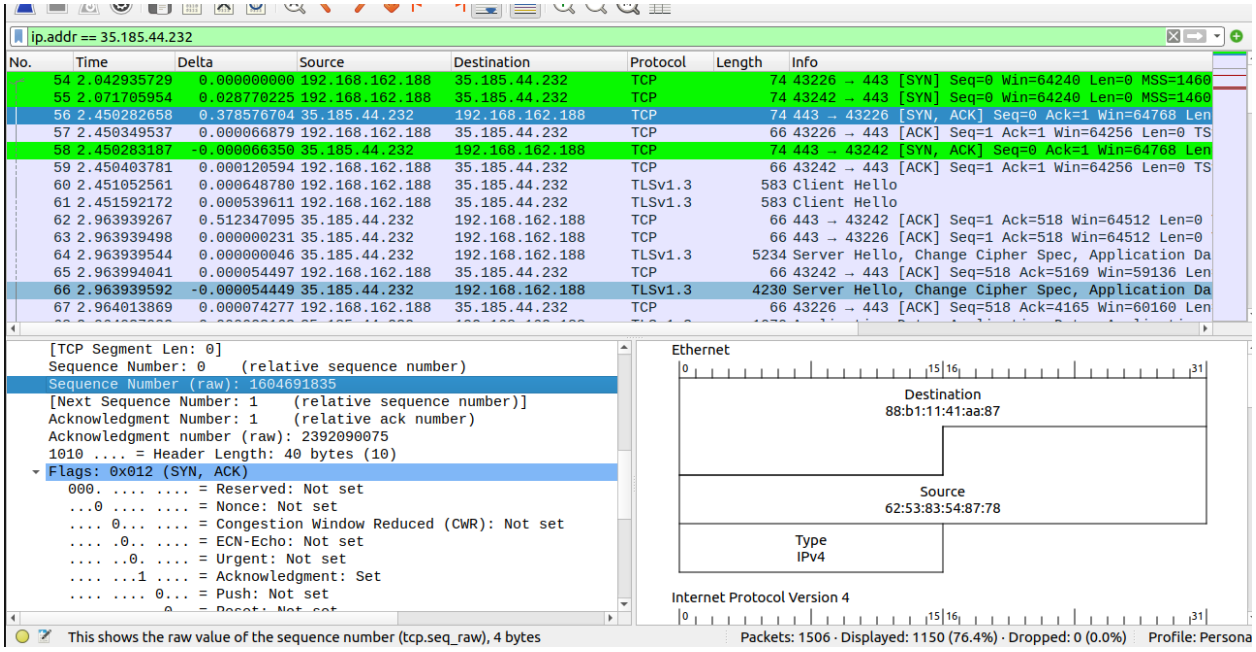
We can identify TCP segment is a SYN segment by looking into syn flag in tcp header



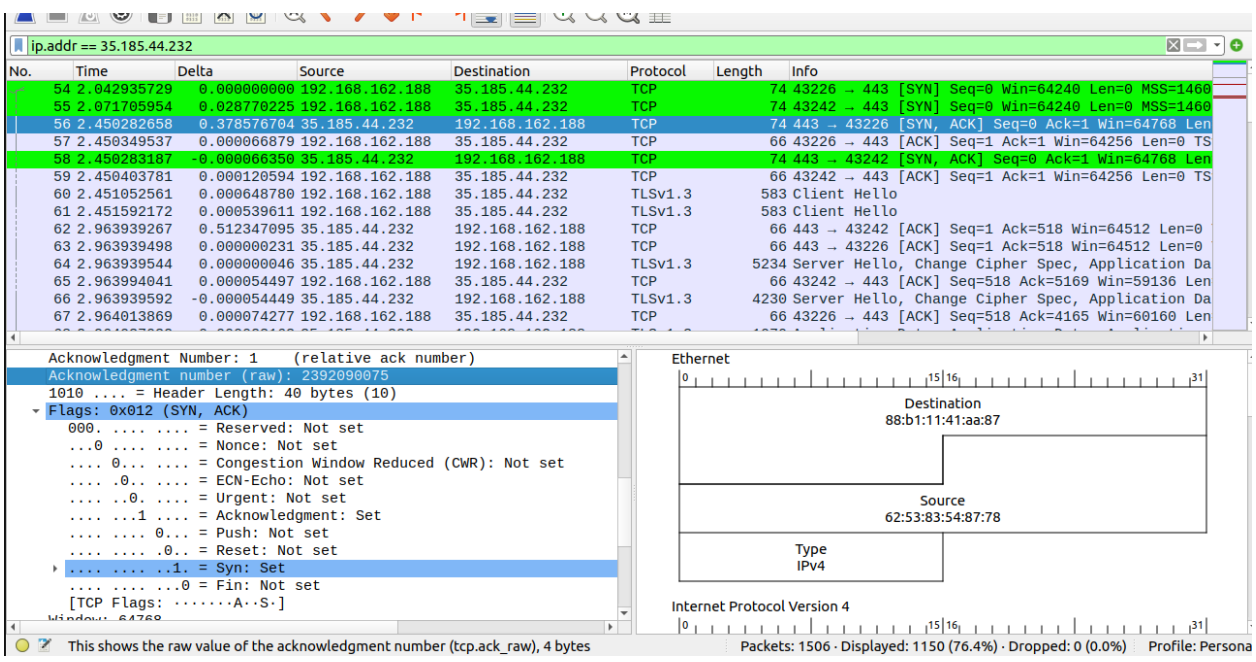
Yes, the TCP receiver in this session is able to use Selective Acknowledgments as we can see that acknowledgement as cumulative.

Q4:

Ans: Sequence number of SYNACK : 1604691835



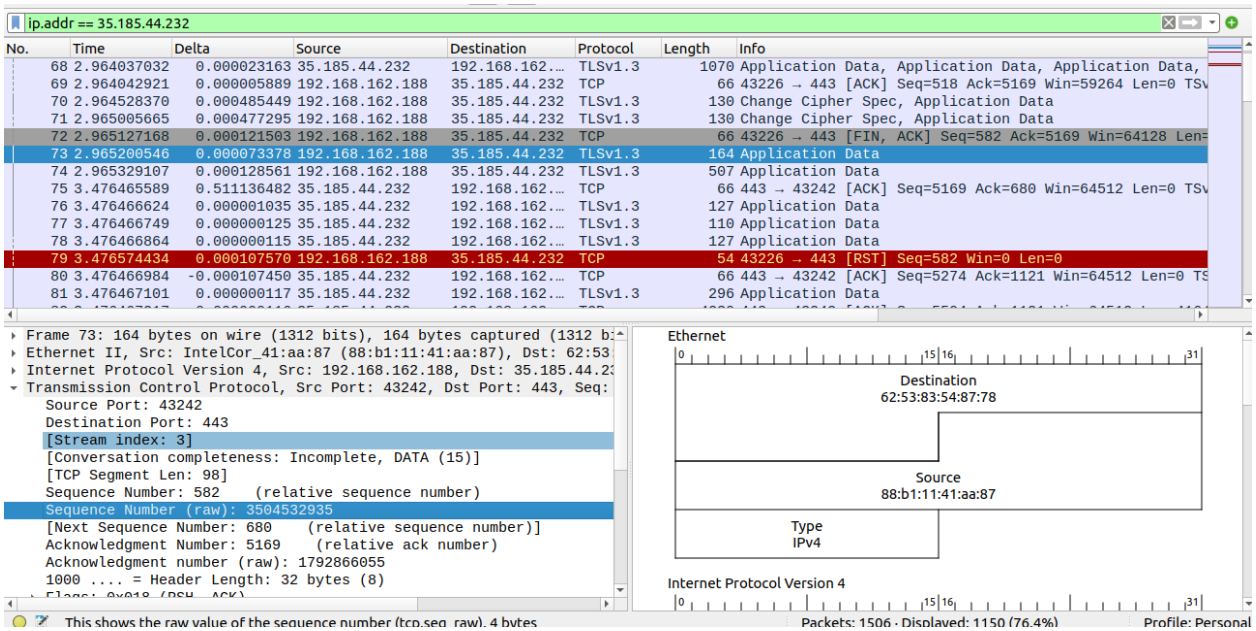
To identify the segment is SYNACK we can check the flags in tcp segment in which the ack and syn will be set to 1



The sequence number of acknowledgement field is 2392090075, it is obtained by adding 1 to the syn segment sequence number sent by the source.

Q5:

Ans: Value of TCP segment containing http get : 3504532935

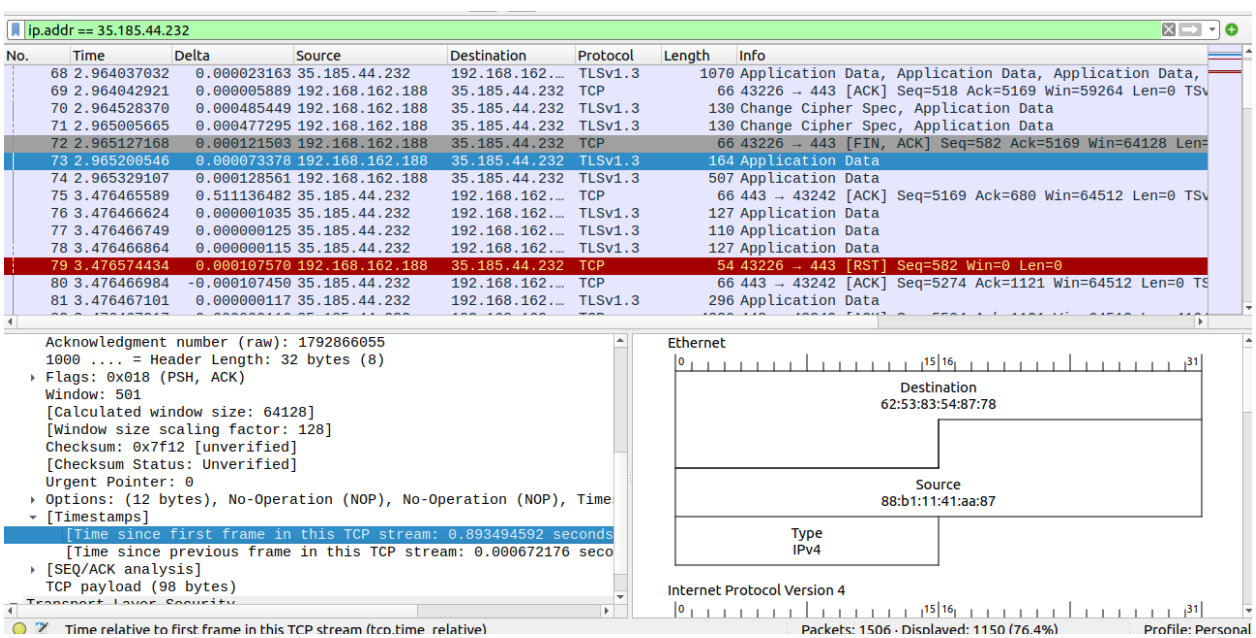


98 bytes of data is contained in this segment.

No, all the data is not transferred in this single segment

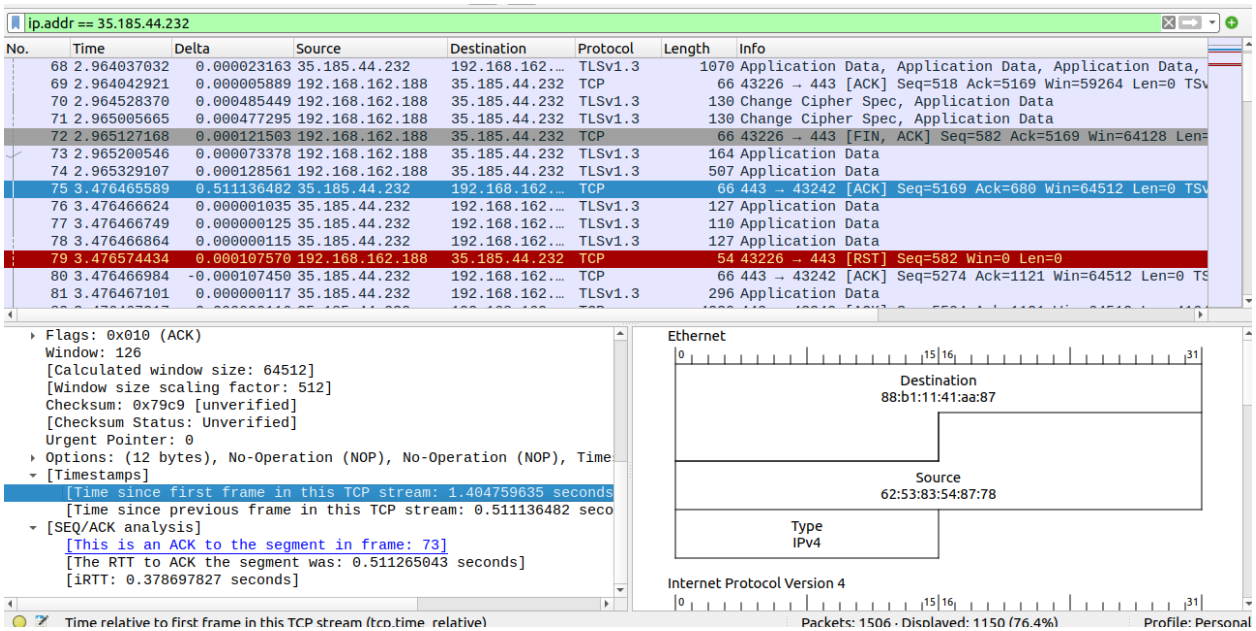
Q6:

Ans: The first segment in the data-transfer part of the TCP connection was sent at time 0.893494592 sec.

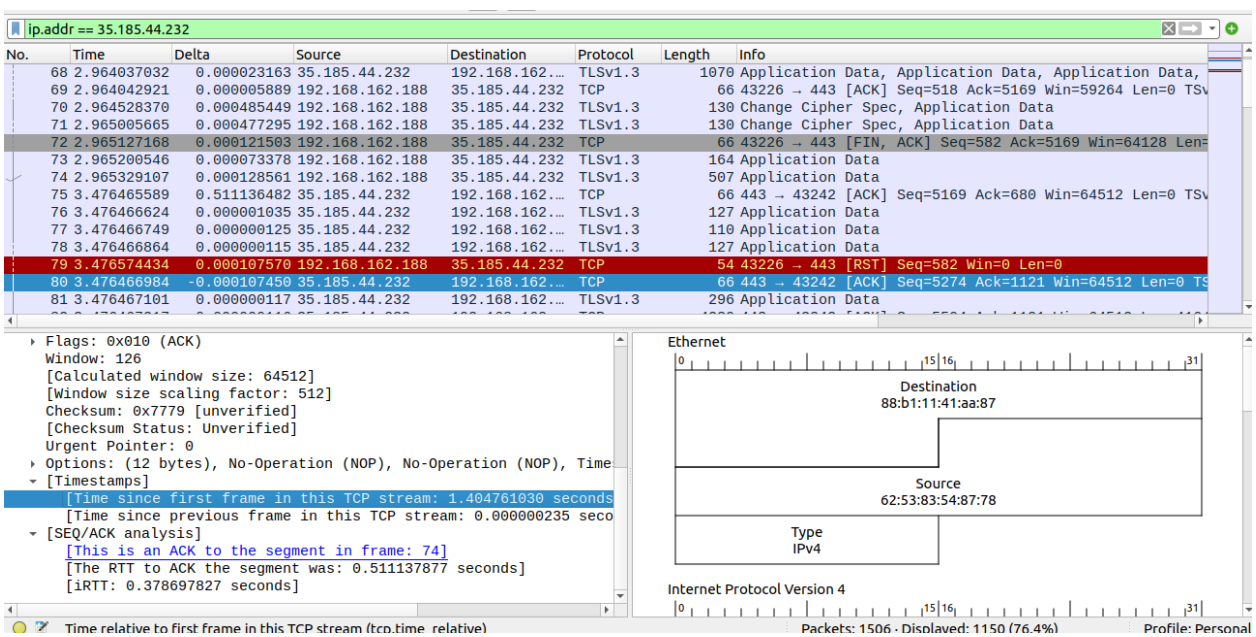


The ack was received at time 1.404759635 sec

RTT =0.511265043 sec

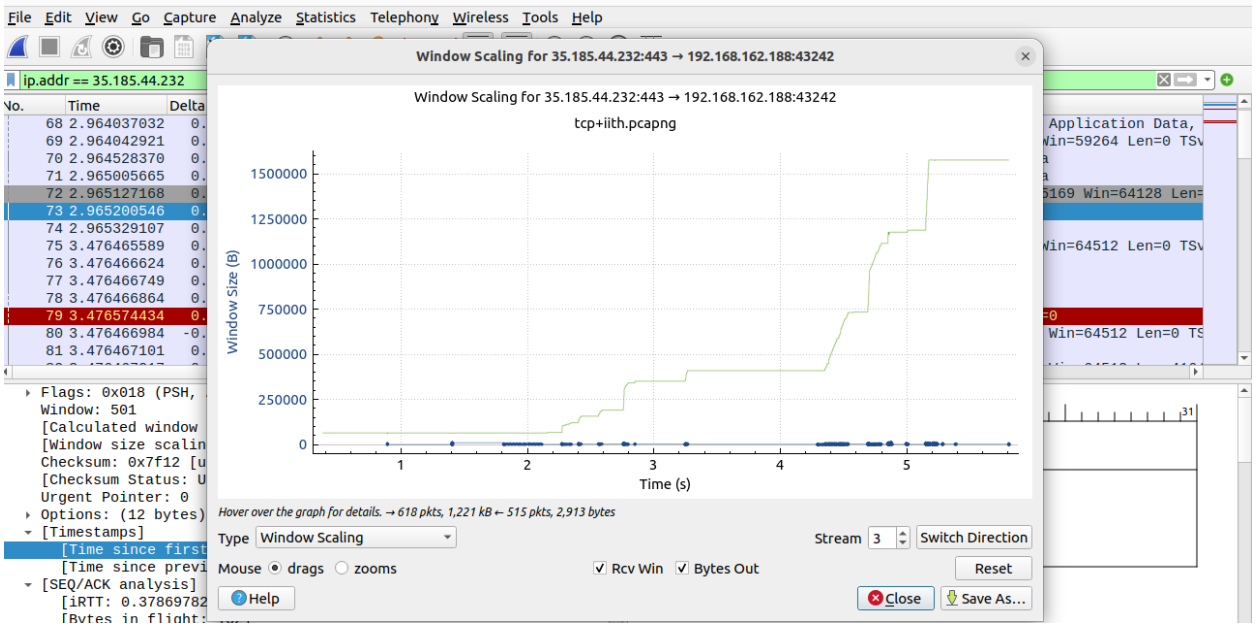


For second segment:
Acknowledgment was received at time 1.404761030 sec.
RTT: 0.511137877sec

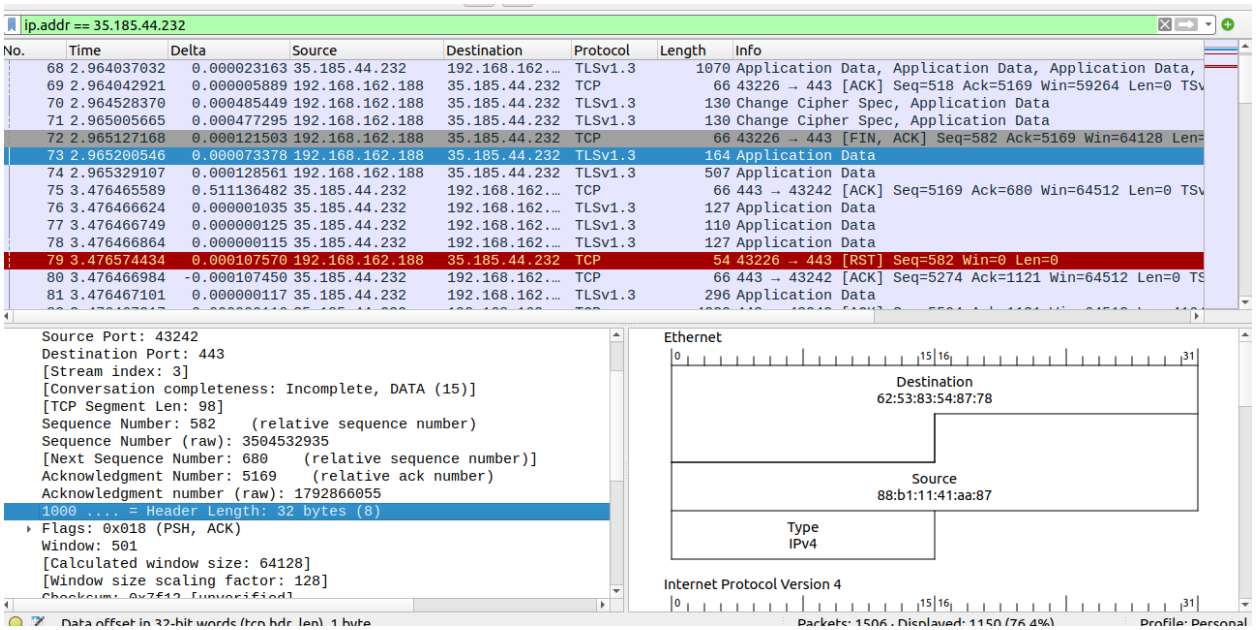


Calculating Estimated RTT after receiving 2nd segment:

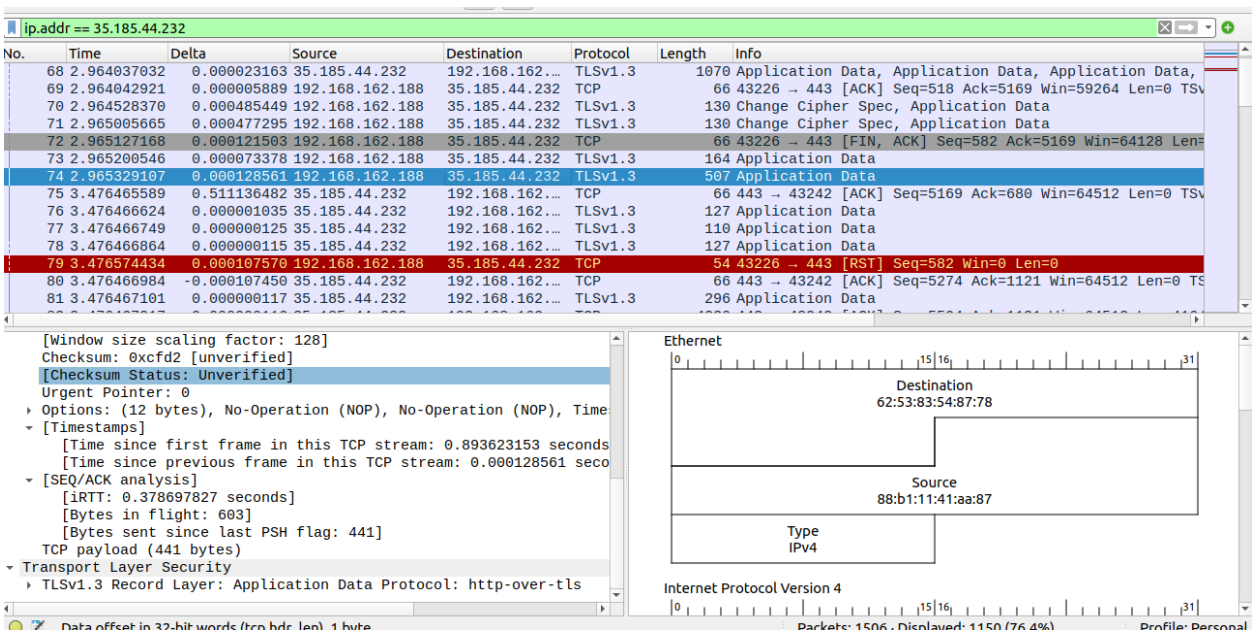
ERTT after 1st segment = 1st segment RTT = 0.893494592 sec
ERTT after 2nd segment = 0.875 * 0.893494592 + 0.125* 0.511137877
= 0.8457 sec



Q7:
Ans: There are only 2 segments for HTTP Get
Length of 1st segment = 98+32 = 130 bytes

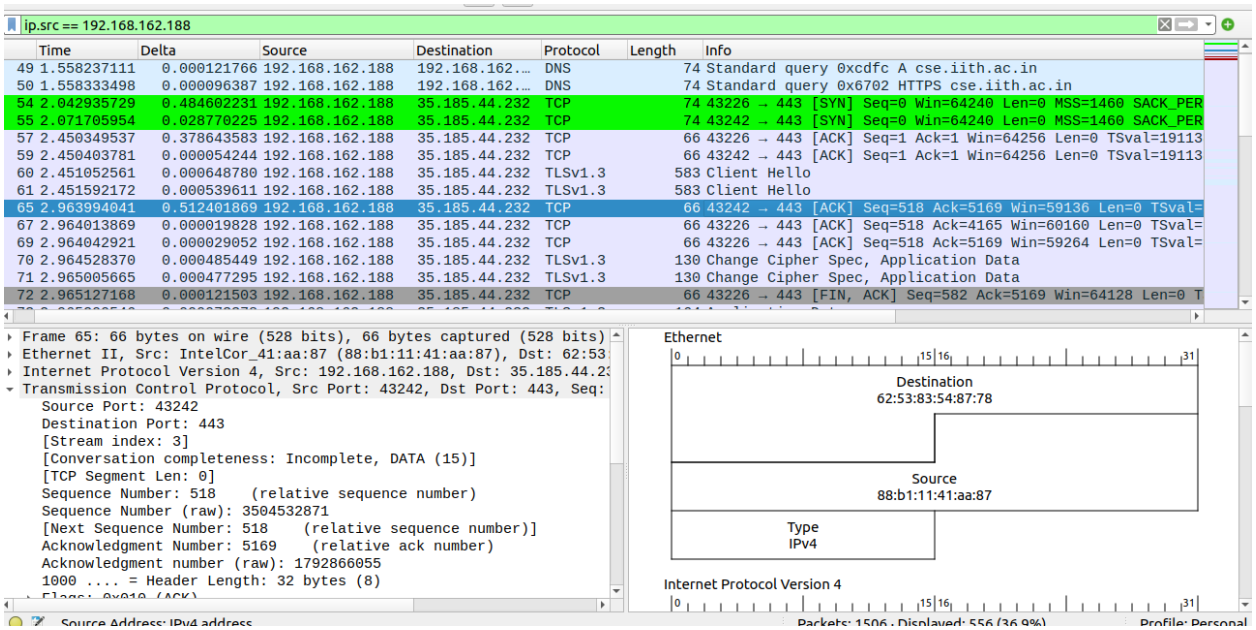


Length of 2nd segment = 441+32 = 473B



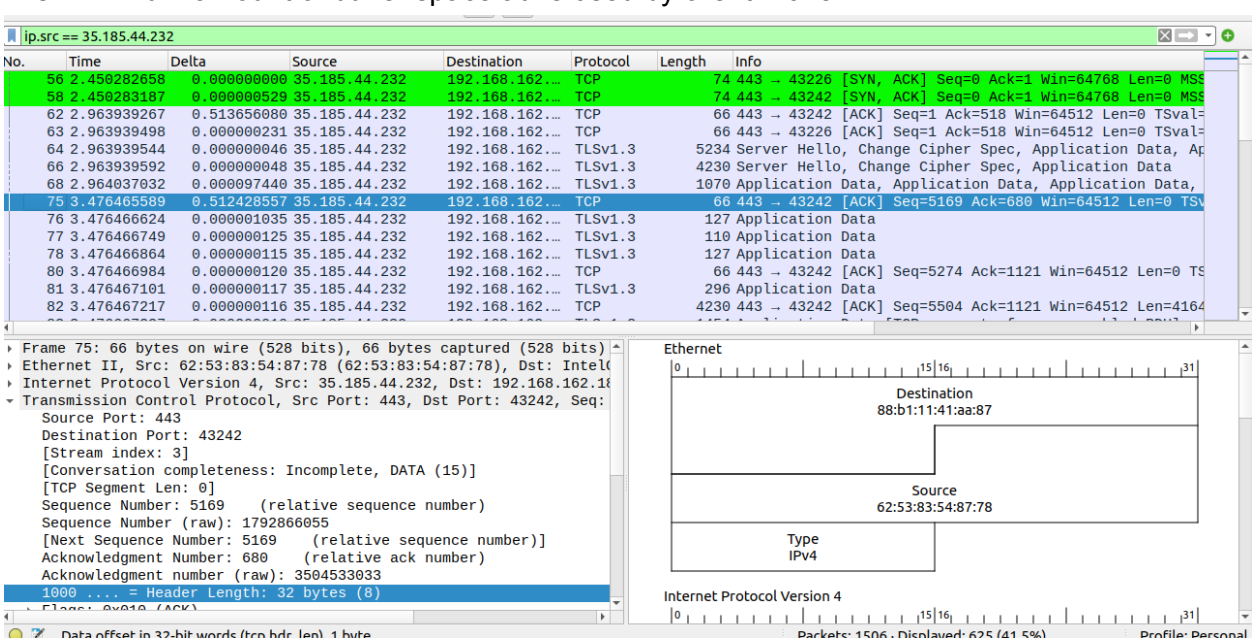
Q8:

Ans: Minimum buffer space advertised to client was 59136B.
No, the sender never throttled for these first five data-carrying segments



Q9:

Ans: Minimum amount of buffer space advertised by client = 64512B



Q10:

Ans: No there are no retransmitted segments in the trace file.

By using filter ‘ tcp.analysis.retransmission ‘ we can filter out the retransmitted segment.