

Activity 6.2 – Lab Computer Systems and Networking

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

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> [SEQ/ACK analysis]
TCP payload (1448 bytes)
[Reassembled PDU in frame: 153]
TCP segment data (1448 bytes)

0040 a1 ea 50 4f 53 54 20 2f 77 69 72 65 73 68 61 72 ..POST / wireshar
0050 6b 2d 6c 61 62 73 2f 6c 61 62 33 2d 31 2d 72 65 k-labs/1 ab3-1-re
0060 70 6c 79 2e 68 74 6d 20 48 54 54 50 2f 31 2e 31 ply.htm HTTP/1.1
0070 0d 0a 48 6f 73 74 3a 20 67 61 69 61 2e 63 73 2e ..Host: gaia.cs.
0080 75 6d 61 73 73 2e 65 64 75 0d 0a 55 73 65 72 2d umass.ed u..User-
0090 41 67 65 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 Agent: Mozilla/5
00a0 2e 30 20 28 4d 61 63 69 6e 74 6f 73 68 3b 20 49 .0 (Maci ntosh; I
00b0 6e 74 65 6c 20 4d 61 63 20 4f 53 20 58 20 31 30 ntel Mac OS X 10
00c0 2e 31 35 3b 20 72 76 3a 38 35 2e 30 29 20 47 65 .15; rv: 85.0) Ge
```

Figure 1. First TCP Segment that contains HTTP ‘POST’

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

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[Time since first frame in this TCP stream: 0.024047000 seconds]
[Time since previous frame in this TCP stream: 0.001542000 seconds]
[SEQ/ACK analysis]

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Answer: at 0.024047 second

No.	Time
1	0.000000
2	0.022414
3	0.022505
4	0.024047

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

4	0.024047	192.168.86.68	128.119.245.12	TCP	1514	55639	→ 80	[ACK]	Seq=1	Ack=1	Win=131712	Len=1448	TSval=725607532	TSecr=3913851370	[TCP
5	0.024048	192.168.86.68	128.119.245.12	TCP	1514	55639	→ 80	[ACK]	Seq=1449	Ack=1	Win=131712	Len=1448	TSval=725607532	TSecr=3913851370	[T
6	0.024049	192.168.86.68	128.119.245.12	TCP	1514	55639	→ 80	[ACK]	Seq=2897	Ack=1	Win=131712	Len=1448	TSval=725607532	TSecr=3913851370	[T
7	0.052671	128.119.245.12	192.168.86.68	TCP	66	80	→ 55639	[ACK]	Seq=1	Ack=1449	Win=31872	Len=0	TSval=3913851399	TSecr=725607532	
8	0.052676	128.119.245.12	192.168.86.68	TCP	66	80	→ 55639	[ACK]	Seq=1	Ack=2897	Win=34816	Len=0	TSval=3913851400	TSecr=725607532	
9	0.052774	192.168.86.68	128.119.245.12	TCP	1514	55639	→ 80	[ACK]	Seq=4345	Ack=1	Win=131712	Len=1448	TSval=725607560	TSecr=3913851399	[T

Answer: at 0.052671 second. Server (128.119.245.12) will gave us acknowledgement for the 3 TCP segments that we previously sent on index 4,5,6 to notify that first packet have successfully received

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

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[Time since previous frame in this TCP stream: 0.028622000
[SEQ/ACK analysis]
[This is an ACK to the segment in frame: 4]
[The RTT to ACK the segment was: 0.028624000 seconds]
[IRTT: 0.022505000 seconds]

```

Answer: RTT of first segment containing data is 0.028624, obtained from the formula of $RTT = 0.052671 - 0.024047 = 0.028624$

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

4 0.024048	frames have previous frame as their previous segment
5 0.024048	✓ [SEQ/ACK analysis]
7 0.052676	[This is an ACK to the segment in frame: 5]
8 0.052676	[The RTT to ACK the segment was: 0.028628000 seconds]
	[iRTT: 0.022505000 seconds]

Answer: RTT of second segment containing data is 0.028628, obtained from the formula of $RTT = 0.052676 - 0.024048 = 0.028628$

- What is the EstimatedRTT value 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 (page 236 of the attached PDF file in elok), and a value of $\alpha = 0.125$

Answer:

$$\text{EstimatedRTT} = (1 - \alpha) \cdot \text{EstimatedRTT} + \alpha \cdot \text{SampleRTT}$$

$$\text{EstimatedRTT} = (1 - 0.125) \cdot 0.028624 + 0.125 \cdot 0.028628$$

$$\text{EstimatedRTT} = 0.875 \cdot 0.028624 + 0.125 \cdot 0.028628$$

$$\text{EstimatedRTT} = 0.025046 + 0.0035785 = 0.0286245$$

Hence, $\text{EstimatedRTT} = 0.0286245$