

Lab Task: 09

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Subject: Computer Networks Lab

Submitted To Respected Ma'am: Hurmat Hidayat

Section: BCS-5B

#####786#####

1. What is the source and destination port numbers?

Answer:

Computer IP Address:

The computer IP Address is **192.168.1.122**

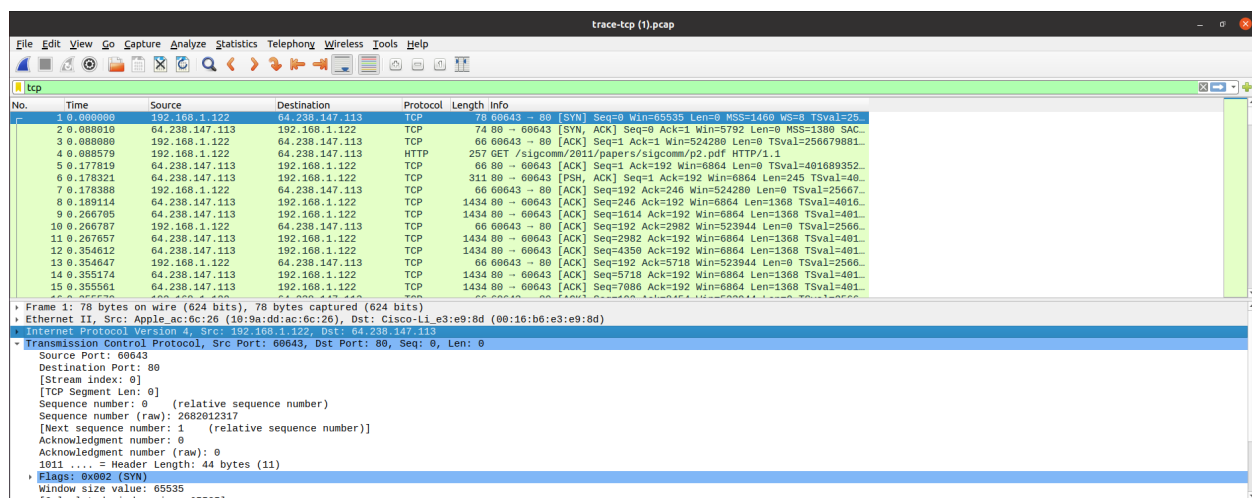
TCP Port:

The TCP Port is **60643**.

IP Address Of Destination Computer:

The IP Address of destination computer is **64.238.147.113**

Visual Demonstration:



Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 0, Len: 0

Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113

2. What is the sequence number of the TCP SYN segment that is used to initiate the TCP connection? What is it in the segment that identifies the segment as SYN segment?

Answer:

SYN Flag:

The SYN Flag is set to 1 and it indicates that this segment is a SYN segment.

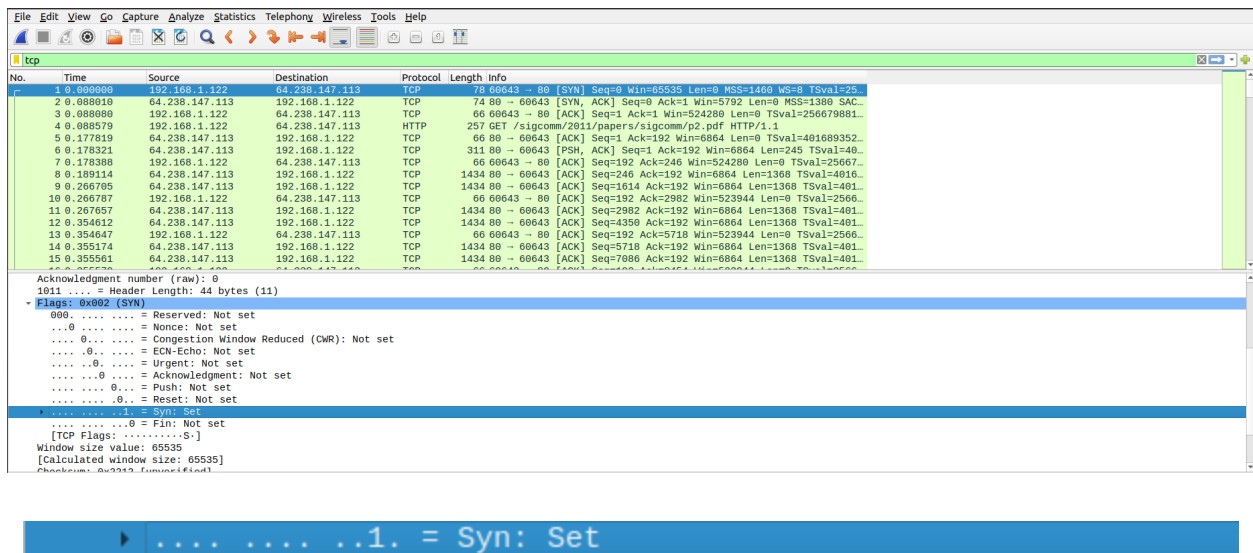
Sequence Number Of TCP SYN Segment:

The sequence number of the TCP SYN segment is used to initiate the TCP connection between the client computer and destination is:

Sequence Number: 64.238.147.113.

The value is “0” in the trace.

Visual Demonstration:



3. What is the sequence number of the SYNACK segment sent by the server.....?

Answer:

Sequence Number From Destination To Client Computer:

Sequence number of the SYNACK segment from destination to the client computer in reply to the SYN has the value of 0 in this trace.

Value Of Acknowledgement Field:

The value of acknowledgement field in the SYNACK segment is 1.

Calculating Acknowledgment Value:

The value of the Acknowledgement field in the SYNACK segment is determined by destination by adding 1 to the initial sequence number of SYN segment from the client

computer.

SYN Segment Initiated By Client Computer:

The sequence number of the SYN segment initiated by the client computer is 0.

SYN Flag And Acknowledgement Flag In The Segment:

The SYN flag and Acknowledgement flag in the segment are set to 1.

These flag indicate that this segment is a SYNACK Segment.

Visual Demonstration:

The image displays two screenshots of a Wireshark packet capture. The top screenshot shows a list of packets with the following details:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	66643 → 80 [SYN, Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008010	64.238.147.113	192.168.1.122	TCP	74	80 → 66643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008080	192.168.1.122	64.238.147.113	TCP	66	66643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 66643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 66643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	66643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 66643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 66643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	66643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 66643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 66643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	66643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 66643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 66643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

The bottom screenshot shows the details of the first packet (Frame 1):

- Frame 1: 78 bytes on wire (624 bits), 78 bytes captured (624 bits)
- Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (00:16:b0:e3:e9:8d)
- Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
- Transmission Control Protocol, Src Port: 66643, Dst Port: 80, Seq: 0, Len: 0
 - Source Port: 66643
 - Destination Port: 80
 - [Stream index: 0]
 - [TCP Segment Len: 0]
 - Sequence number: 0 (relative sequence number)
 - Sequence number (raw): 2682012317
 - [Next sequence number: 1 (relative sequence number)]
 - Acknowledgment number: 0
 - Acknowledgment number (raw): 0
 - 1011 = Header Length: 44 bytes (11)
 - Flags: 0x002 (SYN)
 - 000. = Reserved: Not set

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.000010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.000000	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.000579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1014 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

Sequence number (raw): 2682012317

[Next sequence number: 1 (relative sequence number)]

Acknowledgment number: 0

Acknowledgment number (raw): 0

1011 = Header Length: 44 bytes (11)

Flags: 0x002 (SYN)

0000 = Reserved: Not set

...0 = Nonce: Not set

....0 = Congestion Window Reduced (CWR): Not set

....0 = ECN-Echo: Not set

....0 = Urgent: Not set

....0 = Acknowledgment: Not set

....0 = Push: Not set

....0 = Reset: Not set

....0 = SYN: Set

....0 = FIN: Not set

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.000010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.000000	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.000579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1014 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

Frame 3: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)

Ethernet II, Src: Apple_ac:6c:26 (08:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d)

Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113

Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 1, Ack: 1, Len: 0

Source Port: 60643

Destination Port: 80

[Stream index: 0]

[TCP Segment Len: 0]

Sequence number: 1 (relative sequence number)

Sequence number (raw): 2682012318

[Next sequence number: 1 (relative sequence number)]

Acknowledgment number: 1 (relative ack number)

Acknowledgment number (raw): 349487777

1000 = Header Length: 32 bytes (8)

Flags: 0x010 (ACK)

0000 = Reserved: Not set

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.000010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.000000	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.000579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1014 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

Frame 4: 257 bytes on wire (2056 bits), 257 bytes captured (2056 bits)

Ethernet II, Src: Apple_ac:6c:26 (08:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d)

Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113

Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 1, Ack: 1, Len: 191

Source Port: 60643

Destination Port: 80

[Stream index: 0]

[TCP Segment Len: 191]

Sequence number: 1 (relative sequence number)

Sequence number (raw): 2682012318

[Next sequence number: 192 (relative sequence number)]

Acknowledgment number: 1 (relative ack number)

Acknowledgment number (raw): 349487777

1000 = Header Length: 32 bytes (8)

Flags: 0x018 (PSH, ACK)

0000 = Reserved: Not set

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

Frame 4: 257 bytes on wire (2056 bits), 257 bytes captured (2056 bits)
 Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d)
 Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
 Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 1, Ack: 1, Len: 191
 Source Port: 60643
 Destination Port: 80
 [Stream Index: 0]
 [TCP Segment Len: 191]
 Sequence number: 1 (relative sequence number)
 Sequence number (raw): 349487777
 [Next sequence number: 192 (relative sequence number)]
 Acknowledgment number: 1 (relative ack number)
 Acknowledgment number (raw): 349487777
 1000 = Header Length: 32 bytes (8)
 Flags: 0010 (PSH, ACK)
 0000 = Reserved: Not set

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

Answer:

Length Of The First TCP Segment:

The length of the first TCP segment is “191”.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

Frame 4: 257 bytes on wire (2056 bits), 257 bytes captured (2056 bits)
 Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d)
 Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
 Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 1, Ack: 1, Len: 191
 Hypertext Transfer Protocol

Length Of The Second TCP Segment:

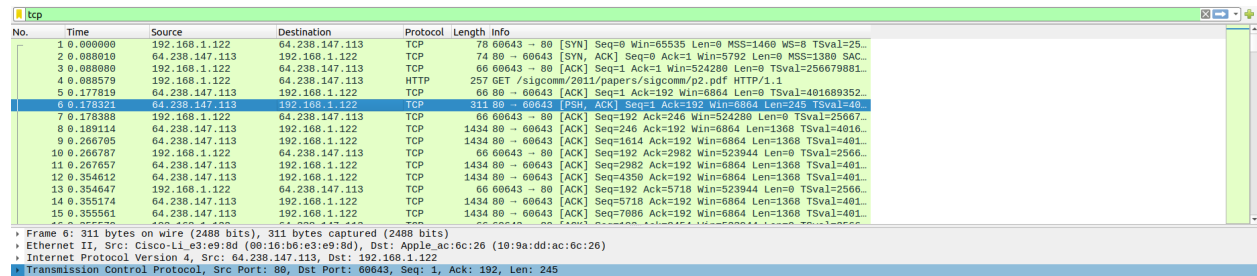
The length of the second TCP segment is “0”.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

Frame 5: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)
 Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:ac:6c:26)
 Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
 Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192, Len: 0

Length Of The Third TCP Segment:

The length of the third TCP segment is “245”.



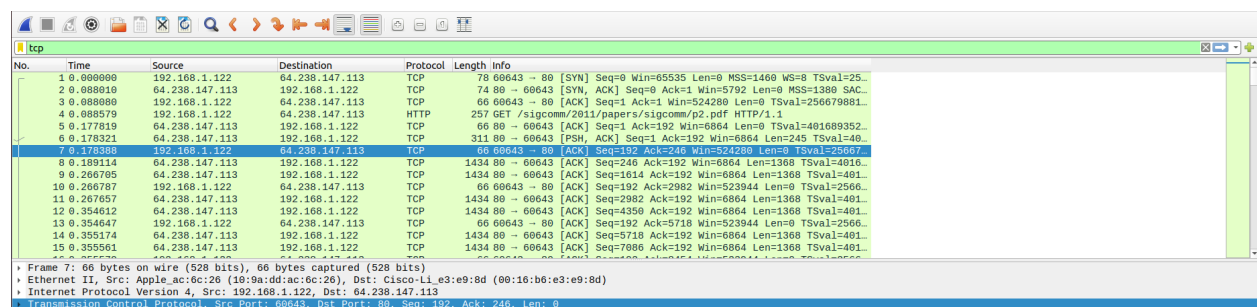
The image shows a Wireshark packet capture window with the 'tcp' filter applied. The packet list shows packet 6, which is a TCP segment. The packet details pane shows the 'Transmission Control Protocol' section, indicating the source port is 80, the destination port is 60643, the sequence number is 1, and the length is 245.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008810	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008880	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...

Frame 6: 311 bytes on wire (2488 bits), 311 bytes captured (2488 bits) on interface 0
Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:ac:6c:26)
Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192, Len: 245

Length Of The Fourth TCP Segment:

The length of the fourth TCP segment is “0”.



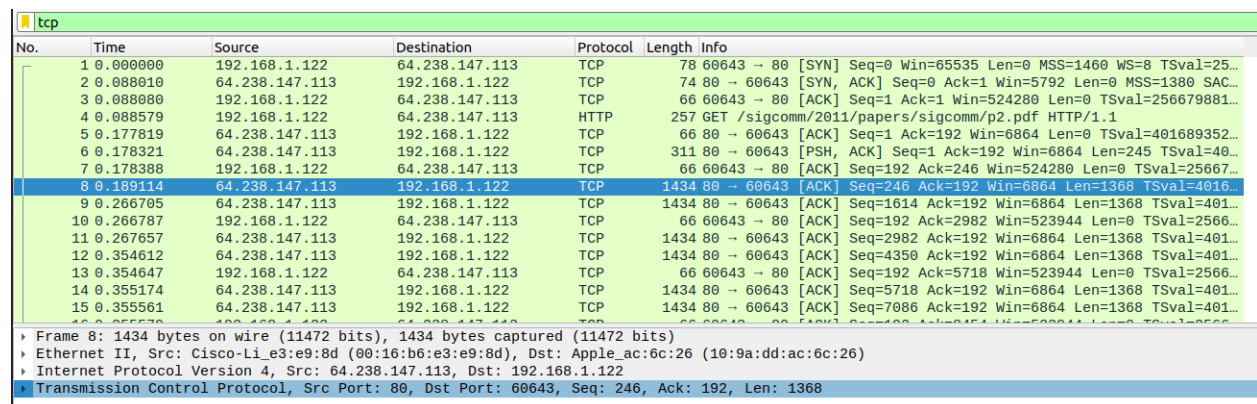
The image shows a Wireshark packet capture window with the 'tcp' filter applied. The packet list shows packet 7, which is a TCP segment. The packet details pane shows the 'Transmission Control Protocol' section, indicating the source port is 80, the destination port is 60643, the sequence number is 192, and the length is 0.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008810	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008880	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=6864 Len=0 TSval=25667...

Frame 7: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0
Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d)
Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 192, Ack: 246, Len: 0

Length Of The Fifth TCP Segment:

The length of the fifth TCP segment is “1368”.



The image shows a Wireshark packet capture window with the 'tcp' filter applied. The packet list shows packet 8, which is a TCP segment. The packet details pane shows the 'Transmission Control Protocol' section, indicating the source port is 80, the destination port is 60643, the sequence number is 246, and the length is 1368.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.008810	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.008880	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.008579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=6864 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...

Frame 8: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits) on interface 0
Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:ac:6c:26)
Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 246, Ack: 192, Len: 1368

Length Of The Sixth TCP Segment:

The length of the sixth TCP segment is “1368”.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

▶ Frame 9: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits)
 ▶ Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:ac:6c:26)
 ▶ Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
 ▶ Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1614, Ack: 192, Len: 1368

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

Answer:

In the packet number 5 and 6 the acknowledgment number is same so we can determine through this data that there was retransmission in the trace file.

Packet 5:

For packet 5 visual demonstration is below,

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=25...
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524280 Len=0 TSval=256679881...
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524280 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

▶ Frame 5: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)
 ▶ Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:ac:6c:26)
 ▶ Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
 ▶ Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192, Len: 0
 Source Port: 80
 Destination Port: 60643
 [Stream index: 0]
 [TCP Segment Len: 0]
 Sequence number: 1 (relative sequence number)
 Sequence number (raw): 349407777
 [Next sequence number: 1 (relative sequence number)]
 Acknowledgment number: 192 (relative ack number)
 Acknowledgment number (raw): 2082012509
 1000 = Header Length: 32 bytes (8)
 ▶ Flags: 0x010 (ACK)
 0000 = Reserved: Not set
 0 = Nagano Nag-ot

Packet 6:

For packet 6 visual demonstration is below,

tcp						
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=0 TSval=25...
2	0.000010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1380 SAC...
3	0.000080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=1 Ack=1 Win=524288 Len=0 TSval=256679881...
4	0.000579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm/2011/papers/sigcomm/p2.pdf HTTP/1.1
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [ACK] Seq=1 Ack=192 Win=6864 Len=0 TSval=401689352...
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [PSH, ACK] Seq=1 Ack=192 Win=6864 Len=245 TSval=40...
7	0.178386	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=246 Win=524288 Len=0 TSval=25667...
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=246 Ack=192 Win=6864 Len=1368 TSval=4016...
9	0.266785	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=1614 Ack=192 Win=6864 Len=1368 TSval=401...
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=2982 Win=523944 Len=0 TSval=2566...
11	0.267057	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=2982 Ack=192 Win=6864 Len=1368 TSval=401...
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=4350 Ack=192 Win=6864 Len=1368 TSval=401...
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [ACK] Seq=192 Ack=5718 Win=523944 Len=0 TSval=2566...
14	0.355174	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=5718 Ack=192 Win=6864 Len=1368 TSval=401...
15	0.355561	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [ACK] Seq=7086 Ack=192 Win=6864 Len=1368 TSval=401...

▶ Frame 6: 311 bytes on wire (2488 bits), 311 bytes captured (2488 bits)
 ▶ Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:ac:6c:26)
 ▶ Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
 ▶ Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192, Len: 245
 Source Port: 80
 Destination Port: 60643
 [Stream Index: 0]
 [TCP Segment Len: 245]
 Sequence number: 1 (relative sequence number)
 Sequence number (raw): 349487777
 [Next sequence number: 246 (relative sequence number)]
 Acknowledgment number: 192 (relative ack number)
 Acknowledgment number (raw): 2682012509
 1000 = Header Length: 32 bytes (8)
 Flags: 0x018 (PSH, ACK)
 0000 = Reserved: Not set
 = Window: Not set

END.....