

Lab 3: Wireshark

- 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).

The source IP address for the client computer is 192.168.1.102 and the source TCP port is 1161.

The image shows a Wireshark packet capture window titled 'tcp-ethereal-trace-1'. The packet list on the left shows several packets, with packet 199 selected. The packet details pane on the right shows the structure of the selected packet:

- Frame 199: 104 bytes on wire (832 bits), 104 bytes captured (832 bits)
- Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
- Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12
 - 0100 = Version: 4
 - 0101 = Header Length: 20 bytes (5)
 - > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
 - Total Length: 90
 - Identification: 0x1e9a (7834)
 - > Flags: 0x4000, Don't fragment
 - Time to live: 128
 - Protocol: TCP (6)
 - Header checksum: 0xa471 [validation disabled]
 - [Header checksum status: Unverified]
 - Source: 192.168.1.102
 - Destination: 128.119.245.12
- Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 164041, Ack: 1, Len: 50
 - Source Port: 1161
 - Destination Port: 80
 - [Stream index: 0]
 - [TCP Segment Len: 50]
 - Sequence number: 164041 (relative sequence number)
 - [Next sequence number: 164091 (relative sequence number)]
 - Acknowledgment number: 1 (relative ack number)
 - 0101 = Header Length: 20 bytes (5)
 - > Flags: 0x018 (PSH, ACK)
 - Window size value: 17520

The packet bytes pane at the bottom shows the raw data of the selected packet, with the source IP address 192.168.1.102 highlighted in blue.

- 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?

The destination IP address for gaia.cs.umass.edu is 128.119.245.12 and the destination TCP port is 80.

tcp-ethereal-trace-1

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No.	Time	Source	Destination	Protocol	Length	Info
195	06:44:25.770633	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=160849 Ack=1 Win=17520 Len=1460 [TCP segment of a reass...
196	06:44:25.771531	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=162309 Ack=1 Win=17520 Len=1460 [TCP segment of a reass...
197	06:44:25.772405	192.168.1.102	128.119.245.12	TCP	326	1161 → 80 [PSH, ACK] Seq=163769 Ack=1 Win=17520 Len=272 [TCP segment of a reass...
198	06:44:25.867638	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=159389 Win=62780 Len=0
199	06:44:25.867722	192.168.1.102	128.119.245.12	HTTP	104	POST /ethereal-labs/lab3-1-reply.htm HTTP/1.1 (text/plain)
200	06:44:25.959852	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=162309 Win=62780 Len=0
201	06:44:26.018268	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=164041 Win=62780 Len=0
202	06:44:26.026211	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=164091 Win=62780 Len=0
203	06:44:26.031556	128.119.245.12	192.168.1.102	HTTP	784	HTTP/1.1 200 OK (text/html)
204	06:44:26.168471	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1

> Frame 199: 104 bytes on wire (832 bits), 104 bytes captured (832 bits)

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

0100 = Version: 4

... 0101 = Header Length: 20 bytes (5)

> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)

Total Length: 90

Identification: 0x1e9a (7834)

> Flags: 0x4000, Don't fragment

Time to live: 128

Protocol: TCP (6)

Header checksum: 0xa471 [validation disabled]

[Header checksum status: Unverified]

Source: 192.168.1.102

Destination: 128.119.245.12

> Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 164041, Ack: 1, Len: 50

Source Port: 1161

Destination Port: 80

[Stream index: 0]

[TCP Segment Len: 50]

Sequence number: 164041 (relative sequence number)

[Next sequence number: 164091 (relative sequence number)]

Acknowledgment number: 1 (relative ack number)

0101 = Header Length: 20 bytes (5)

> Flags: 0x018 (PSH, ACK)

Window size value: 17520

0010 00 5a 1e 9a 40 00 80 06 a4 71 c0 a8 01 66 80 77 ·Z·@·...·q···f·w·

Frame (104 bytes) Reassembled TCP (164090 bytes)

Destination (ip.dst), 4 bytes

Packets: 213 · Displayed: 213 (100.0%) Profile: Default

3) If you have been able to create your own trace, answer the following question: What is the IP address and TCP port number used by your client computer (source) to transfer the file to gaia.cs.umass.edu?

The source IP address for my client computer is 192.168.10.2 and the source TCP port is 3901.

Wireshark packet capture analysis of a TCP connection. The packet list shows a SYN segment (No. 160) from 192.168.10.2 to 128.119.245.12. The packet details pane shows the Internet Protocol Version 4 and Transmission Control Protocol fields. The packet bytes pane shows the raw data of the SYN segment.

No.	Time	Source	Destination	Protocol	Length	Info
160	22:04:19.504354	192.168.10.2	128.119.245.12	TCP	1514	3901 → 80 [ACK] Seq=145943 Ack=1 Win=65536 Len=1460 [TCP segment of a reass...
161	22:04:19.504406	128.119.245.12	192.168.10.2	TCP	54	80 → 3901 [ACK] Seq=1 Ack=81002 Win=173696 Len=0
162	22:04:19.504431	192.168.10.2	128.119.245.12	TCP	1514	3901 → 80 [PSH, ACK] Seq=147403 Ack=1 Win=65536 Len=1460 [TCP segment of a ...
163	22:04:19.504431	192.168.10.2	128.119.245.12	TCP	1514	3901 → 80 [ACK] Seq=148863 Ack=1 Win=65536 Len=1460 [TCP segment of a reass...
164	22:04:19.504434	192.168.10.2	128.119.245.12	TCP	1514	3901 → 80 [ACK] Seq=150323 Ack=1 Win=65536 Len=1460 [TCP segment of a reass...
165	22:04:19.504434	192.168.10.2	128.119.245.12	HTTP	1294	POST /wireshark-labs/lab3-1-reply.htm HTTP/1.1 (text/plain)
166	22:04:19.508299	128.119.245.12	192.168.10.2	TCP	54	80 → 3901 [ACK] Seq=1 Ack=83163 Win=182528 Len=0
167	22:04:19.508334	128.119.245.12	192.168.10.2	TCP	54	80 → 3901 [ACK] Seq=1 Ack=89003 Win=178560 Len=0
168	22:04:19.508351	128.119.245.12	192.168.10.2	TCP	54	80 → 3901 [ACK] Seq=1 Ack=91923 Win=182528 Len=0

Frame 165: 1294 bytes on wire (10352 bits), 1294 bytes captured (10352 bits) on interface 0

Ethernet II, Src: Tp-LinkT_61:1c:8a (18:d6:c7:61:1c:8a), Dst: AsustekC_c6:cb:08 (1c:b7:2c:c6:cb:08)

Internet Protocol Version 4, Src: 192.168.10.2, Dst: 128.119.245.12

0100 = Version: 4

.... 0101 = Header Length: 20 bytes (5)

Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)

Total Length: 1280

Identification: 0x511e (20766)

Flags: 0x4000, Don't fragment

Time to live: 128

Protocol: TCP (6)

Header checksum: 0x0000 [validation disabled]

[Header checksum status: Unverified]

Source: 192.168.10.2

Destination: 128.119.245.12

Transmission Control Protocol, Src Port: 3901, Dst Port: 80, Seq: 151783, Ack: 1, Len: 1240

Source Port: 3901

Destination Port: 80

[Stream index: 6]

[TCP Segment Len: 1240]

Sequence number: 151783 (relative sequence number)

[Next sequence number: 153023 (relative sequence number)]

Acknowledgement number: 1 (relative ack number)

0010 05 00 51 1e 40 00 00 06 00 00 c0 a8 0a 02 80 77 ..Q.@... ..w

0020 f5 0c 0f 3d 00 50 31 37 c4 fc 92 81 a1 3a 50 18 ...=P17P

0030 01 00 45 21 00 00 0f 6e 64 65 72 6c 61 6e 64 2c ..E!...on derland,

0040 20 74 68 6f 75 67 68 20 73 68 65 20 6b 6e 65 77 though she knew

0050 20 73 68 65 20 68 61 64 20 62 75 74 20 74 6f 20 she had but to

0060 6f 70 65 6e 20 74 68 65 6d 20 61 67 61 69 6e 2c open the m again,

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?

The sequence number of the TCP SYN segment used to initiate the TCP connection is 0. The flags field in the TCP SYN segment has the SYN bit set to 1, which identifies the segment as a SYN segment.

tcp-ethereal-trace-1

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No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460

Destination: 128.119.245.12

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 0, Len: 0

Source Port: 1161

Destination Port: 80

[Stream index: 0]

[TCP Segment Len: 0]

Sequence number: 0 (relative sequence number)

[Next sequence number: 0 (relative sequence number)]

Acknowledgment number: 0

0111 = Header Length: 28 bytes (7)

Flags: 0x002 (SYN)

000. = 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... ..1. = Syn: Set

[Expert Info (Chat/Sequence): Connection establish request (SYN): server port 80]

[Connection establish request (SYN): server port 80]

[Severity level: Chat]

[Group: Sequence]

.... ..0... ..0 = Fin: Not set

[TCP Flags:S.]

Window size value: 16384

0020 f5 0c 04 89 00 50 0d d6 01 f4 00 00 00 00 70 02P.....p.

0030 40 00 f6 e9 00 00 02 04 05 b4 01 01 04 02 @.....

Sequence number (tcp.seq), 4 bytes

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

- 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?

The sequence number of the SYNACK segment sent by gaia.cs.umass.edu to the client computer in reply to the SYN is 0. The value of the ACK field in the SYNACK segment is 1. gaia.cs.umass.edu determined the ACK value in the SYNACK segment by incrementing sequence number 0 that was received from the client computer to the ACK value 1. The 10-bit flags field in the TCP SYNACK segment has bit 0 set, which indicates that this is a SYN segment, and bit 3 set, which indicates that this is an ACK segment as well.

tcp-ethereal-trace-1

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Apply a display filter ... <Ctrl-/> Expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460

Destination: 192.168.1.102

Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 0, Ack: 1, Len: 0

Source Port: 80

Destination Port: 1161

[Stream index: 0]

[TCP Segment Len: 0]

Sequence number: 0 (relative sequence number)

[Next sequence number: 0 (relative sequence number)]

Acknowledgment number: 1 (relative ack number)

0111 = Header Length: 28 bytes (7)

Flags: 0x012 (SYN, ACK)

000. = Reserved: Not set

...0 = Nonce: Not set

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

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

...0... = Urgent: Not set

...1... = Acknowledgment: Set

...0... = Push: Not set

...0... = Reset: Not set

...1... = Syn: Set

[Expert Info (Chat/Sequence): Connection establish acknowledge (SYN+ACK): server port 80]

[Connection establish acknowledge (SYN+ACK): server port 80]

[Severity level: Chat]

[Group: Sequence]

.... = Fin: Not set

[TCP Flags:A..S.]

Window size value: 5840

0020 01 66 00 50 04 89 34 a2 74 19 0d d6 01 f5 70 12 ..f.P..4..t....p.

0030 16 d0 77 4d 00 00 02 04 05 b4 01 01 04 02 ...wM.....

Sequence number (tcp.seq), 4 bytes

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

- 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.

The sequence number of the TCP segment containing the HTTP POST command is 1.

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 565]
Sequence number: 1 (relative sequence number)
[Next sequence number: 566 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
Flags: 0x018 (PSH, ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x1fbd [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
TCP payload (565 bytes)
Reassembled PDU in frame: 199
TCP segment data (565 bytes)

- 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. You should have a table that looks like this.

The frame numbers for the first 6 segments in the TCP connection are 4, 5, 7, 8, 10, 11, and the respective sequence numbers of the first six segments in the TCP connection are 1, 566, 2026, 3486, 4946, and 6406. The time for each segment since the capture started, when ACK was received, RTT value, and EstimatedRTT value after ACK receipt is:

Packet Number #	1	2	3	4	5	6
Time Sent	0.026477	0.041737	0.054026	0.05469	0.077405	0.078157
Time The Ack Received	0.053937	0.077294	0.124085	0.169118	0.217299	0.267802
SampleRTT	0.02746	0.035557	0.070059	0.114428	0.139894	0.189645
EstimatedRTT	0.02746	0.028472	0.03367	0.043765	0.055781	0.072514

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

The following shows the seqno for the first six TCP segments -

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No.	Time	Source	Destination	Protocol	Length	Info
194	06:44:25.769656	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=159389 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
195	06:44:25.770633	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=160849 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
196	06:44:25.771531	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=162309 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
197	06:44:25.772405	192.168.1.102	128.119.245.12	TCP	326	1161 → 80 [PSH, ACK] Seq=163769 Ack=1 Win=17520 Len=272 [TCP segment of a reassembled PDU]
198	06:44:25.867638	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=159389 Win=62780 Len=0
199	06:44:25.867722	192.168.1.102	128.119.245.12	HTTP	104	POST /ethereal-labs/lab3-1-reply.htm HTTP/1.1 (text/plain)
200	06:44:25.959852	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=162309 Win=62780 Len=0
201	06:44:26.018268	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=164041 Win=62780 Len=0
202	06:44:26.026211	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=164091 Win=62780 Len=0
203	06:44:26.031556	128.119.245.12	192.168.1.102	HTTP	784	HTTP/1.1 200 OK (text/html)
204	06:44:26.168471	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1
205	06:44:26.169463	192.168.1.100	192.168.1.1	SSDP	175	M-SEARCH * HTTP/1.1
206	06:44:26.221522	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=164091 Ack=731 Win=16790 Len=0

[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x9f0f [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
> [SEQ/ACK analysis]
> [Timestamps]
TCP payload (50 bytes)
TCP segment data (50 bytes)
v [122 Reassembled TCP Segments (164090 bytes): #4(565), #5(1460), #7(1460), #8(1460), #10(1460), #11(1460), #13(1147), #18(1460), #19(1460), #20(1460), #21(1460), #22(1460), #23(892), #30(1460), #31(1460)]
[Frame: 4, payload: 0-564 (565 bytes)]
[Frame: 5, payload: 565-2024 (1460 bytes)]
[Frame: 7, payload: 2025-3484 (1460 bytes)]
[Frame: 8, payload: 3485-4944 (1460 bytes)]
[Frame: 10, payload: 4945-6404 (1460 bytes)]
[Frame: 11, payload: 6405-7864 (1460 bytes)]
[Frame: 13, payload: 7865-9011 (1147 bytes)]
[Frame: 18, payload: 9012-10471 (1460 bytes)]
[Frame: 19, payload: 10472-11931 (1460 bytes)]
[Frame: 20, payload: 11932-13391 (1460 bytes)]

00000000 50 4f 53 54 20 2f 65 74 68 65 72 65 61 6c 2d 6c POST /et hereal-l
00000010 61 62 73 2f 6c 61 62 33 2d 31 2d 72 65 70 6c 79 abs/lab3 -1-reply
00000020 2e 68 74 6d 20 48 54 54 50 2f 31 2e 31 0d 0a 48 .htm HTT P/1.1...H
00000030 6f 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 ost: gai a.cs.uma
00000040 73 73 2e 65 64 75 0d 0a 55 73 65 72 2d 41 67 65 ss.edu.. User-Age
00000050 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20 nt: Mozil la/5.0
00000060 28 57 69 6e 64 6f 77 73 3b 20 55 3b 20 57 69 6e (Windows ; U; Win
00000070 64 6f 77 73 20 4e 54 20 35 2e 31 3b 20 65 6e 2d dows NT 5.1; en-
00000080 55 53 3b 20 72 76 3a 31 2e 30 2e 32 29 20 47 65 US; rv:1 .0.2) Ge
00000090 63 6b 6f 2f 32 30 30 33 30 32 30 38 20 4e 65 74 cko/2003 0208 Net
000000a0 73 63 61 70 65 2f 37 2e 30 32 0d 0a 41 63 63 65 scape/7. 02..Acce
000000b0 70 74 3a 20 74 65 78 74 2f 78 6d 6c 2c 61 70 70 ot: text /xml,app

ame (104 byte) ssembled TCP (164090 by
TCP Segment (tcp.segment), 56

Packets: 213 · Displayed: 213 (100.0%) Profile: Defai

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expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 1, Ack: 1, Len: 565

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 565]
Sequence number: 1 (relative sequence number)
[Next sequence number: 566 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
> Flags: 0x018 (PSH, ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x1fbd [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
> [SEQ/ACK analysis]
> [Timestamps]
TCP payload (565 bytes)
Reassembled PDU in frame: 199
TCP segment data (565 bytes)

0020 f5 0c 04 89 00 50 0d d6 01 f9 34 a2 74 1a 50 18P...4.t.P.
0030 44 70 1f bd 00 00 50 4f 53 54 20 2f 65 74 68 65 Dp....PO ST /ethe
0040 72 65 61 6c 2d 6c 61 62 73 2f 6c 61 62 33 2d 31 real-lab s/lab3-1
0050 2d 72 65 70 6c 79 2e 68 74 6d 20 48 54 54 50 2f -reply.h tm HTTP/
0060 31 2e 31 0d 0a 48 6f 73 74 3a 20 67 61 69 61 2e 1.1..Hos t: gaia.
0070 63 73 2e 75 6d 61 73 73 2e 65 64 75 0d 0a 55 73 cs.umass .edu..Us
0080 65 72 2d 41 67 65 6e 74 3a 20 4d 6f 7a 69 6c 6c er-Agent : Mozill
0090 61 2f 35 2e 30 20 28 57 69 6e 64 6f 77 73 3b 20 a/5.0 (W indows;
00a0 55 3b 20 57 69 6e 64 6f 77 73 20 4e 54 20 35 2e U; Windo ws NT 5.
00b0 31 3b 20 65 6e 2d 55 53 3b 20 72 76 3a 31 2e 30 1; en-US ; rv:1.0
00c0 2e 32 29 20 47 65 63 6b 6f 2f 32 30 30 33 30 32 .2) Geck o/200302
00d0 30 38 20 4e 65 74 73 63 61 70 65 2f 37 2e 30 32 08 Netsc ape/7.02
00e0 0d 0a 41 63 63 65 70 74 3a 20 74 65 78 74 2f 78 ..Accept : text/x

Sequence number (tcp.seq), +

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

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expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 566, Ack: 1, Len: 1460

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 1460]
Sequence number: 566 (relative sequence number)
[Next sequence number: 2026 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
Flags: 0x018 (PSH, ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x3be5 [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
TCP payload (1460 bytes)
[Reassembled PDU in frame: 199](#)
TCP segment data (1460 bytes)

0020 f5 0c 04 89 00 50 0d d6 04 2a 34 a2 74 1a 50 18P...4.t.P.
0030 44 70 3b e5 00 00 43 6f 6e 74 65 6e 74 2d 54 79 Dp;...Co ntent-Ty
0040 70 65 3a 20 6d 75 6c 74 69 70 61 72 74 2f 66 6f pe: mult ipart/fo
0050 72 6d 2d 64 61 74 61 3b 20 62 6f 75 6e 64 61 72 rm-data; boundar
0060 79 3d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d y-----
0070 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 32 36 35 -----265
0080 30 30 31 39 31 36 39 31 35 37 32 34 0d 0a 43 6f 00191691 5724..Co
0090 6e 74 65 6e 74 2d 4c 65 6e 67 74 68 3a 20 31 36 ntent-Le ngth: 16
00a0 33 34 31 31 0d 0a 0d 0a 2d 2d 2d 2d 2d 2d 2d 2d 3411....
00b0 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d -----
00c0 2d 2d 2d 2d 2d 32 36 35 30 30 31 39 31 36 39 31 -----265 00191691
00d0 35 37 32 34 0d 0a 43 6f 6e 74 65 6e 74 2d 44 69 5724..Co ntent-Di
00e0 73 70 6f 73 69 74 69 6f 6e 3a 20 66 6f 72 6d 2d spositio n: form-

Sequence number (tcp.seq),

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

tcp-ethereal-trace-1

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Apply a display filter ... <Ctrl-/>

expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 2026, Ack: 1, Len: 1460

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 1460]
Sequence number: 2026 (relative sequence number)
[Next sequence number: 3486 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
Flags: 0x010 (ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0xb98e [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
TCP payload (1460 bytes)
[Reassembled PDU in frame: 199](#)
TCP segment data (1460 bytes)

0020 f5 0c 04 89 00 50 0d d6 09 d6 34 a2 74 1a 50 10P...4.t.P.
0030 44 70 b9 8e 00 00 0d 0a 0d 0a 57 65 20 61 72 65 Dp..... We are
0040 20 6e 6f 77 20 74 72 79 69 6e 67 20 74 6f 20 72 now try ing to r
0050 65 6c 65 61 73 65 20 61 6c 6c 20 6f 75 72 20 62 elease a ll our b
0060 6f 6f 6b 73 20 6f 6e 65 20 6d 6f 6e 74 68 20 69 ooks one month i
0070 6e 20 61 64 76 61 6e 63 65 0d 0a 6f 66 20 74 68 n advanc e of th
0080 65 20 6f 66 66 69 63 69 61 6c 20 72 65 6c 65 61 e offici al relea
0090 73 65 20 64 61 74 65 73 2c 20 66 6f 72 20 74 69 se dates , for ti
00a0 6d 65 20 66 6f 72 20 62 65 74 74 65 72 20 65 64 me for b etter ed
00b0 69 74 69 6e 67 2e 20 20 57 65 0d 0a 68 61 76 65 iting. We have
00c0 20 74 68 69 73 20 61 73 20 61 20 6f 6f 61 6c 20 this as a goal
00d0 74 6f 20 61 63 63 6f 6d 70 6c 69 73 68 20 62 79 to accom plish by
00e0 20 74 68 65 20 65 6e 64 20 6f 66 20 74 68 65 20 the end of the

Sequence number (tcp.seq),

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

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expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 3486, Ack: 1, Len: 1460

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 1460]
Sequence number: 3486 (relative sequence number)
[Next sequence number: 4946 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
Flags: 0x010 (ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0xdd01 [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
TCP payload (1460 bytes)
[Reassembled PDU in frame: 199](#)
TCP segment data (1460 bytes)

0020 f5 0c 04 89 00 50 0d d6 0f 92 34 a2 74 1a 50 10P...4.t.P.
0030 44 70 dd 01 00 00 20 73 6f 6d 65 20 65 69 67 68 Dp.... s ome eigh
0040 74 20 74 65 78 74 0d 0a 66 69 6c 65 73 20 70 65 t text.. files pe
0050 72 20 6d 6f 6e 74 68 3a 20 20 74 68 75 73 20 75 r month: thus u
0060 70 70 69 6e 67 20 6f 75 72 20 70 72 6f 64 75 63 pping ou r produc
0070 74 69 76 69 74 79 20 66 72 6f 6d 20 24 32 20 6d tivity f rom \$2 m
0080 69 6c 6c 69 6f 6e 2e 0d 0a 0d 0a 54 68 65 20 47 illion. ...The G
0090 6f 61 6c 20 6f 66 20 50 72 6f 6a 65 63 74 20 47 oal of P roject G
00a0 75 74 65 6e 62 65 72 67 20 69 73 20 74 6f 20 47 utenberg is to G
00b0 69 76 65 20 41 77 61 79 20 4f 6e 65 20 54 72 69 ive Away One Tri
00c0 6c 6c 69 6f 6e 20 45 74 65 78 74 0d 0a 46 69 6c llion Et ext..Fil
00d0 65 73 20 62 79 20 74 68 65 20 44 65 63 65 6d 62 es by th e Decemb
00e0 65 72 20 33 31 2c 20 32 30 30 31 2e 20 20 5b 31 er 31, 2 001. [1

Sequence number (tcp.seq), +

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

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Apply a display filter ... <Ctrl-/>

expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 4946, Ack: 1, Len: 1460

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 1460]
Sequence number: 4946 (relative sequence number)
[Next sequence number: 6406 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
Flags: 0x010 (ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x908e [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
TCP payload (1460 bytes)
[Reassembled PDU in frame: 199](#)
TCP segment data (1460 bytes)

0020 f5 0c 04 89 00 50 0d d6 15 48 34 a2 74 1a 50 10P...f4.t.P.
0030 44 70 90 8e 00 00 6f 66 20 62 6f 6f 6b 73 0d 0a Dp....of books..
0040 61 6e 64 0d 0a 47 45 54 20 4e 45 57 20 47 55 54 and..GET NEW GUT
0050 20 66 6f 72 20 67 65 6e 65 72 61 6c 20 69 6e 66 for gen eral inf
0060 6f 72 6d 61 74 69 6f 6e 0d 0a 61 6e 64 0d 0a 4d ormat ion ..and..M
0070 47 45 54 20 47 55 54 2a 20 66 6f 72 20 6e 65 77 GET GUT* for new
0080 73 6c 65 74 74 65 72 73 2e 0d 0a 0d 0a 2a 2a 49 sletters**I
0090 6e 66 6f 72 6d 61 74 69 6f 6e 20 70 72 65 70 61 nformati on prepa
00a0 72 65 64 20 62 79 20 74 68 65 20 50 72 6f 6a 65 red by t he Proje
00b0 63 74 20 47 75 74 65 6e 62 65 72 67 20 6c 65 67 ct Guten berg leg
00c0 61 6c 20 61 64 76 69 73 6f 72 2a 2a 0d 0a 28 54 al advis or***..(T
00d0 68 72 65 65 20 50 61 67 65 73 29 0d 0a 0d 0a 0d hree Pag es).....
00e0 0a 2a 2a 2a 53 54 41 52 54 2a 2a 54 48 45 20 53 -***STAR T**THE S

Sequence number (tcp.seq), +

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

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Apply a display filter ... <Ctrl-/> :expression.. +

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 6406, Ack: 1, Len: 1460

Source Port: 1161
Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 1460]
Sequence number: 6406 (relative sequence number)
[Next sequence number: 7866 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0101 = Header Length: 20 bytes (5)
Flags: 0x010 (ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x9583 [Unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
TCP payload (1460 bytes)
[Reassembled PDU in frame: 199](#)
TCP segment data (1460 bytes)

```

0020  f5 0c 04 89 00 50 0d d6 1a fa 34 a2 74 1a 50 10  ....P...4.t.P.
0030  44 70 95 83 00 00 20 55 6e 69 74 65 64 20 53 74  Dp.... United St
0040  61 74 65 73 20 63 6f 70 79 72 69 67 68 74 0d 0a  ates copyright..
0050  6f 6e 20 6f 72 20 66 6f 72 20 74 68 69 73 20 77  on or fo r this w
0060  6f 72 6b 2c 20 73 6f 20 74 68 65 20 50 72 6f 6a  ork, so the Proj
0070  65 63 74 20 28 61 6e 64 20 79 6f 75 21 29 20 63  ect (and you!) c
0080  61 6e 20 63 6f 70 79 20 61 6e 64 0d 0a 64 69 73  an copy and dis
0090  74 72 69 62 75 74 65 20 69 74 20 69 6e 20 74 68  tribute it in th
00a0  65 20 55 6e 69 74 65 64 20 53 74 61 74 65 73 20  e United States
00b0  77 69 74 68 6f 75 74 20 70 65 72 6d 69 73 73 69  without permissi
00c0  6f 6e 20 61 6e 64 0d 0a 77 69 74 68 6f 75 74 20  on and.. without
00d0  70 61 79 69 6e 67 20 63 6f 70 79 72 69 67 68 74  paying c opyright
00e0  20 72 6f 79 61 6c 74 69 65 73 2e 20 20 53 70 65  royalty es. Spe

```

Sequence number (tcp.seq), +

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

The following shows the time delta since the capture started for the first 6 TCP segments –

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

TitleTimeTypeTime (format as specified)FieldsEnter a field ...OccurrenceOKCancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

▼ Frame 4: 619 bytes on wire (4952 bits), 619 bytes captured (4952 bits)

Encapsulation type: Ethernet (I)

Arrival Time: Aug 21, 2004 06:44:20.596858000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.596858000 seconds

[Time delta from previous captured frame: 0.003212000 seconds]

[Time delta from previous displayed frame: 0.003212000 seconds]

[Time since reference or first frame: 0.026477000 seconds]

Frame Number: 4

Frame Length: 619 bytes (4952 bits)

Capture Length: 619 bytes (4952 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

▼ Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 1, Ack: 1, Len: 565

Source Port: 1161

Destination Port: 80

0000 00 06 25 da af 73 00 20 e0 8a 70 1a 08 00 45 00 ..%..s. ...p...E.

0010 02 5d 1e 21 40 00 80 06 a2 e7 c0 a8 01 66 80 77 .].!@... ..f.w

0020 f5 0c 04 89 00 50 0d d6 01 f5 34 a2 74 1a 50 18P... ..t.P.

0030 44 70 1f bd 00 00 50 4f 53 54 20 2f 65 74 68 65 Dp....PO ST /ethe

0040 72 65 61 6c 2d 6c 61 62 73 2f 6c 61 62 33 2d 31 real-lab s/lab3-1

0050 2d 72 65 70 6c 79 2e 68 74 6d 20 48 54 54 50 2f -reply.h tm HTTP/

0060 31 2e 31 0d 0a 48 6f 73 74 3a 20 67 61 69 61 2e 1.i..Hos t: gaia.

0070 63 73 2e 75 6d 61 73 73 2e 65 64 75 0d 0a 55 73 cs.umass .edu..Us

0080 65 72 2d 41 67 65 6e 74 3a 20 4d 6f 7a 69 6c 6c er-Agent : Mozill

0090 61 2f 35 2e 30 20 28 57 69 6e 64 6f 77 73 3b 20 a/5.0 (W indows;

00a0 55 3b 20 57 69 6e 64 6f 77 73 20 4e 54 20 35 2e U; Windo ws NT 5.

00b0 31 3b 20 65 6e 2d 55 53 3b 20 72 76 3a 31 2e 30 1; en-US ; rv:1.0

00c0 2e 32 29 20 47 65 63 6b 6f 2f 32 30 30 33 30 32 .2) Geck o/200302

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

tcp-ethereal-trace-1

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Apply a display filter ... <Ctrl-/>

TitleTimeTypeTime (format as specified)FieldsEnter a field ...OccurrenceOKCancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

▼ Frame 5: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits) on interface eth0

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.612118000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.612118000 seconds

[Time delta from previous captured frame: 0.015260000 seconds]

[Time delta from previous displayed frame: 0.015260000 seconds]

[Time since reference or first frame: 0.041737000 seconds]

Frame Number: 5

Frame Length: 1514 bytes (12112 bits)

Capture Length: 1514 bytes (12112 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

▼ Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 566, Ack: 1, Len: 1460

Source Port: 1161

Destination Port: 80

0000 00 06 25 da af 73 00 20 e0 8a 70 1a 08 00 45 00 ..%.s. .p...E.

0010 05 dc 1e 22 40 00 80 06 9f 67 c0 a8 01 66 80 77 ..."@...g...f.w

0020 f5 0c 04 89 00 50 0d d6 04 2a 34 a2 74 1a 50 18P...*4.t.P.

0030 44 70 3b e5 00 00 43 6f 6e 74 65 6e 74 2d 54 79 Dp;...Content-Ty

0040 70 65 3a 20 6d 75 6c 74 69 70 61 72 74 2f 66 6f pe: mult ipart/fo

0050 72 6d 2d 64 61 74 61 3b 20 62 6f 75 6e 64 61 72 rm-data; boundar

0060 79 3d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d y=-----

0070 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 32 36 35 -----265

0080 30 30 31 39 31 36 39 31 35 37 32 34 0d 0a 43 6f 00191691 5724..Co

0090 6e 74 65 6e 74 2d 4c 65 6e 67 74 68 3a 20 31 36 ntent-Le ngth: 16

00a0 33 34 31 31 0d 0a 0d 0a 2d 2d 2d 2d 2d 2d 2d 2d 3411....

00b0 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d 2d -----

00c0 2d 2d 2d 2d 2d 32 36 35 30 30 31 39 31 36 39 31 -----265 00191691

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

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Apply a display filter ... <Ctrl-/>

TitleTimeTypeTime (format as specified)FieldsEnter a field ...OccurrenceOKCancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

▼ Frame 7: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.624407000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.624407000 seconds

[Time delta from previous captured frame: 0.000089000 seconds]

[Time delta from previous displayed frame: 0.000089000 seconds]

[Time since reference or first frame: 0.054026000 seconds]

Frame Number: 7

Frame Length: 1514 bytes (12112 bits)

Capture Length: 1514 bytes (12112 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

▼ Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 2026, Ack: 1, Len: 1460

Source Port: 1161

Destination Port: 80

00000010002000300040005000600070008000900a00b00c00d00e00f01001100120013001400150016001700180019001a001b001c001d001e001f020002100220023002400250026002700280029002a002b002c002d002e002f030003100320033003400350036003700380039003a003b003c003d003e003f040004100420043004400450046004700480049004a004b004c004d004e004f050005100520053005400550056005700580059005a005b005c005d005e005f060006100620063006400650066006700680069006a006b006c006d006e006f070007100720073007400750076007700780079007a007b007c007d007e007f080008100820083008400850086008700880089008a008b008c008d008e008f090009100920093009400950096009700980099009a009b009c009d009e009f0a000a100a200a300a400a500a600a700a800a900aa00ab00ac00ad00ae00af0b000b100b200b300b400b500b600b700b800b900ba00bb00bc00bd00be00bf0c000c100c200c300c400c500c600c700c800c900ca00cb00cc00cd00ce00cf0d000d100d200d300d400d500d600d700d800d900da00db00dc00dd00de00df0e000e100e200e300e400e500e600e700e800e900ea00eb00ec00ed00ee00ef0f000f100f200f300f400f500f600f700f800f900fa00fb00fc00fd00fe00ff

..%..s. .p...E.
...#... .f...f.w
....P... .4.t.P.
Dp..... We are
now try ing to r
elease a ll our b
ooks one month i
n advanc e..of th
e offici al relea
se dates , for ti
me for b etter ed
iting. We..have
this as a goal

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Frame 8: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)
Encapsulation type: Ethernet (1)
Arrival Time: Aug 21, 2004 06:44:20.625071000 Pacific Daylight Time
[Time shift for this packet: 0.000000000 seconds]
Epoch Time: 1093095860.625071000 seconds
[Time delta from previous captured frame: 0.000664000 seconds]
[Time delta from previous displayed frame: 0.000664000 seconds]
[Time since reference or first frame: 0.054690000 seconds]
Frame Number: 8
Frame Length: 1514 bytes (12112 bits)
Capture Length: 1514 bytes (12112 bits)
[Frame is marked: False]
[Frame is ignored: False]
[Protocols in frame: eth:ethertype:ip:tcp]
[Coloring Rule Name: HTTP]
[Coloring Rule String: http || tcp.port == 80 || http2]
> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12
> Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 3486, Ack: 1, Len: 1460
Source Port: 1161
Destination Port: 80

```

0000  00 06 25 da af 73 00 20 e0 8a 70 1a 08 00 45 00  ..%..s.  ..p...E.
0010  05 dc 1e 24 40 00 80 06 9f 65 c0 a8 01 66 80 77  ...$@...e...f.w
0020  f5 0c 04 89 00 50 0d d6 0f 92 34 a2 74 1a 50 10  ....P...4.t.P.
0030  44 70 dd 01 00 00 20 73 6f 6d 65 20 65 69 67 68  Dp....s ome eigh
0040  74 20 74 65 78 74 0d 0a 66 69 6c 65 73 20 70 65  t text.. files pe
0050  72 20 6d 6f 6e 74 68 3a 20 20 74 68 75 73 20 75  r month:  thus u
0060  70 70 69 6e 67 20 6f 75 72 20 70 72 6f 64 75 63  pping ou r produc
0070  74 69 76 69 74 79 20 66 72 6f 6d 20 24 32 20 6d  tivity f rom $2 m
0080  69 6c 6c 69 6f 6e 2e 0d 0a 0d 0a 54 68 65 20 47  illion. ...The G
0090  6f 61 6c 20 6f 66 20 50 72 6f 6a 65 63 74 20 47  oal of P roject G
00a0  75 74 65 6e 62 65 72 67 20 69 73 20 74 6f 20 47  utenberg is to G
00b0  69 76 65 20 41 77 61 79 20 4f 6e 65 20 54 72 69  ive Away One Tri
00c0  6c 6c 69 6f 6e 20 45 74 65 78 74 0d 0a 46 69 6c  llion Et ext..Fill

```

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

TitleTimeTypeTime (format as specified)FieldsEnter a field ...OccurrenceOKCancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

▼ Frame 10: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.647786000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.647786000 seconds

[Time delta from previous captured frame: 0.000111000 seconds]

[Time delta from previous displayed frame: 0.000111000 seconds]

[Time since reference or first frame: 0.077405000 seconds]

Frame Number: 10

Frame Length: 1514 bytes (12112 bits)

Capture Length: 1514 bytes (12112 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

▼ Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 4946, Ack: 1, Len: 1460

Source Port: 1161

Destination Port: 80

0000 00 06 25 da af 73 00 20 e0 8a 70 1a 08 00 45 00 ..%..s. .p...E.

0010 05 dc 1e 25 40 00 80 06 9f 64 c0 a8 01 66 80 77 ...%@... .d...f.w

0020 f5 0c 04 89 00 50 0d d6 15 46 34 a2 74 1a 50 10P...F4.t.P.

0030 44 70 90 8e 00 00 6f 66 20 62 6f 6f 6b 73 0d 0a Dp....of books..

0040 61 6e 64 0d 0a 47 45 54 20 4e 45 57 20 47 55 54 and..GET NEW GUT

0050 20 66 6f 72 20 67 65 6e 65 72 61 6c 20 69 6e 66 for gen eral inf

0060 6f 72 6d 61 74 69 6f 6e 0d 0a 61 6e 64 0d 0a 4d ormation ..and..M

0070 47 45 54 20 47 55 54 2a 20 66 6f 72 20 6e 65 77 GET GUT* for new

0080 73 6c 65 74 74 65 72 73 2e 0d 0a 0d 0a 2a 2a 49 sletters*I

0090 6e 66 6f 72 6d 61 74 69 6f 6e 20 70 72 65 70 61 nformati on prepa

00a0 72 65 64 20 62 79 20 74 68 65 20 50 72 6f 6a 65 red by t he Proje

00b0 63 74 20 47 75 74 65 6e 62 65 72 67 20 6c 65 67 ct Guten berg leg

00c0 61 6c 20 61 64 76 69 73 6f 72 2a 2a 0d 0a 28 54 al advis or*** (T

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

▼ Frame 11: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.648538000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.648538000 seconds

[Time delta from previous captured frame: 0.000752000 seconds]

[Time delta from previous displayed frame: 0.000752000 seconds]

[Time since reference or first frame: 0.078157000 seconds]

Frame Number: 11

Frame Length: 1514 bytes (12112 bits)

Capture Length: 1514 bytes (12112 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

▼ Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 6406, Ack: 1, Len: 1460

Source Port: 1161

Destination Port: 80

```

0000  00 06 25 da af 73 00 20 e0 8a 70 1a 08 00 45 00  ..%.s. .p...E.
0010  05 dc 1e 26 40 00 80 06 9f 63 c0 a8 01 66 80 77  ...&@... .c...f.w
0020  f5 0c 04 89 00 50 0d d6 1a fa 34 a2 74 1a 50 10  ....P... .4.t.P.
0030  44 70 95 83 00 00 20 55 6e 69 74 65 64 20 53 74  Dp.... U nited St
0040  61 74 65 73 20 63 6f 70 79 72 69 67 68 74 0d 0a  ates cop yright..
0050  6f 6e 20 6f 72 20 66 6f 72 20 74 68 69 73 20 77  on or fo r this w
0060  6f 72 6b 2c 20 73 6f 20 74 68 65 20 50 72 6f 6a  ork, so  the Proj
0070  65 63 74 20 28 61 6e 64 20 79 6f 75 21 29 20 63  ect (and you!) c
0080  61 6e 20 63 6f 70 79 20 61 6e 64 0d 0a 64 69 73  an copy and..dis
0090  74 72 69 62 75 74 65 20 69 74 20 69 6e 20 74 68  tribute it in th
00a0  65 20 55 6e 69 74 65 64 20 53 74 61 74 65 73 20  e United States
00b0  77 69 74 68 6f 75 74 20 70 65 72 6d 69 73 73 69  without permissi
00c0  6f 6e 20 61 6e 64 0d 0a 77 69 74 68 6f 75 74 20  on and.. without

```

Time relative to time reference or first frame (frame.11) | Packets: 213 · Displayed: 213 (100.0%) | Profile: Default

The following shows the time when the ACK was received from the server to client for the first 6 segments -

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

TitleTimeTypeTime (format as specified)FieldsEnter a field ...OccurrenceOKCancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

▼ Frame 6: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.624318000 Pacific Daylight Time

[Time shift for this packet: 0.00000000 seconds]

Epoch Time: 1093095860.624318000 seconds

[Time delta from previous captured frame: 0.012200000 seconds]

[Time delta from previous displayed frame: 0.012200000 seconds]

[Time since reference or first frame: 0.053937000 seconds]

Frame Number: 6

Frame Length: 60 bytes (480 bits)

Capture Length: 60 bytes (480 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

▼ Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 566, Len: 0

Source Port: 80

Destination Port: 1161

0000 00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00 ···p···%·s··E·

0010 00 28 58 72 40 00 37 06 b3 cb 80 77 f5 0c c0 a8 ·(Xr@·7···w···

0020 01 66 00 50 04 89 34 a2 74 1a 0d d6 04 2a 50 10 ·f·P··4·t····*P·

0030 1a 7c 9e 30 00 00 da 12 00 00 47 a5 ·|·0·····G·

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

Time

Type

Time (format as specified)

Fields

Enter a field ...

Occurrence

OK

Cancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Frame 9: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.647675000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.647675000 seconds

[Time delta from previous captured frame: 0.022604000 seconds]

[Time delta from previous displayed frame: 0.022604000 seconds]

[Time since reference or first frame: 0.077294000 seconds]

Frame Number: 9

Frame Length: 60 bytes (480 bits)

Capture Length: 60 bytes (480 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 2026, Len: 0

Source Port: 80

Destination Port: 1161

0000 00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00 ···p...%..s..E·

0010 00 28 58 73 40 00 37 06 b3 ca 80 77 f5 0c c0 a8 ·(Xs@-7·...w....

0020 01 66 00 50 04 89 34 a2 74 1a 0d d6 09 de 50 10 ·f·P··4·t.....P·

0030 22 38 90 c0 00 00 87 9e 00 00 3a 30 "8.....:·0

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

TitleTimeTypeTime (format as specified)FieldsEnter a field ...OccurrenceOKCancel

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

Frame 12: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.694466000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.694466000 seconds

[Time delta from previous captured frame: 0.045928000 seconds]

[Time delta from previous displayed frame: 0.045928000 seconds]

[Time since reference or first frame: 0.124085000 seconds]

Frame Number: 12

Frame Length: 60 bytes (480 bits)

Capture Length: 60 bytes (480 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

▼ Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 3486, Len: 0

Source Port: 80

Destination Port: 1161

0000 00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00 ···p...%..s..E·

0010 00 28 58 74 40 00 37 06 b3 c9 80 77 f5 0c c0 a8 ·(Xt@-7·...w....

0020 01 66 00 50 04 89 34 a2 74 1a 0d d6 0f 92 50 10 ·f·P··4·t.....P·

0030 2d a0 7f a4 00 00 7b ec 00 00 5f 33 -----{..._3

Time relative to time reference or first frame (frame.0)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Default

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

expression...

OK Cancel

No.	Time	Source	Destination	Protocol	Length	Info
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]
14	06:44:20.739499	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=4946 Win=14600 Len=0
15	06:44:20.787680	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=6406 Win=17520 Len=0
16	06:44:20.838183	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=7866 Win=20440 Len=0

Frame 14: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.739499000 Pacific Daylight Time

[Time shift for this packet: 0.00000000 seconds]

Epoch Time: 1093095860.739499000 seconds

[Time delta from previous captured frame: 0.044933000 seconds]

[Time delta from previous displayed frame: 0.044933000 seconds]

[Time since reference or first frame: 0.169118000 seconds]

Frame Number: 14

Frame Length: 60 bytes (480 bits)

Capture Length: 60 bytes (480 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 4946, Len: 0

Source Port: 80

Destination Port: 1161

0000 00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00 ···p···%·s··E·

0010 00 28 58 75 40 00 37 06 b3 c8 00 77 f5 0c c0 a8 ·(Xu@-7···w···

0020 01 66 00 50 04 89 34 a2 74 1a 0d d6 15 46 50 10 ·f·P··4·t····FP·

0030 39 08 0e 88 00 00 d4 3c 00 00 d8 3a 9·n·....<···

Time relative to time reference or first frame (frame.1)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

tcp-ethereal-trace-1

FileEditViewGoCaptureAnalyzeStatisticsTelephonyWirelessToolsHelp

Apply a display filter ... <Ctrl-/>

expression...

OKCancel

TitleTimeTypeTime (format as specified)FieldsEnter a field ...Occurrence

No.

Time

Source

Destination

Protocol

Length

Info

406:44:20.596850192.168.1.102128.119.245.12TCP6191161→80[PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]

506:44:20.612118192.168.1.102128.119.245.12TCP15141161→80[PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

606:44:20.624318128.119.245.12192.168.1.102TCP6080→1161[ACK] Seq=1 Ack=566 Win=6780 Len=0

706:44:20.624407192.168.1.102128.119.245.12TCP15141161→80[ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

806:44:20.625071192.168.1.102128.119.245.12TCP15141161→80[ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

906:44:20.647675128.119.245.12192.168.1.102TCP6080→1161[ACK] Seq=1 Ack=2026 Win=8760 Len=0

1006:44:20.647786192.168.1.102128.119.245.12TCP15141161→80[ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

1106:44:20.648538192.168.1.102128.119.245.12TCP15141161→80[ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

1206:44:20.694466128.119.245.12192.168.1.102TCP6080→1161[ACK] Seq=1 Ack=3486 Win=11680 Len=0

1306:44:20.694566192.168.1.102128.119.245.12TCP12011161→80[PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]

1406:44:20.739499128.119.245.12192.168.1.102TCP6080→1161[ACK] Seq=1 Ack=4946 Win=14600 Len=0

1506:44:20.787680128.119.245.12192.168.1.102TCP6080→1161[ACK] Seq=1 Ack=6406 Win=17520 Len=0

1606:44:20.838183128.119.245.12192.168.1.102TCP6080→1161[ACK] Seq=1 Ack=7866 Win=20440 Len=0

Frame 15: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.787680000 Pacific Daylight Time

[Time shift for this packet: 0.00000000 seconds]

Epoch Time: 1093095860.787680000 seconds

[Time delta from previous captured frame: 0.048181000 seconds]

[Time delta from previous displayed frame: 0.048181000 seconds]

[Time since reference or first frame: 0.217299000 seconds]

Frame Number: 15

Frame Length: 60 bytes (480 bits)

Capture Length: 60 bytes (480 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

▼ Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 6406, Len: 0

Source Port: 80

Destination Port: 1161

00000020e08a701a000625daaf7308004500...p...%..s..E.

00100028587640003706b3c78077f50cc0a8(Xv@-7...w....

002001660050048934a2741a0dd61afa5010-f-P..4.t.....P.

003044705d6c00006af30000b520Dp]l..j....

Time relative to time reference or first frame (frame.1)

Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai

tcp-ethereal-trace-1

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Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]
14	06:44:20.739499	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=4946 Win=14600 Len=0
15	06:44:20.787600	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=6406 Win=17520 Len=0
16	06:44:20.838183	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=7866 Win=20440 Len=0

Frame 16: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)

Encapsulation type: Ethernet (1)

Arrival Time: Aug 21, 2004 06:44:20.838183000 Pacific Daylight Time

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1093095860.838183000 seconds

[Time delta from previous captured frame: 0.050503000 seconds]

[Time delta from previous displayed frame: 0.050503000 seconds]

[Time since reference or first frame: 0.267802000 seconds]

Frame Number: 16

Frame Length: 60 bytes (480 bits)

Capture Length: 60 bytes (480 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

▼ Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 7866, Len: 0

Source Port: 80

Destination Port: 1161

```

0000  00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00  ···p...%..s..E·
0010  00 28 58 77 40 00 37 06 b3 c6 80 77 f5 0c c0 a8  ·(Xm@-7·...w....
0020  01 66 00 50 04 89 34 a2 74 1a 0d d6 20 ae 50 10  ·f·P...4·t...·P·
0030  4f d8 4c 50 00 00 93 c0 00 00 63 ed             0·LP....·c·

```

Time relative to time reference or first frame (frame.0) | Packets: 213 · Displayed: 213 (100.0%) | Profile: Default

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

The length of each of the first six TCP segments are:

- Segment 1 – 565 bytes
- Segment 2 – 1460 bytes
- Segment 3 – 1460 bytes
- Segment 4 – 1460 bytes
- Segment 5 – 1460 bytes
- Segment 6 – 1460 bytes

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

Title Time Type Time (format as specified) Fields Enter a field ... Occurrence OK Cancel

No.	Time	Source	Destination	Protocol	Length	Info
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]
14	06:44:20.739499	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=4946 Win=14600 Len=0
15	06:44:20.787680	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=6406 Win=17520 Len=0
16	06:44:20.838183	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=7866 Win=20440 Len=0

[Coloring Rule String: http || tcp.port == 80 || http]

> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)

> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12

▼ Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 6406, Ack: 1, Len: 1460

Source Port: 1161

Destination Port: 80

[Stream index: 0]

[TCP Segment Len: 1460]

Sequence number: 6406 (relative sequence number)

[Next sequence number: 7866 (relative sequence number)]

Acknowledgment number: 1 (relative ack number)

0101 ... = Header Length: 20 bytes (5)

> Flags: 0x010 (ACK)

Window size value: 17520

[Calculated window size: 17520]

[Window size scaling factor: -2 (no window scaling used)]

Checksum: 0x9583 [unverified]

[Checksum Status: Unverified]

Urgent pointer: 0

> [SEQ/ACK analysis]

> [Timestamps]

TCP payload (1460 bytes)

[Reassembled PDU in frame: 199]

TCP segment data (1460 bytes)

```

0020 f5 0c 04 89 00 50 0d d6 1a fa 34 a2 74 1a 50 10 .....P...4-t-P
0030 44 70 95 83 00 00 20 55 6e 69 74 65 64 20 53 74 Dp.... U nited St
0040 61 74 65 73 20 63 6f 70 79 72 69 67 68 74 0d 0a ates cop yright..
0050 6f 6e 20 6f 72 20 66 6f 72 20 74 68 69 73 20 77 on or fo r this w
0060 6f 72 6b 2c 20 73 6f 20 74 68 65 20 50 72 6f 6a ork, so the Proj
0070 65 63 74 20 28 61 6e 64 20 79 6f 75 21 29 20 63 ect (and you!) c
0080 61 6e 20 63 6f 70 79 20 61 6e 64 0d 0a 64 69 73 an copy and .dis
0090 74 72 69 62 75 74 65 20 69 74 20 69 6e 20 74 68 tribute it in th
00a0 65 20 55 6e 69 74 65 64 20 53 74 61 74 65 73 20 e United States
00b0 77 69 74 68 6f 75 74 20 70 65 72 6d 69 73 73 69 without permissi

```

TCP Segment Len (tcp.len), Packets: 213 · Displayed: 213 (100.0%) Profile: Defai

9) What is the minimum amount of available buffer space advertised at the receiver for the entire trace? Does the lack of receiver buffer space ever throttle the sender?

The minimum amount of available buffer space advertised at the receiver for the entire trace is a window size of 5840 bytes. No, the lack of receiver buffer space never throttles the sender, which can be observed by viewing the window size for each of the packets in the RTT Graph shown below. In the RTT graph below, the window size never drops after reaching a maximum window size of 62780 bytes.

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	06:44:20.570381	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
2	06:44:20.593553	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM=1
3	06:44:20.593646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	06:44:20.596858	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	06:44:20.612118	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	06:44:20.624318	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	06:44:20.624407	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	06:44:20.625071	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	06:44:20.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	06:44:20.647786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	06:44:20.648538	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	06:44:20.694466	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	06:44:20.694566	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]
14	06:44:20.739499	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=4946 Win=14600 Len=0
15	06:44:20.787680	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=6406 Win=17520 Len=0
16	06:44:20.838183	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=7866 Win=20440 Len=0
17	06:44:20.875188	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=9013 Win=23360 Len=0

[Frame is marked: False]
[Frame is ignored: False]
[Protocols in frame: eth:ethertype:ip:tcp]
[Coloring Rule Name: HTTP]
[Coloring Rule String: http || tcp.port == 80 || http2]

> Ethernet II, Src: LinksysG, da:af:73:00:06:25, da:af:73:00:06:25, Dst: Actionte_8a:70:1a:00:20:e0:8a:70:1a

> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102

> Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 0, Ack: 1, Len: 0

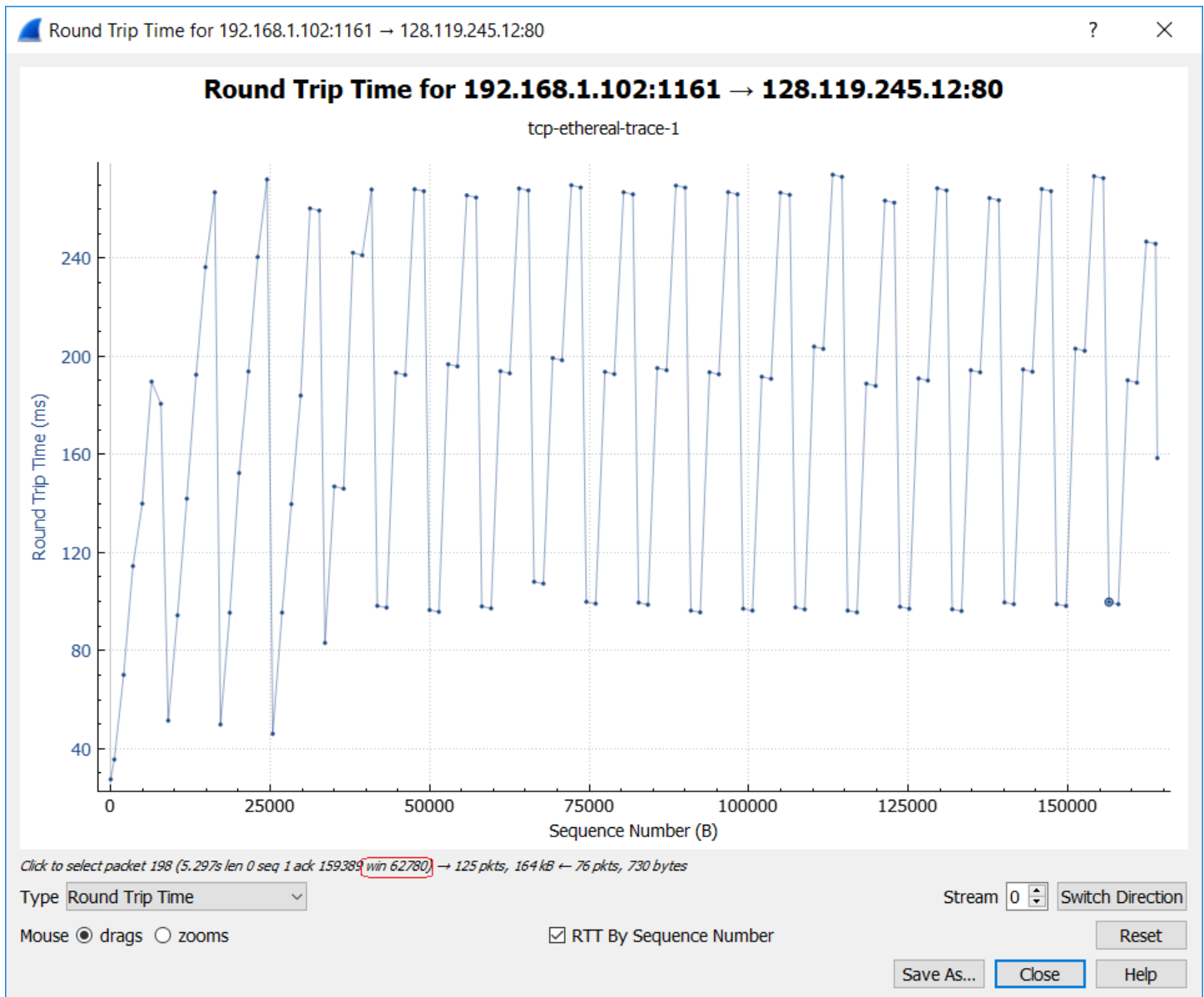
Source Port: 80
Destination Port: 1161
[Stream index: 0]
[TCP Segment Len: 0]
Sequence number: 0 (relative sequence number)
[Next sequence number: 0 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
0111 = Header Length: 28 bytes (7)
> Flags: 0x012 (SYN, ACK)
Window size value: 5840
[Calculated window size: 5840]
Checksum: 0x774d [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
> Options: (8 bytes), Maximum segment size, No-Operation (NOP), No-Operation (NOP), SACK permitted
> [SEQ/ACK analysis]
> [Timestamps]

0000 00 20 e0 8a 70 1a 00 06 25 da af 73 00 00 45 00 . . . p . . . % . . s . . E .
0010 00 30 00 00 40 00 37 06 0c 36 80 77 f5 0c c0 a8 . 0 . . @ . 7 . . 6 w
0020 01 66 00 50 04 89 34 a2 74 19 0d d6 01 f5 70 12 - f . P . . 4 . t p .
0030 16 d0 77 4d 00 00 02 04 05 b4 01 01 04 02

The scaled window size (if scaling has been used) (tcp.window

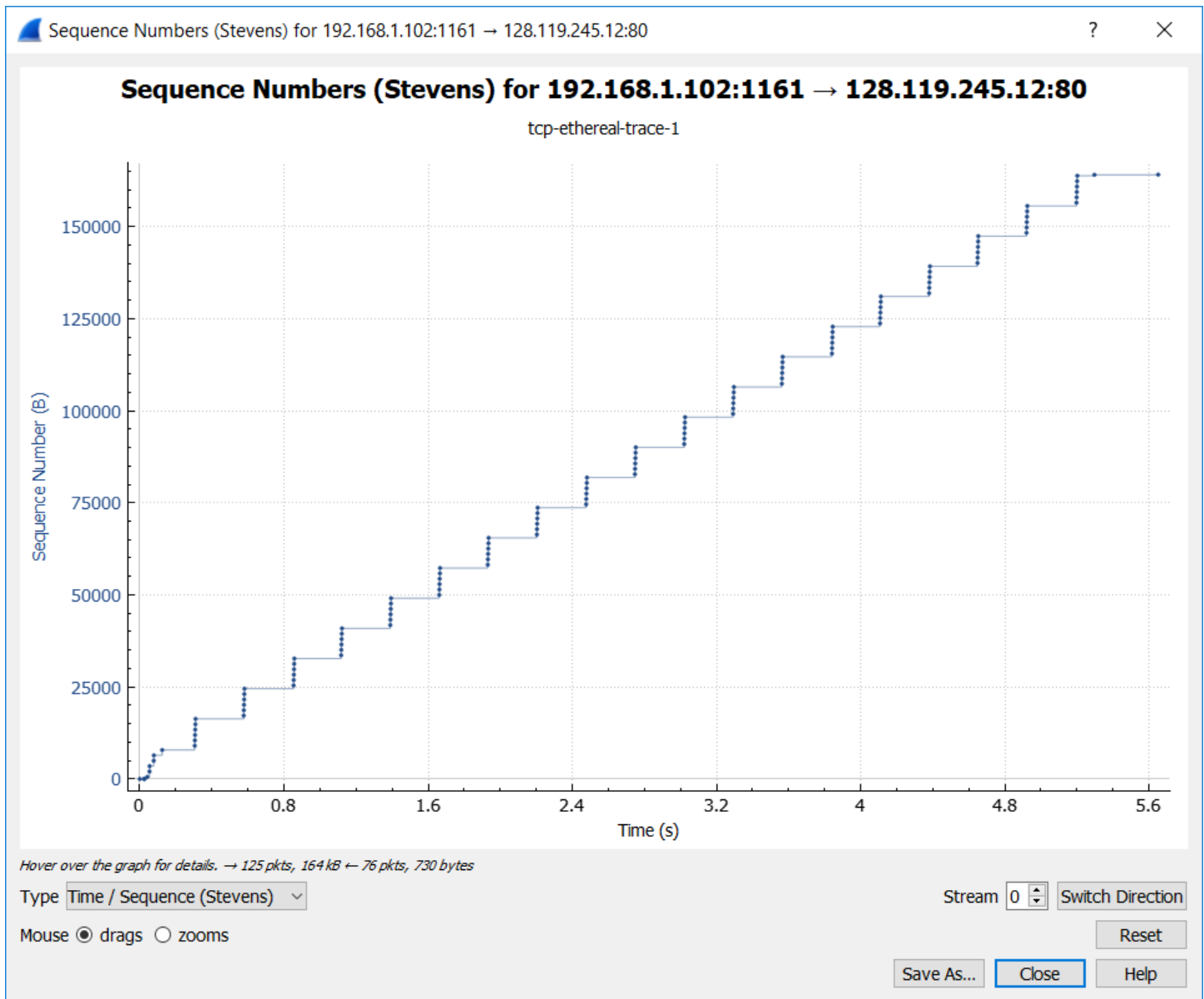
Packets: 213 · Displayed: 213 (100.0%)

Profile: Defai



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

No, there are no retransmitted segments in the trace file. I verified this by manually viewing all of the sequence numbers in each of the TCP packets sent from the client to server. If there was a retransmission, then the client would send a TCP packet with a sequence number that is less than any previous TCP segments' sequence numbers. I also verified this by observing that the Sequence Numbers graph below never decreases, which verifies that the sequence number transmitted from client to server never decreases.



12	3486	1460
14	4946	1460
15	6406	1460
16	7866	1460
17	9013	1147
24	10473	1460
25	11933	1460
26	13393	1460
27	14853	1460
28	16313	1460
29	17205	892
36	18665	1460
37	20125	1460
38	21585	1460
39	23045	1460
40	24505	1460
41	25397	892
48	26857	1460
49	28317	1460
50	29777	1460
51	31237	1460
52	33589	2352

tcp-ethereal-trace-1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> expression...

No.	Time	Source	Destination	Protocol	Length	Info
40	06:44:21.391003	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=24505 Win=52560 Len=0
41	06:44:21.423567	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=25397 Win=52560 Len=0
42	06:44:21.423786	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=25397 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
43	06:44:21.424457	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=26857 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
44	06:44:21.425417	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=28317 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
45	06:44:21.426259	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=29777 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
46	06:44:21.427183	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=31237 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
47	06:44:21.428064	192.168.1.102	128.119.245.12	TCP	946	1161 → 80 [PSH, ACK] Seq=32697 Ack=1 Win=17520 Len=892 [TCP segment of a reassembled PDU]
48	06:44:21.469804	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=26857 Win=55480 Len=0
49	06:44:21.519926	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=28317 Win=58400 Len=0
50	06:44:21.565096	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=29777 Win=61320 Len=0
51	06:44:21.610201	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=31237 Win=62780 Len=0
52	06:44:21.687478	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=33589 Win=62780 Len=0
53	06:44:21.687714	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=33589 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
54	06:44:21.688514	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=35049 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
55	06:44:21.689410	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=36509 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
56	06:44:21.690239	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=37969 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

Capture Length: 60 bytes (480 bits)
 [Frame is marked: False]
 [Frame is ignored: False]
 [Protocols in frame: eth:ethertype:ip:tcp]
 [Coloring Rule Name: HTTP]
 [Coloring Rule String: http || tcp.port == 80 || http2]
 > Ethernet II, Src: LinksysG, Dst: Actionte_8a:70:1a (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)
 > Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
 > Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 1, Ack: 33589, Len: 0
 Source Port: 80
 Destination Port: 1161
 [Stream index: 0]
 [TCP Segment Len: 0]
 Sequence number: 1 (relative sequence number)
 [Next sequence number: 1 (relative sequence number)]
 Acknowledgment number: 33589 (relative ack number)
 0101 = Header Length: 20 bytes (5)
 > Flags: 0x010 (ACK)
 Window size value: 62780
 [Calculated window size: 62780]
 [Window size scaling factor: -2 (no window scaling used)]
 Checksum: 0x4270 [unverified]
 [Checksum Status: Unverified]
 Urgent pointer: 0
 > [SEQ/ACK analysis]
 > [Timestamps]

0000 00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00 ···p...%..s..E·
 0010 00 28 58 89 40 00 37 06 b3 b4 80 77 f5 0c 0c a8 ·(X·@·7·...w....
 0020 01 66 00 50 04 89 34 a2 74 1a 0d d6 85 29 50 10 ·f·P...4·t.....)P·
 0030 f5 3c 42 70 00 00 a4 13 00 00 00 4c ·<Bp....L

The frame matched this coloring rule string (frame.color) | Packets: 213 · Displayed: 213 (100.0%) | Profile: Default

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

If the throughput for the TCP connection is bytes transferred per unit of time, then throughput can be calculated as $\text{throughput_rate} = (\text{total_length}) / (\text{time_elapsed})$. Total length would be calculated as $\text{total_length} = \text{TCP_segmentN_ack} - \text{TCP_segment1_seqno}$, where TCP_segmentN_ack is the ACK value of the last TCP segment sent by the server minus the sequence number of the first TCP segment sent by the client. The time elapsed would be calculated as $\text{time_elapsed} = \text{TCP_segmentN_time} - \text{TCP_segment1_time}$, where TCP_segmentN_time is the time elapsed since the capture first started for the last TCP segment and TCP_segment1_time is the time elapsed since the capture first started for the first TCP segment. Therefore, the throughput is 30222.75 bytes per second.

$$\text{throughput_rate} = (\text{TCP_segmentN_ack} - \text{TCP_segment1_seqno}) / (\text{TCP_segmentN_time} - \text{TCP_segment1_time})$$

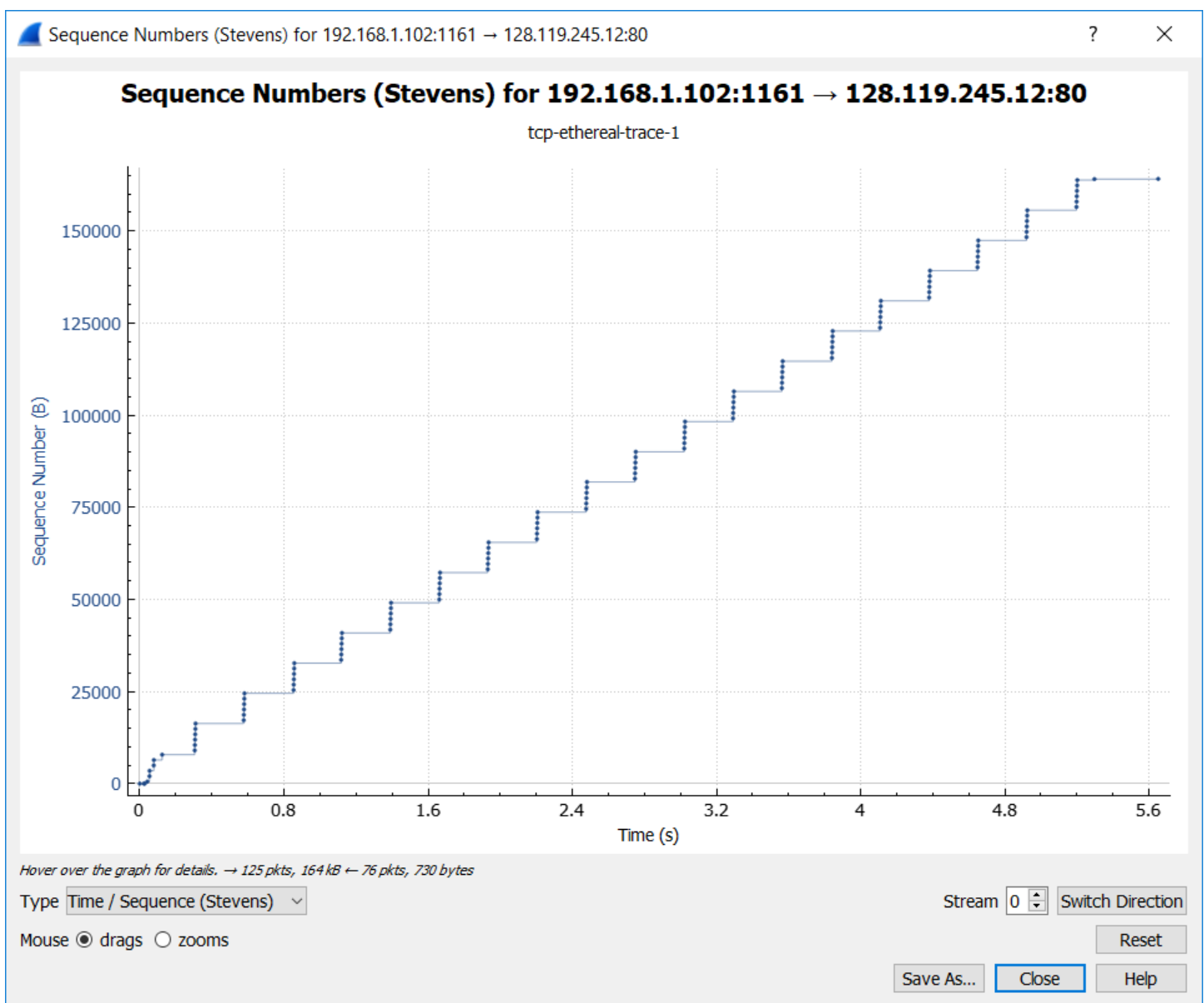
$$\text{throughput_rate} = (164091 - 1) \text{ bytes} / (5.455830000 - 0.026477000) \text{ seconds}$$

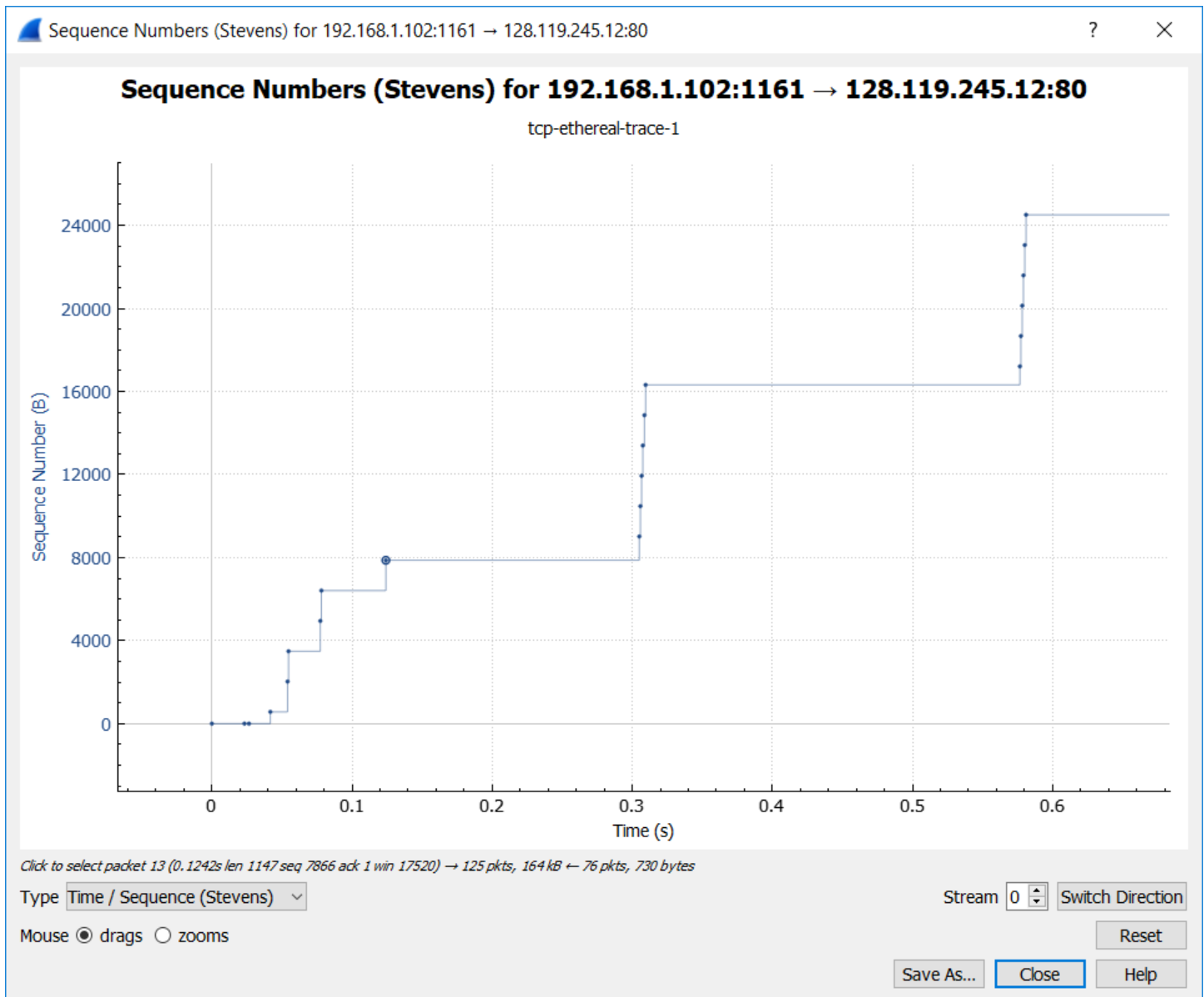
Total_length = 164090 bytes
 Time_elapsed = 5.429353 seconds

$$\begin{aligned} \text{throughput_rate} &= 164090 \text{ bytes} / 5.429353 \text{ s} \\ &= 30222.753981920129341378245253164 \text{ bytes per second} \\ &= 241782.03185536103473102596202531 \text{ bps} \\ &= 241.78203185536103473102596202531 \text{ Mbps} \end{aligned}$$

- 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.

The TCP's slowstart phase begins after sending the first TCP segment at 0.02648s and ends after sending packet 13 around 0.1242s. Congestion avoidance takes over around 0.3s where we see 5 TCP packets transmitted. The measured data differs from the ideal behavior of TCP that is in the text because we do not observe the typical exponential increase in CWND that's described in the text. The first 8 packets look as if slow-start is just beginning to increase the CWND at 0.0s to 0.15s. After this point in time, the measured data transmits in batches of 6 packets even though the window size in the ACK packets are typically much greater than the number of packets transmitted. This is unlike the expected method of transmission described in the text where slow-start CWND increases exponentially until an event occurs that triggers moving to congestion avoidance mode. These slow-start to congestion avoidance event triggers are a loss event indicated a timeout, CWND equals ssthresh, or 3 duplicate ACKs are received.



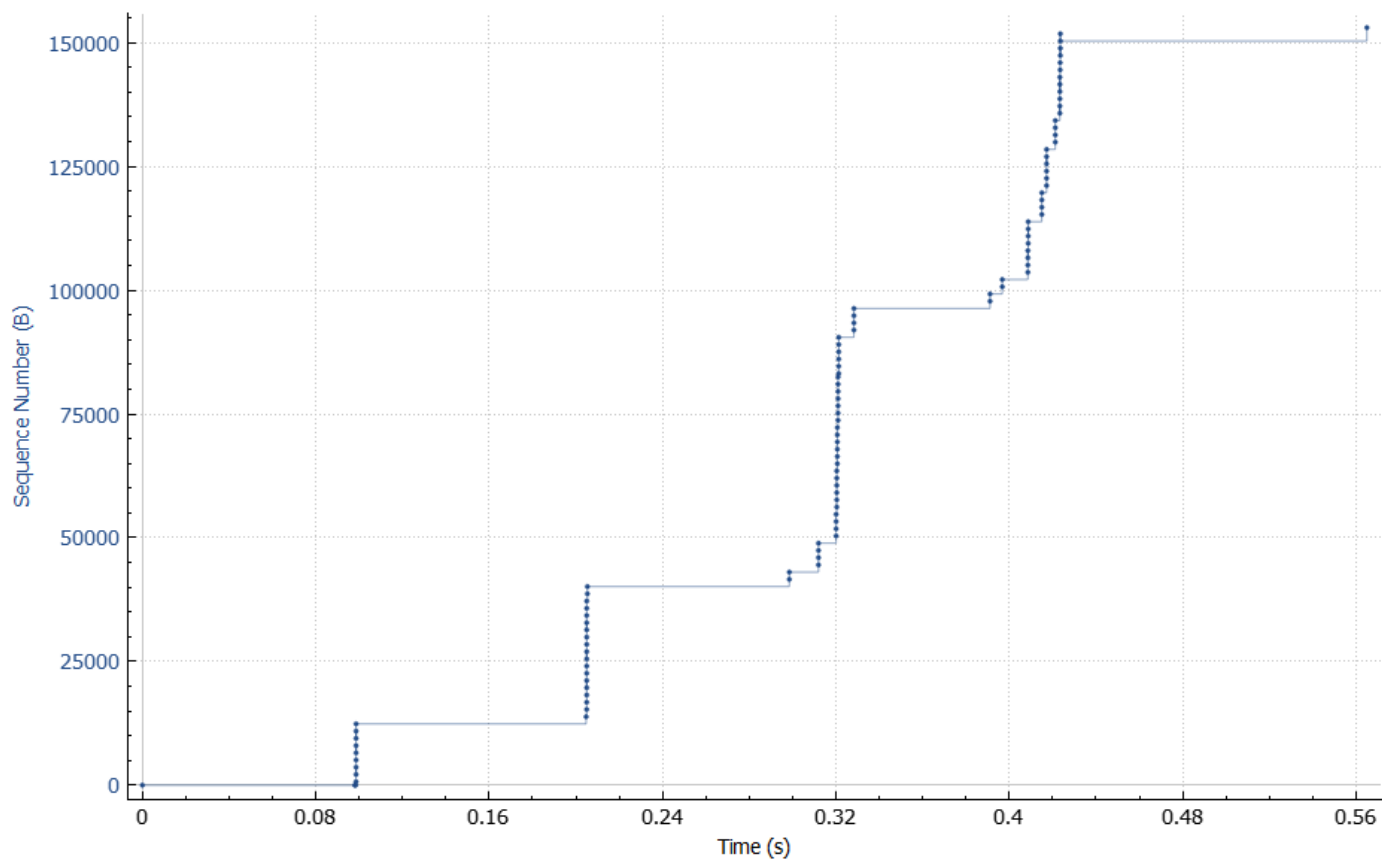


14) Answer Question 13 for the trace that you captured when you transferred a file from your **own** computer to gaia.cs.umass.edu.

The TCP's slowstart phase begins after sending the first TCP segment at 0.10s and ends after sending packet 13 around 0.33s. Congestion avoidance takes over at this point after 0.33s. The measured data is more in line with the ideal behavior of TCP that is in the text because we observed the exponential increase in in MSS until CWND equals the SSTHRESH around 0.33s. At around 0.10s, 8 TCP packets are transmitted. At around 0.22s, 16 TCP packets are transmitted. At around 0.32s, 32 TCP packets are transmitted. This doubling in CWND size matches what is described in the text.

Sequence Numbers (Stevens) for 192.168.10.2:3901 → 128.119.245.12:80

wireshark-traces-2.pcapng



Hover over the graph for details. → 109 pkts, 153 kB ← 46 pkts, 777 bytes

Type Time / Sequence (Stevens) ▾

Stream 6 ▾ Switch Direction

Mouse ☒ drags ☐ zooms

Reset

Save As...

Close

Help