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.

```
Source: 192.168.1.102
Destination: 128.119.245.12
Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 1, Ack: 1, Len: 0
Source Port: 1161
Destination Port: 80
```

Source IP: 192.168.1.102

Source Port: 1161

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?

```
Source: 128.119.245.12
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
```

Destination IP: 128.119.245.12

Destination Port: 80

3. What is the IP address and TCP port number used by your client computer (source) to transfer the file to gaia.cs.umass.edu?

```
Source: 192.168.1.3
Destination: 128.119.245.12
Transmission Control Protocol, Src Port: 56677, Dst Port: 80, Seq: 695, Ack: 1, Len: 13140
Source Port: 56677
Destination Port: 80
```

Source IP: 192.168.1.3 Source Port: 56677

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?

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```
Sequence number: 0 (relative sequence number)

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

Acknowledgment number: 0

1000 .... = Header Length: 32 bytes (8)

Flags: 0x002 (SYN)

Window size value: 64240
```

Sequence #: 0

The SYN flag identifies it as a SYN segment

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?

```
Sequence number: 0 (relative sequence number)

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

Acknowledgment number: 1 (relative ack number)

1000 - Header Length: 32 bytes (8)

Flags: 0x012 (SYN, ACK)
```

Sequence #: 0 ACK value: 1

The ACK value is the client-sent SYN segment number + 1.

The SYN and ACK flags identify the segment as a SYNACK segment.

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.

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```
Sequence number: 1) (relative sequence number)
 [Next sequence number: 695 (relative sequence number)]
 Acknowledgment number: 1 (relative ack number)
 0101 .... = Header Length: 20 bytes (5)
Flags: 0x018 (PSH, ACK)
 Window size value: 256
 [Calculated window size: 65536]
 [Window size scaling factor: 256]
 Checksum: 0x3a00 [unverified]
 [Checksum Status: Unverified]
 Urgent pointer: 0
[SEQ/ACK analysis]
[Timestamps]
 TCP payload (694 bytes)
ata (694 bytes)
 Data: 504f5354202f77697265736861726b2d6c6162732f6c6162...
02 de 3d 90 40 00 80 06 00 00 c0 a8 01 03 80 77
 01 00 3a 00 00 00 50 4f 53 54 20 2f 77 69 72 65 ···· PO ST /wire
 73 68 61 72 6b 2d 6c 61 62 73 2f 6c 61 62 33 2d shark-la bs/lab3-
31 2d 72 65 70 6c 79 2e 68 74 6d 20 48 54 54 50 1-reply. htm HTTP
2f 31 2e 31 0d 0a 48 6f 73 74 3a 20 67 61 69 61 /1.1 Ho st: gaia
```

Sequence #: 1

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

2. (1.69:115.942155) 92.168.1.3 128.119.245.12 TCP 748 56677 + 80 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=694				
1.607.16.03150.27.8.119.245.12 192.168.1.3 TCP 60 80 + 56677 ACK Seq-1 Ack-e95 Nin-30592 Lene0	22 14:07:15.942155 192.168.1.3	128.119.245.12	TCP	748 56677 → 80 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=694
25 (4:07:16.03162.52.168.1.3 128.119.245.12 TCP 1514 56677 + 80 [ACK] Seq-13835 Ack-1 Min-65536 Len-1460 26 14:07:16.032360] 92.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq-15295 Ack-1 Min-65536 Len-2920 28 15:07:16.03391 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-16.15 Win-36336 Len-2920 26.07:16.03391 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-13255 Ack-1 Min-65536 Len-2920 27.07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1325 Ack-1 Min-65536 Len-2920 27.07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-5075 Win-39424 Len-0 37.07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-2 1315 Ack-1 Min-65536 Len-2920 37.07:16.03591 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-2 1315 Ack-1 Min-65536 Len-2920 37.07:16.03591 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-2 4Ack-5075 Win-39424 Len-0 37.07:16.03591 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-24055 Ack-1 Win-65536 Len-2920 37.07:16.03591 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-24055 Ack-1 Win-65536 Len-2920 37.07:16.03591 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-24055 Ack-1 Win-65536 Len-2920 37.07:16.035931 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-3955 Win-48128 Len-0 37.07:16.035931 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-3955 Win-48128 Len-0 39.14:07:16.035994 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-3955 Win-48128 Len-0 39.14:07:16.035994 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-3055 Win-65536 Len-2920 38.14:07:16.035994 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-10915 Win-55536 Len-2920 39.14:07:16.035994 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-10915 Win-55536 Len-2920 39.14:07:16.035995 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-32815 Ack-1 Win-65536 Len-2920 39.14:07:16.035995 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-32835 Ack-1 Win-65536 Len-2920		128.119.245.12	TCP	13194 56677 → 80 [ACK] Seq=695 Ack=1 Win=65536 Len=13140
26 14:07:16.032366 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=2155 Win=33536 Len=0 220 (14:07:16.032391 22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=1 Ack=3615 Win=36536 Len=220 (16:07:16.03391) 21.61.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=3615 Win=36536 Len=2920 (16:07:16.033925]92.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=3615 Win=36536 Len=2920 (16:07:16.033926]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=575 Win=39424 Len=0 (16:07:16.03594]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=6535 Win=24368 Len=0 (16:07:16.03594]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=6535 Win=24368 Len=0 (16:07:16.03594]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=6535 Win=24368 Len=0 (16:07:16.03594]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=6535 Win=24368 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=975 Win=45312 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Exp=26975 Ack=1 Win=65536 Len=2920 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=975 Win=45312 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=975 Win=45312 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=975 Win=65536 Len=2920 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=975 Win=65536 Len=2920 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 (16:07:16.03994]22.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=105536 Len=2920 (16:07:16.125279]22	24 14:07:16.031594 28.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=695 Win=30592 Len=0
2 14:07:16.032380 192.168.1.3	25 14:07:16.031638 192.168.1.3	128.119.245.12	TCP	1514 56677 → 80 [ACK] Seq=13835 Ack=1 Win=65536 Len=1460
28 14.07:16.033911 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=3615 Win=36480 Len=0 29 (4:07:16.033925)92.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=3675 Win=39424 Len=0 31 (4:07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=3675 Win=39424 Len=0 32 (4:07:16.034901 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=3675 Win=39424 Len=0 32 (4:07:16.035904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=3658 Win=42568 Len=2920 32 (4:07:16.035904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=3658 Win=42568 Len=0 32 (4:07:16.035904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=995 Win=48128 Len=0 35 (4:07:16.037942 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=26975 Ack=1 Win=65536 Len=2920 61 (4:07:16.038926 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=26975 Ack=1 Win=65536 Len=0 32 (4:07:16.038939 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=26975 Ack=1 Win=65536 Len=2920 81 (4:07:16.038936 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=28955 Ack=1 Win=65536 Len=2920 81 (4:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=3855 Win=48128 Len=0 14:07:16.049391 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=18355 Win=56536 Len=2920 81 (4:07:16.049391 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920 81 (4:07:16.049391 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920 81 (4:07:16.042375 Win=190.14) 119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920 81 (4:07:16.042375 Win=190.14) 119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=13835 Win=5690 Len=0 81 (4:07:16.042375 Win=190.14) 119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920 81 (4:07:16.12552) 129.2168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=13835 Win=56536 Len=2920 81 (4:07:16.125251 229.168.1.3 128.119.245.12 TCP 2974 56677 80 [ACK] S	26 14:07:16.032366 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=2155 Win=33536 Len=0
29 4:07:16.033925 02.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-18215 Ack-1 Win=65536 Len-2920 30 14:07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-5075 Win-39424 Len=0 31 14:07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-5075 Win-39424 Len=0 32 14:07:16.035904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-6535 Win-42368 Len=0 33 14:07:16.035904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-24055 Ack-1 Win-65536 Len-2920 34 14:07:16.035914 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-24055 Ack-1 Win-65536 Len-2920 34 14:07:16.037942 192.168.1.3 128.119.245.12 TCP 2974 56677 [ACK] Seq-1 Ack-407995 Win-448128 Len=0 35 14:07:16.039942 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-26075 Ack-1 Win-65536 Len-2920 36 14:07:16.038994 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-1 Ack-9455 Win-448128 Len=0 37 14:07:16.038994 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-9455 Win-448128 Len=0 39 14:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-10915 Win-51072 Len=0 40 14:07:16.040915 P2.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-232815 Ack-1 Win-65536 Len-2920 40 14:07:16.040915 P2.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-1 Ack-12375 Win-54016 Len-0 40 14:07:16.040915 P2.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq-1 Ack-12375 Win-5536 Len-2920 40 14:07:16.042375 Win-54016 Len-0 40 14:07:16.12502 Win-54016 Len-0 40 14:07:16.12501 Win-5536 Len-2920 40 14:07:16.12501 P2.168.1.3 TCP 60 80 + 56677 [ACK] Seq-1 Ack-12359 Win-56560 Len-2920 40 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56	21 14:07:16.032380 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [PSH, ACK] Seq=15295 Ack=1 Win=65536 Len=2920
30 14:07:16.034902 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=5075 Win=39424 Len=0 31 14:07:16.035904 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2135 Ack=1 Win=65536 Len=2920 31 14:07:16.035914 192.168.1.3 128.119.245.12 TCP 60 80 + 56677 [ACK] Seq=2 Ack=6535 Win=42368 Len=0 33 14:07:16.035914 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=6535 Win=42368 Len=0 34 14:07:16.035914 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=2 Ack=505 Ack=1 Win=65536 Len=2920 34 14:07:16.037942 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=7995 Win=45312 Len=0 35 14:07:16.038942 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=9455 Win=45326 Len=0 37 14:07:16.038939 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=9455 Win=6536 Len=2920 38 14:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=9455 Win=65536 Len=2920 39 14:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 30 14:07:16.049911 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.049012 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.049012 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.049012 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12385 Win=5536 Len=2920 41 14:07:16.042382 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=1385 Win=56960 Len=0 41 14:07:16.121562 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=1385 Win=56960 Len=0 41 14:07:16.121562 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16255 Win=59904 Len=0 41 14:07:16.121562 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=162556 Len=2920 41 14:07:16.122501 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=16255 Win=65536 Len=2920 41 14:07:16.122501 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=16255	28 14:07:16.033911 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=3615 Win=36480 Len=0
14:07:16.034916 92:168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=21135 Ack=1 Win=65536 Len=2920 2916.0:16.035941 129.168.1.3 128.119.245.12 TCP 60 80 + 56677 [ACK] Seq=1 Ack=6535 Win=42368 Len=0 31 14:07:16.035941 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=24055 Ack=1 Win=65536 Len=2920 34 14:07:16.037931 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=7995 Win=45312 Len=0 35 14:07:16.037942 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=7995 Win=45312 Len=0 36 14:07:16.038939 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=26075 Ack=1 Win=65536 Len=2920 37 14:07:16.0389943 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=22095 Ack=1 Win=65536 Len=2920 38 14:07:16.0389943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 39 14:07:16.038950 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=32815 Ack=1 Win=65536 Len=2920 40 14:07:16.049911 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.042375 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.042375 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.042375 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.042375 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=12375 Win=5536 Len=2920 41 14:07:16.12156 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12395 Win=59904 Len=0 41 14:07:16.12156 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 41 14:07:16.12256 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 41 14:07:16.12256 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16755 Min=65536 Len=2920 41 14:07:16.122507 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16755 Win=65536 Len=2920 41 14:07:16.122507 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=10975 Win=6608 Len=0 51 14:07:16.125	29 4:07:16.033925 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=18215 Ack=1 Win=65536 Len=2920
32 14:07:16.035984 128.119.245.12	30 14:07:16.034902 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=5075 Win=39424 Len=0
33 14:07:16.035914 192.168.1.3	31 14:07:16.034916 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=21135 Ack=1 Win=65536 Len=2920
34 14:07:16.037931 128.119.245.12	32 14:07:16.035904 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=6535 Win=42368 Len=0
35 14:07:16.037942 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=26975 Ack=1 Win=65536 Len=2920 36 14:07:16.038936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=9455 Win=48128 Len=0 37 14:07:16.038939 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=28985 Ack=1 Win=65536 Len=2920 38 14:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 39 14:07:16.039950 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=32815 Ack=1 Win=65536 Len=2920 40 14:07:16.040911 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.040912 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=32815 Ack=1 Win=65536 Len=2920 41 14:07:16.042975] 18.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.042975] 18.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 42 14:07:16.042375] 18.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 42 14:07:16.121562] 28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 45 14:07:16.122516 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 46 14:07:16.122516 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920 48 14:07:16.122516 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=1 Ack=16755 Win=62720 Len=0 49 14:07:16.122507 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=1065536 Len=2920 48 14:07:16.12507 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=1065536 Len=2920 50 14:07:16.125904] 18.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=1 Ack=1065536 Len=2920 50 14:07:16.125904] 18.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=1 Ack=1065536 Len=2920 51 14:07:16.125904] 18.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=1 Ack=1065536 Len=2920 51 14:07:16.125904] 18.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=1 Ack=1065536 Len=2920 51 14:07:16.125904] 18.119.245.12 TCP 2974 56677 → 80	33 14:07:16.035914 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=24055 Ack=1 Win=65536 Len=2920
36 14:07:16.038926 128.119.245.12	34 14:07:16.037931 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=7995 Win=45312 Len=0
37 14:07:16.038939 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=29895 Ack=1 Win=65536 Len=2920 38 14:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 39 14:07:16.039959 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=32815 Ack=1 Win=65536 Len=2920 40 14:07:16.040911 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 41 14:07:16.042975 18.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920 42 14:07:16.042375 18.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=13835 Win=56960 Len=0 43 14:07:16.042382 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 44 14:07:16.121562 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 45 14:07:16.121562 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 46 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=15295 Win=65536 Len=2920 48 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=15295 Win=65536 Len=2920 48 14:07:16.123775 [ACC] 18.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 48 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 49 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 50 14:07:16.12507 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 51 14:07:16.125090 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 52 14:07:16.125901 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 52 14:07:16.125904 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50355 Ack=1 Win=65536 Len=2920 53 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50355 Ack=1 Win=65536 Len=2920 54 14:07:16.127961 192.168.1.3 128.119.245.1	35 14:07:16.037942 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=26975 Ack=1 Win=65536 Len=2920
38 14:07:16.039943 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=10915 Win=51072 Len=0 39 14:07:16.039950 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=32815 Ack=1 Win=65536 Len=2920 40 14:07:16.040911 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=3755 Ack=1 Win=65536 Len=2920 41 14:07:16.040918 392.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=37575 Ack=1 Win=65536 Len=2920 42 14:07:16.042375 1p8.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=1335 Win=56960 Len=0 43 14:07:16.042382 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 44 14:07:16.121562 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 45 14:07:16.122561 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16755 Win=65536 Len=2920 46 14:07:16.122516 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920 47 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=16755 Win=62720 Len=0 47 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=16755 Win=65664 Len=0 49 14:07:16.122539 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 50 14:07:16.12507 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=18215 Win=65664 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=10675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=19675 Win=65536 Len=2920 52 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=2055 Win=70566 Len=2920 53 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=2055 Win=70566 Len=2920 54 14:07:16.127904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=2055 Win=7056 Len=2920 55 14:07:16.128986 [128.119.245.12 192.168.1.3 TCP 60 8	36 14:07:16.038926 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=9455 Win=48128 Len=0
39 14:07:16.039950 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=32815 Ack=1 Win=65536 Len=2920 40 14:07:16.040911 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0 41 14:07:16.040915 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920 42 14:07:16.042375 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=13835 Win=56960 Len=0 43 14:07:16.042382 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 44 [4:07:16.121562] 28.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 45 14:07:16.122560 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=41575 Ack=1 Win=65536 Len=2920 46 14:07:16.122516 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16755 Win=62720 Len=0 47 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920 48 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=16755 Win=66606 Len=0 49 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=18215 Win=65536 Len=2920 50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21315 Win=71552 Len=0 51 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21355 Win=71552 Len=0 51 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 51 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 51 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 51 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 +	37 14:07:16.038939 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=29895 Ack=1 Win=65536 Len=2920
40 14:07:16.040911 128.119.245.12	38 14:07:16.039943 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=10915 Win=51072 Len=0
41 14:07:16.040016 192.168.1.3	39 14:07:16.039950 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [PSH, ACK] Seq=32815 Ack=1 Win=65536 Len=2920
14:07:16.042375 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=18355 Win=56960 Len=0 43 14:07:16.042382 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 44 (14:07:16.121562 328.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 45 14:07:16.122569 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=41Ack=16755 Win=65536 Len=2920 46 14:07:16.122519 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16755 Win=662720 Len=0 47 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920 48 (14:07:16.123775 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=4 Ack=18215 Win=655664 Len=0 49 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=47415 Ack=1 Win=65536 Len=2920 50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 52 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21315 Win=71552 Len=0 53 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21355 Win=71552 Len=0 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=71552 Len=0 55 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=7536 Len=2920 56 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 56 14:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 57 14:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	40 14:07:16.040911 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=12375 Win=54016 Len=0
43 14:07:16.042382 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920 44 14:07:16.121562 328.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0 45 14:07:16.122516 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=16755 Win=65536 Len=2920 46 14:07:16.122516 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=16755 Win=66720 Len=0 47 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=444495 Ack=1 Win=65536 Len=2920 48 14:07.16.123775 108.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=4 Ack=18215 Win=65536 Len=2920 49 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [PSH, ACK] Seq=47415 Ack=1 Win=65536 Len=2920 50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [14:07:16.125904]28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [14:07:16.125904]28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=21355 Win=71552 Len=0 51 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 51 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 51 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 51 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 51 14:07:16.128986]28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 51 14:07:16.128986]28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0 51 14:07:16.128986]28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0 51 14:07:16.128986]28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [AC	41 14:07:16.040018 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920
44 [4:07:16.121562] 28.119.245.12	2 14:07:16.042375 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=13835 Win=56960 Len=0
45 14:07:16.121600 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=41575 Ack=1 Win=65536 Len=2920 46 14:07:16.122516 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=16755 Win=62720 Len=0 47 14:07:16.122529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920 48 14:07.16.123793 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=18215 Win=65664 Len=0 49 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=47415 Ack=1 Win=65536 Len=2920 50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [14:07:16.125904]28.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0 53 14:07:16.127936 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 51 14:07:16.127936 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 51 14:07:16.127936 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127936 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127936 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=22595 Win=774496 Len=0 55 14:07:16.127936 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 50 14:07:16.128986 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50175 Ack=1 Win=65536 Len=2920 51 14:07:16.128986 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=22595 Win=77312 Len=0 51 14:07:16.128986 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=24055 Win=77312 Len=0 51 14:07:16.128986 128.119.245.12 TCP 2974 56677 Ack] Seq=1 Ack=24055 Win=77312 Len=0 51 14:07:16.128986 128.119.245.12 TCP 2974 56677 Ack] Seq=1 Ack=24055 Win=77312 Len=0 51 14:07:16.128986 128.119.245.12 TCP 2974 56677 Ack] Seq=1 Ack=24055 Win=77312 Len=0 51 14:07:16.128986 128.119.245.12 TCP 2974 56677 Ack] Seq=1 Ack=24055 Win=77312 Len=0 51 14		128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920
46 14:07:16.122516 128.119.245.12	44 14:07:16.121562 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=15295 Win=59904 Len=0
47 14:07:16.12529 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920 48 14:07.16.123775 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=18215 Win=65664 Len=0 49 14:07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [PSH, ACK] Seq=47415 Ack=1 Win=65536 Len=2920 50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [4:07:16.125904] 28.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0 53 14:07:16.125911 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=6175 Ack=24055 Win=77312 Len=0	45 14:07:16.121600 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=41575 Ack=1 Win=65536 Len=2920
48 [4:07:16.123775]] 48 [14:07:16.123775]] 48 [14:07:16.123775]] 48 [14:07:16.123775]] 48 [14:07:16.123775]] 49 [14:07:16.123775]] 40 [14:07:16.123775]] 40 [14:07:16.123775]] 41 [14:07:16.123775]] 42 [14:07:16.125017]] 42 [14:07:16.125017]] 43 [14:07:16.125017]] 44 [14:07:16.125017]] 45 [14:07:16.125017]] 46 [14:07:16.125017]] 46 [14:07:16.125017]] 47 [14:07:16.125017]] 48 [14:07:16.125017]] 48 [14:07:16.125017]] 49 [14:07:16.125017]] 40 [14:07:16.125017]] 40 [14:07:16.125017]] 41 [14:07:16.125017]] 42 [14:07:16.125017]] 43 [14:07:16.125017]] 44 [14:07:16.125017]] 45 [14:07:16.125017]] 46 [14:07:16.125017]] 46 [14:07:16.125017]] 47 [14:07:16.125017]] 48 [14:07:16.125017]] 48 [14:07:16.125017]] 49 [14:07:16.125017]] 40 [14:07:16.125017]] 40 [14:07:16.125017]] 41 [14:07:16.125017]] 42 [14:07:16.125017]] 42 [14:07:16.125017]] 43 [14:07:16.125017]] 44 [14:07:16.125017]] 45 [14:07:16.125017]] 45 [14:07:16.125017]] 46 [14:07:16.125017]] 47 [14:07:16.125017]] 48 [14:07:16.125017]] 48 [14:07:16.125017]] 48 [14:07:16.125017]] 48 [14:07:16.125017]] 49 [14:07:16.125017]] 49 [14:07:16.125017]] 40 [14:07:16.125017]] 40 [14:07:16.125017]] 41 [14:07:16.125017]] 42 [14:07:16.125017]]	46 14:07:16.122516 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=16755 Win=62720 Len=0
49 14-07:16.123793 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [PSH, ACK] Seq=47415 Ack=1 Win=65536 Len=2920 50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125904 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [14:07:16.125904] 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0 53 14:07:16.125911 192.168.1.3 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 54 14:07:16.127936 128.119.245.12 TCP 2974 56677 [ACK] Seq=1 Ack=22595 Win=7496 Len=0 55 14:07:16.127936 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=1 Ack=22595 Win=7496 Len=0 55 14:07:16.127936 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=51255 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=5175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 TCP 2974 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	47 14:07:16.122529 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920
50 14:07:16.125017 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0 51 14:07:16.125030 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [4:07:16.125904] 28.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0 53 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=7496 Len=2920 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54 14:07:16.127861 192.168.1.3 128.119.245.12 TCP 2974 56677 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54 14:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	48 14:07:16.123775 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=18215 Win=65664 Len=0
51 14:07:16.125903 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920 52 [4:07:16.125904] 28.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0 53 14:07:16.125911 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.127961 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	49 14:07:16.123793 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [PSH, ACK] Seq=47415 Ack=1 Win=65536 Len=2920
52 14:07:16.125904 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0 53 14:07:16.125911 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54 14:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	50 14:07:16.125017 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=19675 Win=68608 Len=0
53 14:07:16.125911 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920 54 14:07:16.127936 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=22595 Win=74496 Len=0 55 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 54:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	51 14:07:16.125030 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=50335 Ack=1 Win=65536 Len=2920
54 14:07:16.127936 128.119.245.12	52 14:07:16.125904 228.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=21135 Win=71552 Len=0
55 14:07:16.127961 192.168.1.3 128.119.245.12 TCP 2974 56677 + 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920 5 14:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	53 14:07:16.125911 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=53255 Ack=1 Win=65536 Len=2920
56 14:07:16.128986 128.119.245.12 192.168.1.3 TCP 60 80 + 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0	54 14:07:16.127936 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=22595 Win=74496 Len=0
	55 14:07:16.127961 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=56175 Ack=1 Win=65536 Len=2920
57 14:07:16.129020 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seg=59095 Ack=1 Win=65536 Len=2920	56 14:07:16.128986 128.119.245.12	192.168.1.3	TCP	60 80 → 56677 [ACK] Seq=1 Ack=24055 Win=77312 Len=0
	57 14:07:16.129020 192.168.1.3	128.119.245.12	TCP	2974 56677 → 80 [ACK] Seq=59095 Ack=1 Win=65536 Len=2920

Packet #	22	23	25	27	29	31
Time Sent	14:07:15.9 42155	14:07:15.9 42258	14:07:16.0 31638	14:07:16.0 32380	14:07:16.0 33925	14:07:16.0 34916
Time ACK Received	14:07:16.0 31594	14:07:16.0 42375	14:07:16.1 21562	14:07:16.1 23775	14:07:16.1 25904	14:07:16.1 28986
SampleRTT	0.089439	0.100117	0.089924	0.091395	0.091979	0.09407
EstimatedRTT	0.089439	0.090774	0.090668	0.090759	0.090912	0.091307

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

Segment	1	2	3	4	-	5	6	
	35 14:07:16.037942 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=26975 Ack=1 Win=65536 Len=2920							
34 14:07:16.037931		128.119.245.12 192.168.1.3	TCP					
	32 14:07:16.035904 128.119.245.12 192.168.1.3 TCP 60 80 → 56677 [ACK] Seq=1 Ack=6535 Win=42368 Len=0 33 14:07:16.035914 192.168.1.3 128.119.245.12 TCP 2974 56677 → 80 [ACK] Seq=24055 Ack=1 Win=65536 Len=2920							
	14:07:16.034916 192.168.1.3 128.119.245.12 TCP (2974)56677 → 80 [ACK] Seq=21135 Ack=1 Win=65536 Len=2920							
30 14:07:16.034902		192.168.1.3	TCP			q=1 Ack=5075 Win=39424		
29 14:07:16.033925	192.168.1.3	128.119.245.12	TCP	2974 56677 →	80 [ACK] Se	q=18215 Ack=1 Win=6553	6 Len=2920	
28 14:07:16.033911	128.119.245.12	192.168.1.3	TCP	60 80 → 56	677 [ACK] Se	q=1 Ack=3615 Win=36480	Len=0	
27 14:07:16.032380	192.168.1.3	128.119.245.12	TCP	2974 36677 →	80 [PSH, AC	K] Seq=15295 Ack=1 Wir	=65536 Len=2920	
26 14:07:16.032366	128.119.245.12	192.168.1.3	TCP	60,80 → 56	677 [ACK] Se	q=1 Ack=2155 Win=33536	Len=0	
25 14:07:16.031638	192.168.1.3	128.119.245.12	TCP			q=13835 Ack=1 Win=6553		
24 14:07:16.031594		192.168.1.3	TCP			q=1 Ack=695 Win=30592		
23 14:07:15.942258		128,119,245,12	TCP		THE RESERVE THE PROPERTY OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TO	g=695 Ack=1 Win=65536		
22 14:07:15.942155	192.168.1.3	128,119,245,12	TCP	748 66677 →	80 [PSH. AC	K] Seq=1 Ack=1 Win=655	36 Len=694	

Length	748	13194	1514	2974	2974	2974
_						

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

```
Window size value: 256

[Calculated window size: 65536]

[Window size scaling factor: 256]
```

Minimum available buffer: 65536

The sender was never throttled during the span of the trace.

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 segments were retransmitted. This was confirmed by finding no segments with duplicate sequence numbers.

11. How much data does the receiver typically acknowledge in an ACK? Can you identify cases where the receiver is ACKing every other received segment (see Table 3.2 on page 250 in the text).

```
60 80 → 56677 [ACK] Seq=1 Ack=695 Win=30592 Len=0
1514 56677 → 80 [ACK] Seq=13835 Ack=1 Win=65536 Len=1460
 60 80 → 56677 [ACK] Seq=1 Ack=2155 Win=33536 Len=0
2974 56677 → 80 [PSH, ACK] Seg=15295 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=3615 Vin=36480 Len=0
2974 56677 → 80 [ACK] Seq=18215 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=5075 Win=39424 Len=0
2974 56677 → 80 [ACK] Seq=21135 Ack-1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq 1 Ack=6535 Vin=42368 Len=0
2974 56677 → 80 [ACK] Seq=24055 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 (Ack=7995 Vin=45312 Len=0
2974 56677 -> 80 [ACK] Seq=26975 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq= Ack=9455 Nin=48128 Len=0
2974 56677 → 80 [ACK] Seq=29895 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=10915 vin=51072 Len=0
2974 56677 → 80 [PSH, ACK] Seg=32815 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 ACK=12375 Nn=54016 Len=0
2974 56677 → 80 [ACK] Seq=35735 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=13835 Din=56960 Len=0
2974 56677 → 80 [ACK] Seq=38655 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=15295 Min=59904 Len=0
2974 56677 → 80 [ACK] Seq=41575 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=16755 Win=62720 Len=0
2974 56677 → 80 [ACK] Seq=44495 Ack=1 Win=65536 Len=2920
 60 80 → 56677 [ACK] Seq=1 Ack=18215 Vin=65664 Len=0
```

The ACKs regularly sent 1460 byte packets. This can be seen in the difference in ACK values.

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

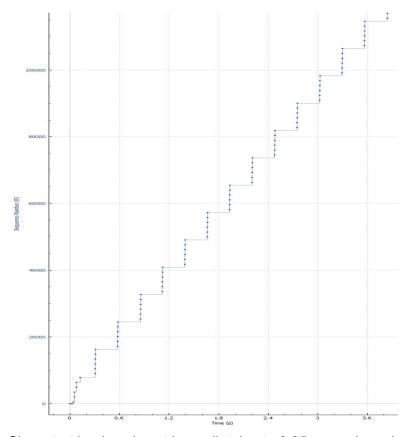
Throughput is calculated by dividing the total amount of data (in bytes) by the duration of time it took to transfer that data. Start time of the transfer can be pulled the the segment that sends the POST data from question 7. Our end time is from the last sent packet of our data as seen in the screenshot above. The sequence number from this last segment can also be used to see how many total bytes we have transferred up to this point.

Start time: 14:07:15.942155 End time: 14:07:16.232928 Bytes transferred: 150309

Throughput =
$$\frac{bytes\ transferred}{Elapsed\ time}$$
 = $\frac{bytes\ transferred}{End\ time}$ = $\frac{150309}{16.232928-15.942155}$ = 516929

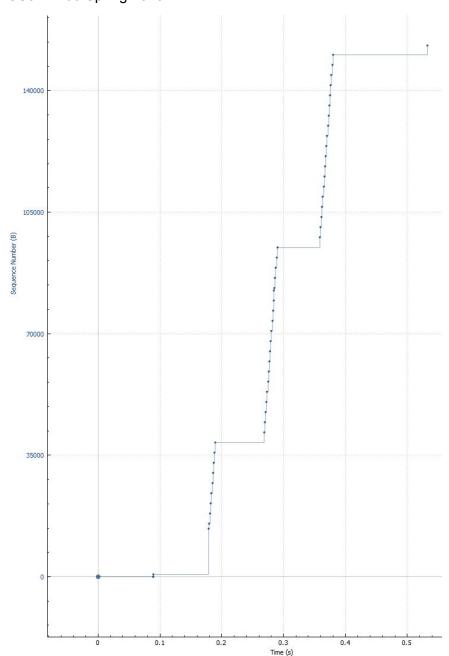
Throughput: 516929 bytes/sec

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



Slow-start begins almost immediately at \sim 0.05 seconds and continues until \sim 0.1 seconds. Then congestion avoidance takes over by growing linearly, but because congestion is detected after sending just a few packets it delays sending more for a bit. This differs from ideal behavior because we aren't seeing linear growth of packets sent, but rather these steps at regular intervals.

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



Similar to the provided trace, slow-start begins almost immediately and ends right before 0.09 seconds. The congestion avoidance looks similar to the previous graph as well, but now more packets are being sent before in fewer groupings. This causes only a few, very tall steps to be seen.