Lab 03 CS372

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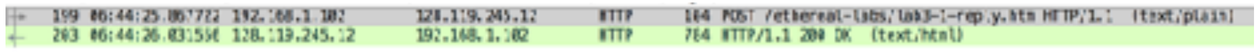
Introduction to Networks

October 31, 2017

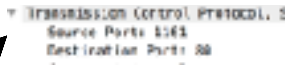
Lab 03



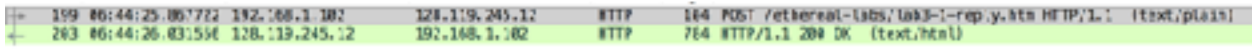
```
199 06:44:25.067722 192.168.1.102    128.119.245.12    HTTP    164 POST /ethereal-labs/lab3-1-reply.htm HTTP/1.1  (text/plain)
203 06:44:26.031556 128.119.245.12   192.168.1.102     HTTP    784 HTTP/1.1 200 OK  (text/html)
```

1. Client IP: 192.119.245.12

   Source Port:1161



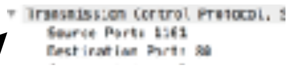
```
▾ Transmission Control Protocol, S
    Source Port: 1161
    Destination Port: 80
```



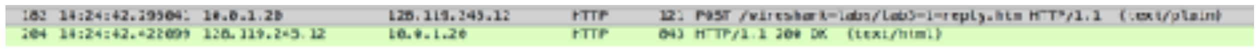
```
199 06:44:25.067722 192.168.1.102    128.119.245.12    HTTP    164 POST /ethereal-labs/lab3-1-reply.htm HTTP/1.1  (text/plain)
203 06:44:26.031556 128.119.245.12   192.168.1.102     HTTP    784 HTTP/1.1 200 OK  (text/html)
```

1. Client IP: 128.119.245.12

   Source Port: 80



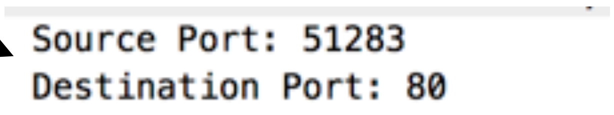
```
▾ Transmission Control Protocol, S
    Source Port: 1161
    Destination Port: 80
```



```
182 14:24:42.295041 10.0.1.20        128.119.245.12    HTTP    121 POST /wireshark-labs/lab3-1-reply.htm HTTP/1.1  (text/plain)
204 14:24:42.422099 128.119.245.12   10.0.1.20         HTTP    843 HTTP/1.1 200 OK  (text/html)
```

3. My computer IP: 10.0.1.20

   My Sending Port: 51283

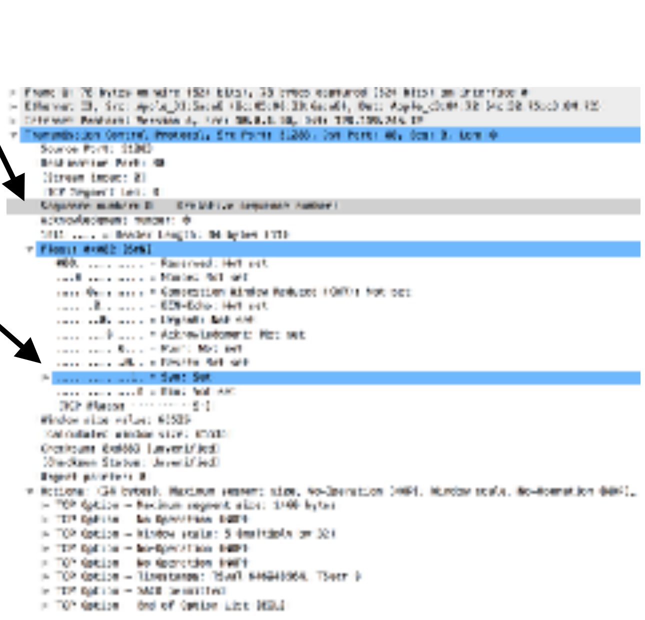


```
Source Port: 51283
Destination Port: 80
```

4. The relative sequence number is 0.

   The SYN flag is set which indicates

   this is a SYN segment.



[illegible]

5. Relative sequence number is 0.

   ACK field is 1 (relative).

   It is the acknowledgement that

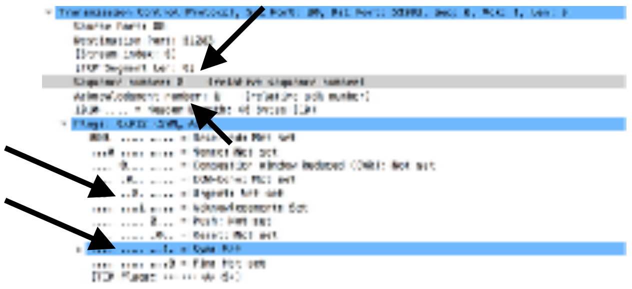
   the SYN segment was received from

   the client, 1 indicates the byte address

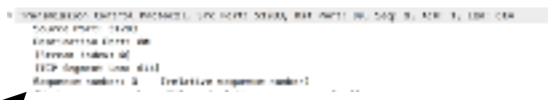
   immediately after the first SYN segment.

   It is a SYNACK segment because both the

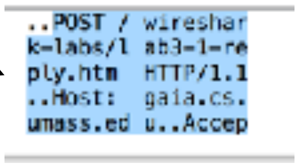
   SYN and ACK flags are set.



[illegible]



6. Sequence number is 1.



```
..POST / wireshar
k-labs/l ab3-1-re
ply.htm  HTTP/1.1
..Host:  gaia.cs.
umass.ed u..Accep
```

7. First 6 sequence numbers: 1 , 615 , 752 , 2140 , 3528 , 4916

Time sent 6 sequence numbers:

1. 14:24:41.735559
2. 14:24:41.735772
3. 14:24:41.736149
4. 14:24:41.736150
5. 14:24:41.819877
6. 14:24:41.822406

Time ACK Recieved

First 6 segments:

1. 14:24:41.819803000 PDT
2. 14:24:41.820416000 PDT
3. 14:24:41.822360000 PDT
4. 14:24:41.836461000 PDT
5. 14:24:41.906196000 PDT
6. 14:24:41.913117000 PDT

RTT value for first 6 segments:

1. 0.084244000 seconds]
2. 0.084644000 seconds]
3. 0.086211000 seconds]
4. 0.100311000 seconds
5. 0.086319000 seconds]
6. 0.090711000 seconds]

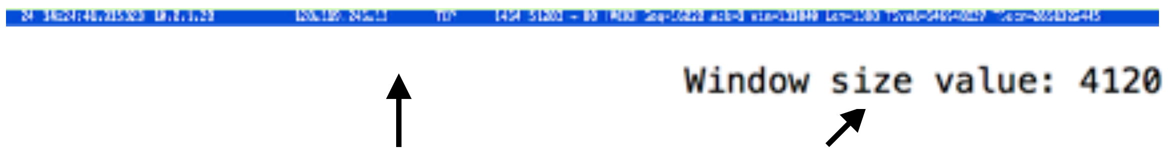
Estimated RTT for first 6 segments:

1. .084244000 seconds
2. .07460484 seconds
3. .06608320 seconds
4. .05865140 seconds
5. .06210985 seconds
6. .06643499 seconds

8.

length of first 6 TCP segments:

1. [TCP Segment Len: 614]
2. [TCP Segment Len: 137]
3. [TCP Segment Len: 1388]
4. [TCP Segment Len: 1388]
5. [TCP Segment Len: 1388]
6. [TCP Segment Len: 1388]

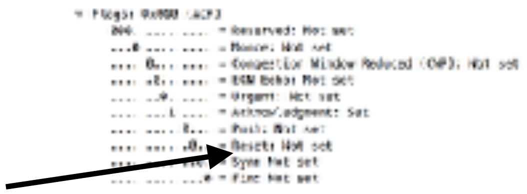


```
24 14:24:40.215320 10.0.1.20 128.119.245.12 TCP 1454 51203 → 80 [ACK] Seq=15628 Ack=1 Win=131840 Len=1388 TSval=[illegible] TSecr=[illegible]
```

```
Window size value: 4120
```

9. Minimum window size is at 4120. The window size value is 236.

It does throttle the sender because in future tcp segments the sending length is 1388. The receiver can only accept two packets at a time without overwhelming the window. Therefore, all subsequent segments are sent in pairs with ACK messages sent back by receiver in between. Congestion window reduced is never set so the window never throttles beyond the 4120 window size.



```
▾ Flags: 0x010 (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
    .... .... ..0. = Syn: Not set
    .... .... ...0 = Fin: Not set
```

10. There are no retransmitted segments. This can be viewed by either entering tcp.-analysis.retransmission in the display filter or searching all the tcp segment flags for the reset flag set to 1.

11. Receiver is typically ACKing 1388 bytes. This is calculated by the difference be-tween one ACK number and the ACK prior. There is a block of segments between 32 and 52 that alternate between sending segment and ACK. The segment lengths and amount of data ACKed for this range remain 1388.

12. Throughput = amount of data transmitted / time to transmit all data

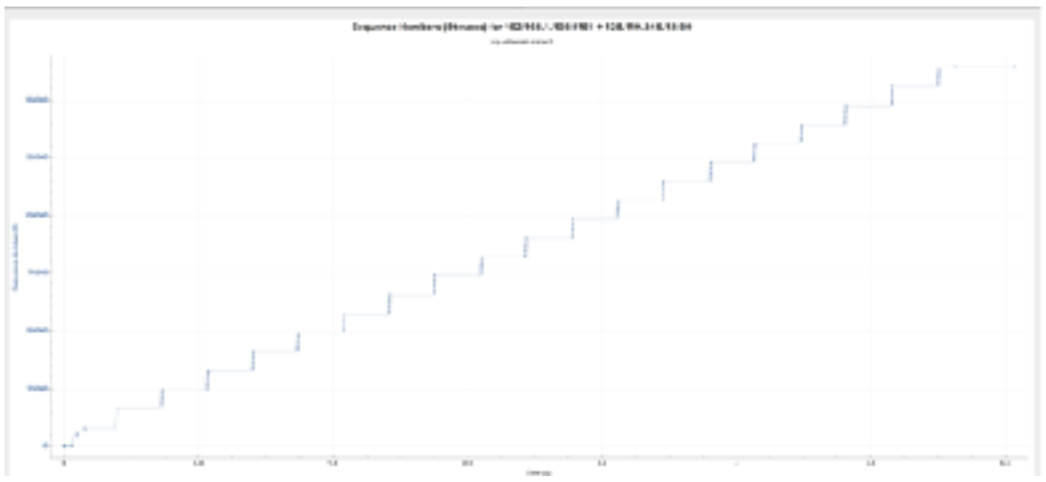
Time to transmit all data is: time last segment - time first segment

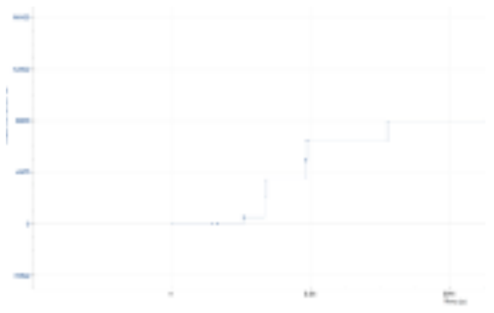
Amount of data transmitted in bytes is = the sequence number of last segment.

Therefore, for this trace, with a total data transmitted of 149,323 bytes,

and total time to transmit of .77 seconds, then throughput = 193,095.912 bytes/sec or

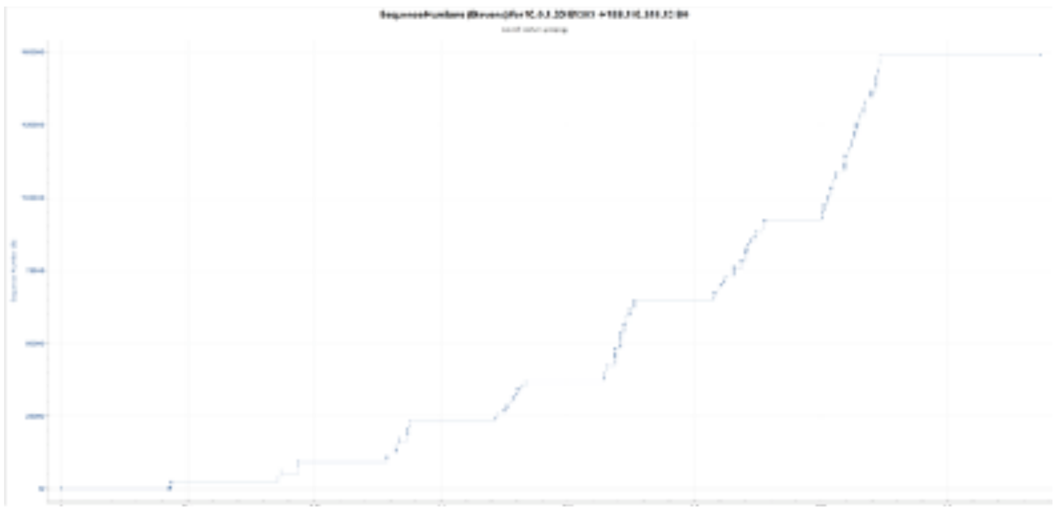
roughly 193kb a second.





13. The above graph shows the slow start phase for the given trace. It appears the slow start phase only lasts for roughly the first second. The growth of the TCP segment window does not

grow linearly as expected but instead remains in incremental congestion control for the duration of the trace. The sender sends segments in consistent groups of 6 segments instead of the number of segments increasing throughout the entire transfer. This may indicate that server has a separate limit on transfer outside of the tcp protocol. It may also be that the version of tcp does not increase the window at linear growth until a segment loss has occurred and the window is reduced before growing again.



14. The graph of the slow start phase for my own trace appears to be similar to the previous graph though the time is significantly limited. Instead of the transmission occurring over the course of 6 seconds this transmission happens in < 1 second. this may explain why the growth rate appears to be exponentially increasing up until the end of transmission. This indicates that the transmission is still in the slow growth phase at the time of transmission completion. These results also differ from the previous results in that the slow growth phase appears to be exponential which is to be expected. This graph more accurately depicts the idealized progression of transmission size over time that the slow growth phase is characterized by.