

# COMPUTER NETWORK LAB

## LAB 3A

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## LAB 3A

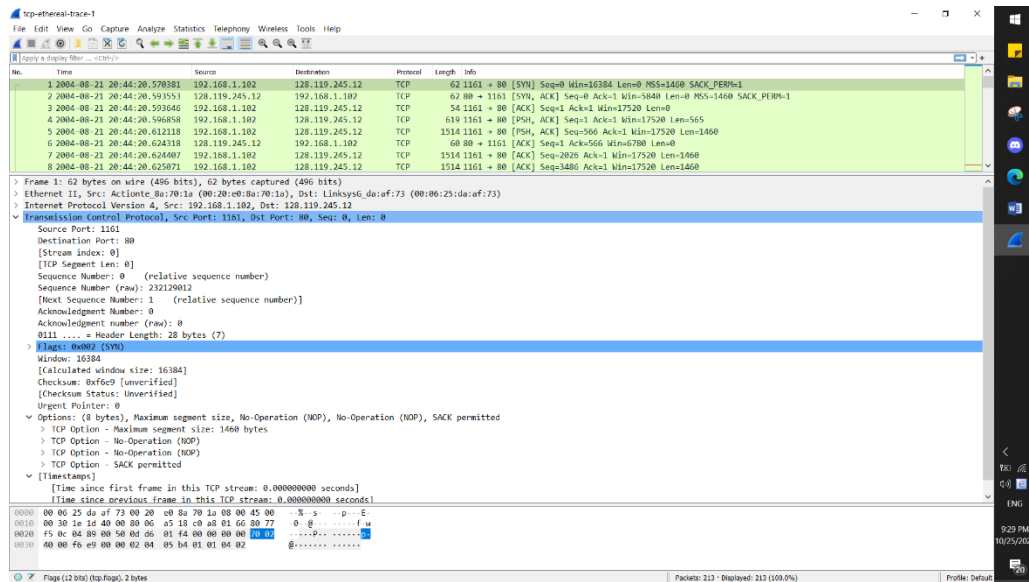
The image shows a Wireshark packet capture of a TCP connection. The packet list on the left shows several packets, with packet 199 being the one of interest. The packet details pane on the right shows the structure of the packet, including the Ethernet II header, Internet Protocol Version 4 header, and Transmission Control Protocol header. The packet bytes pane at the bottom shows the raw data of the packet.

No.	Time	Source	Destination	Protocol	Length	Info
187	2004-08-21 20:44:25.674556	Intel_52:2b:23	Broadcast	ARP	42	Who has 192.168.1.1? Tell 192.168.1.100
188	2004-08-21 20:44:25.675441	LinksysG:da:af:73	Intel_52:2b:23	ARP	42	192.168.1.1 is at 00:06:25:da:af:73
189	2004-08-21 20:44:25.676042	192.168.1.102	192.168.1.102	SSDP	174	M-SEARCH * HTTP/1.1
190	2004-08-21 20:44:25.695400	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=154117 Win=62780 Len=0
191	2004-08-21 20:44:25.767667	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=156469 Win=62780 Len=0
192	2004-08-21 20:44:25.767889	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=156469 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
193	2004-08-21 20:44:25.768769	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]
194	2004-08-21 20:44:25.769656	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	2004-08-21 20:44:25.770633	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=160049 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
196	2004-08-21 20:44:25.771531	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	2004-08-21 20:44:25.772405	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	2004-08-21 20:44:25.867638	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=159389 Win=62780 Len=0
199	2004-08-21 20:44:25.867722	192.168.1.102	128.119.245.12	HTTP	104	POST /etherreal-labs/lab3-1-reply.htm HTTP/1.1 (text/plain)
200	2004-08-21 20:44:25.959552	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=163209 Win=62780 Len=0
201	2004-08-21 20:44:26.018268	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=164041 Win=62780 Len=0
202	2004-08-21 20:44:26.026211	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=164091 Win=62780 Len=0
203	2004-08-21 20:44:26.031556	128.119.245.12	192.168.1.102	HTTP	784	HTTP/1.1 200 OK (text/html)
204	2004-08-21 20:44:26.168471	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1
205	2004-08-21 20:44:26.169163	192.168.1.100	192.168.1.1	SSDP	175	M-SEARCH * HTTP/1.1
206	2004-08-21 20:44:26.221522	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=164091 Ack=731 Win=16790 Len=0
207	2004-08-21 20:44:26.671425	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1
208	2004-08-21 20:44:26.672450	192.168.1.100	192.168.1.1	SSDP	175	M-SEARCH * HTTP/1.1

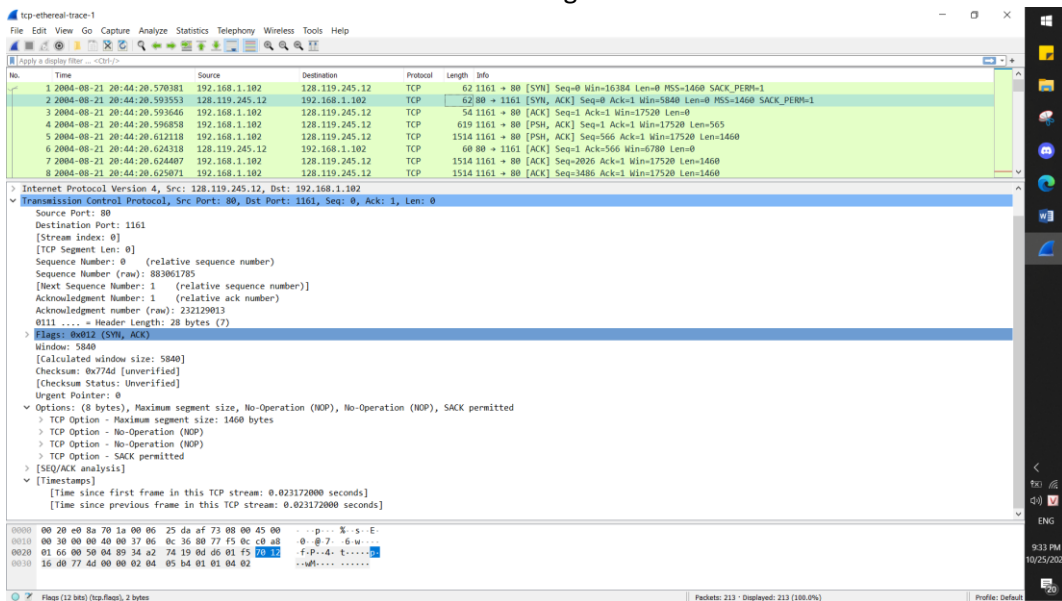
Frame 199: 104 bytes on wire (832 bits), 104 bytes captured (832 bits) on interface 0  
Ethernet II, Src: Actionte\_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG:da:af:73 (00:06:25:da:af:73)  
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12  
Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 164041, Ack: 1, Len: 50  
Source Port: 1161  
Destination Port: 80  
[Stream index: 0]  
[TCP Segment Len: 50]  
Sequence Number: 164041 (relative sequence number)  
Sequence Number (raw): 23220853  
[Next Sequence Number: 164091 (relative sequence number)]  
Acknowledgment Number: 1 (relative ack number)  
Acknowledgment number (raw): 883061786

Frame (104 bytes) Reassembled TCP (164091 bytes)  
tcp-etherreal-trace-1 Packets: 213 · Displayed: 213 (100.0%) Profile: Default

1. The source IP address is 192.168.1.102, the source port is 1161
2. The destination IP address is 128.119.245.12, the destination port is 80
3. .



4. The sequence number is 0. We can see that the message contains a SYN flag indicating that it is a SYN segment



5. The sequence number of the SYNACK segment is 0  
The value of the ACK field is 1. This value is determined by the initial sequence number +1  
The message carries flags that show it to be a SYNACK message

No.	Time	Source	Destination	Protocol	Length	Info
187	2004-08-21 20:44:25.674556	Intel_52:2b:23	Broadcast	ARP	42	Who has 192.168.1.1? Tell 192.168.1.100
188	2004-08-21 20:44:25.675441	Linksys6_da:af:73	Intel_52:2b:23	ARP	42	192.168.1.1 is at 00:06:25:da:af:73
189	2004-08-21 20:44:25.676302	192.168.1.100	192.168.1.1	SSDP	175	M-SEARCH * HTTP/1.1
189	2004-08-21 20:44:25.676400	128.119.245.12	192.168.1.102	TCP	60	60 → 1161 [ACK] Seq=154117 Win=62780 Len=0
191	2004-08-21 20:44:25.767667	128.119.245.12	192.168.1.102	TCP	60	60 → 1161 [ACK] Seq=154649 Win=62780 Len=0
192	2004-08-21 20:44:25.767889	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=154649 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
193	2004-08-21 20:44:25.768789	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=157929 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
194	2004-08-21 20:44:25.769656	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=159389 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
195	2004-08-21 20:44:25.770633	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=160849 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
196	2004-08-21 20:44:25.771531	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=162389 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
197	2004-08-21 20:44:25.772485	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	2004-08-21 20:44:25.867638	128.119.245.12	192.168.1.102	TCP	60	60 → 1161 [ACK] Seq=159389 Win=62780 Len=0
199	2004-08-21 20:44:25.867732	192.168.1.102	128.119.245.12	HTTP	104	POST /etherwall-labs/248b3-3-impl/3.htm HTTP/1.1 (text/plain)
200	2004-08-21 20:44:25.959852	128.119.245.12	192.168.1.102	TCP	60	60 → 1161 [ACK] Seq=162389 Win=62780 Len=0
201	2004-08-21 20:44:26.018268	128.119.245.12	192.168.1.102	TCP	60	60 → 1161 [ACK] Seq=164041 Win=62780 Len=0
202	2004-08-21 20:44:26.020211	128.119.245.12	192.168.1.102	TCP	60	60 → 1161 [ACK] Seq=164041 Win=62780 Len=0
203	2004-08-21 20:44:26.031556	128.119.245.12	192.168.1.102	HTTP	784	HTTP/1.1 200 OK (text/html)
204	2004-08-21 20:44:26.168471	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1
205	2004-08-21 20:44:26.210903	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1
206	2004-08-21 20:44:26.221522	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=164091 Ack=731 Win=16790 Len=0
207	2004-08-21 20:44:26.671425	192.168.1.100	192.168.1.1	SSDP	174	M-SEARCH * HTTP/1.1
208	2004-08-21 20:44:26.672200	192.168.1.100	192.168.1.1	SSDP	175	M-SEARCH * HTTP/1.1

6. The sequence number is 164041

7. .

No.	Time	Source	Destination	Protocol	Length	Info
1	2004-08-21 20:44:26.570381	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	2004-08-21 20:44:26.593533	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	2004-08-21 20:44:26.595646	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	2004-08-21 20:44:26.596958	192.168.1.102	128.119.245.12	TCP	610	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	2004-08-21 20:44:26.612118	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	2004-08-21 20:44:26.624118	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	2004-08-21 20:44:26.624847	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=2020 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	2004-08-21 20:44:26.625071	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	2004-08-21 20:44:26.647675	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2020 Win=8760 Len=0
10	2004-08-21 20:44:26.647776	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=4046 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	2004-08-21 20:44:26.648538	192.168.1.102	128.119.245.12	TCP	514	1161 → 80 [ACK] Seq=6066 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]

8. The length is 62,62,54,619,1514,60

9. The minimum amount of available buffer space is listed as 65535. The sender is never throttled because we never reach full capacity of the window

10. No, no segments were ever retransmitted. This is shown by the fact that an old ACK number was never resent in order to re-request former packets

11. The receiver is typically acking 432 bits. There are cases where the receiver acks every other segment. This is shown when more than one ack occurs in a row.

12. The throughput can be calculated by using the value of the last ack(149,629)- the first sequence number(1) divided by the time since first frame (1.6) = 93517.6 bps.