

CS305-2022Spring Lab7 Report

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Lab Time: Thursday 10:20 a.m. to 12:10 p.m.

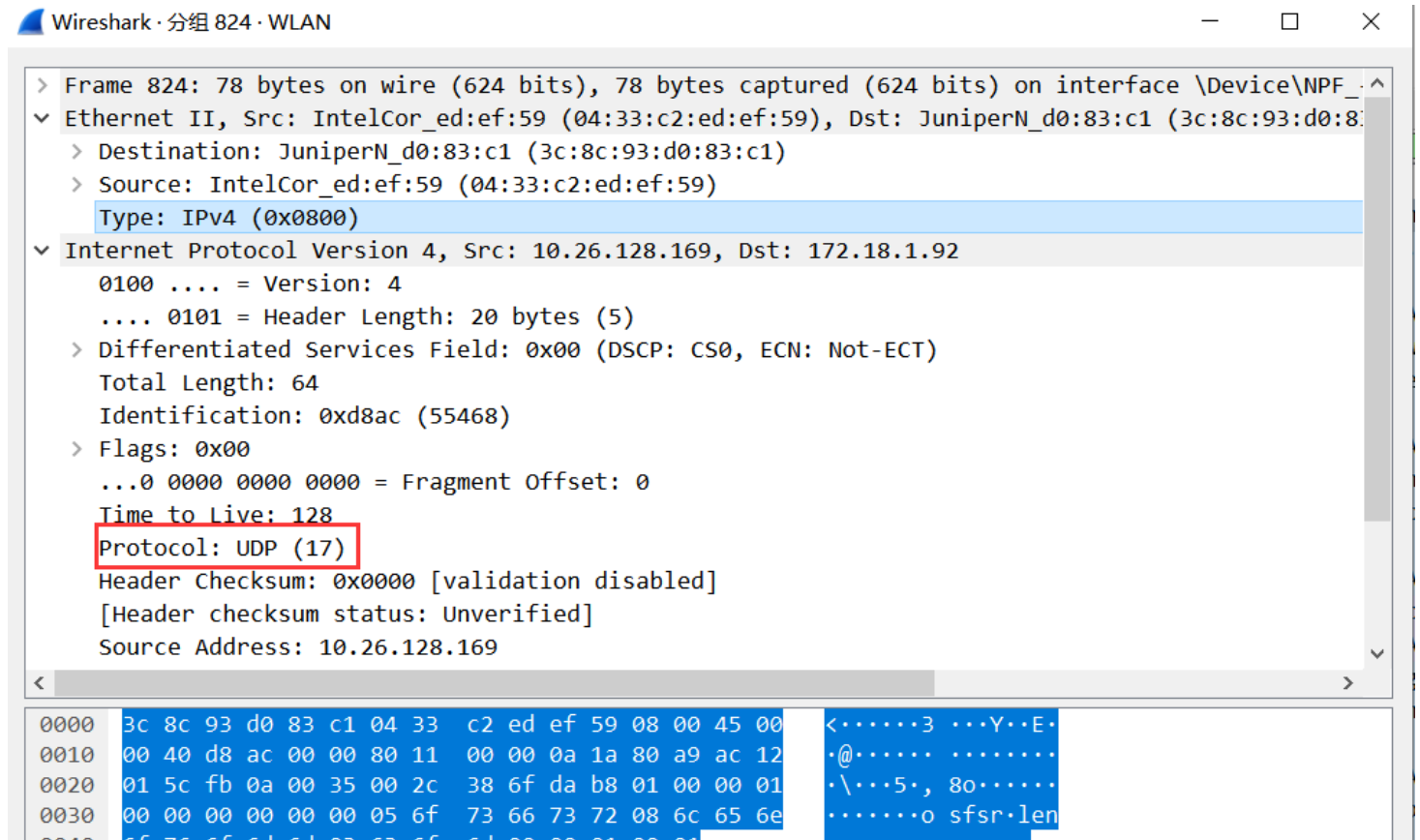
Lab Teacher: Qing WANG wangq9@mail.sustech.edu.cn

Lab SA:

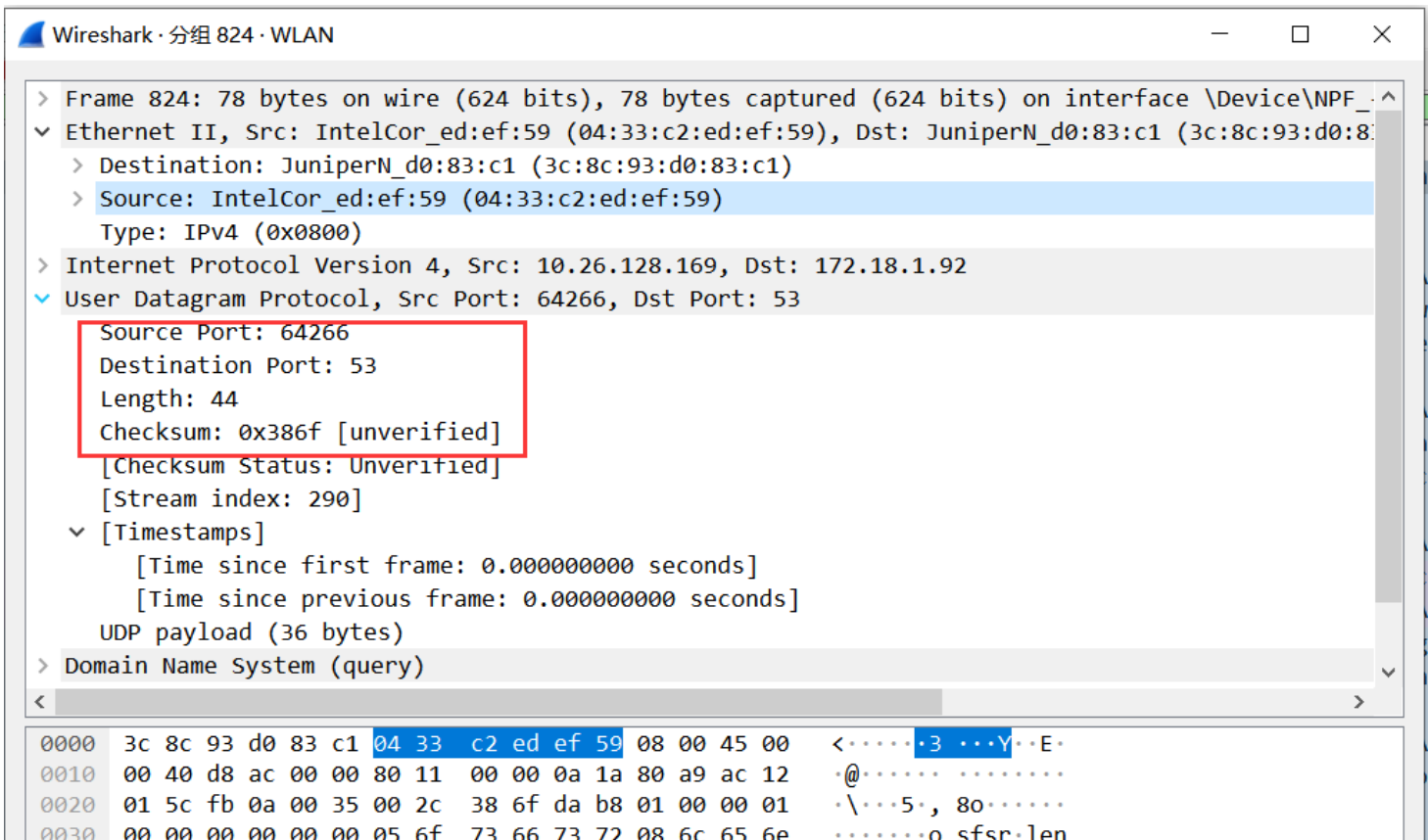
- Siyu LIU 11912935@mail.sustech.edu.cn
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Practice7-1: UDP Packet

Select one UDP packet first:



Then open the header:



- (1) There are 4 fields in the headers.
- (2) Names and values
 - Source Port: 64266
 - Destination Port: 53
 - Length: 44
 - Checksum: 0x386f
- (3) Length:
 - Source Port: 2 bytes
 - Destination Port: 2 bytes
 - Length: 2 bytes
 - Checksum: 2 bytes
- (4) MaxLength: 8 bytes since $4 * 2 = 8$ bytes.
- (5) Max Destination Port: Consider there are 16 bits in the destination field, the maximum port is $2^{16} - 1 = 65535$.
- (6) Protocol ID: 17 in decimal, 0x11 in hexadecimal

Practice7-2: Questions in Wireshark_TCP_v7.0.pdf

Q4. Sequence number

First use display filter to get the ip address of `gaia.cs.umass.edu` :

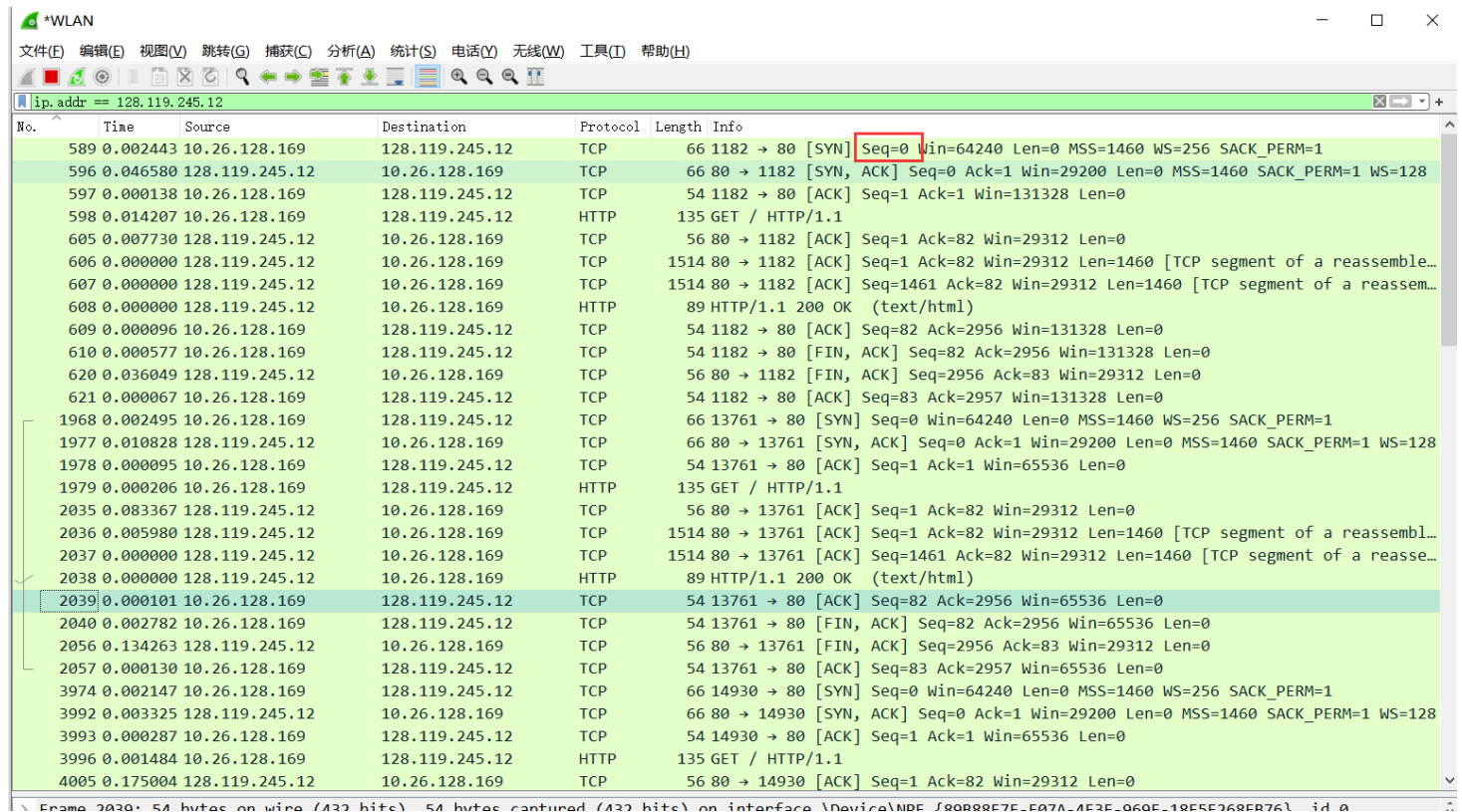
```
http.host == "gaia.cs.umass.edu"
```

We get the ip address is `128.119.245.12` .

Then use this in the display filter:

```
ip.addr == 128.119.245.12
```

We can get the initial sequence number is 0.



No.	Time	Source	Destination	Protocol	Length	Info
589	0.002443	10.26.128.169	128.119.245.12	TCP	66	1182 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
596	0.046580	128.119.245.12	10.26.128.169	TCP	66	80 → 1182 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
597	0.000138	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
598	0.014207	10.26.128.169	128.119.245.12	HTTP	135	GET / HTTP/1.1
605	0.007730	128.119.245.12	10.26.128.169	TCP	56	80 → 1182 [ACK] Seq=1 Ack=82 Win=29312 Len=0
606	0.000000	128.119.245.12	10.26.128.169	TCP	1514	80 → 1182 [ACK] Seq=1 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembled...
607	0.000000	128.119.245.12	10.26.128.169	TCP	1514	80 → 1182 [ACK] Seq=1461 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembled...
608	0.000000	128.119.245.12	10.26.128.169	HTTP	89	HTTP/1.1 200 OK (text/html)
609	0.000096	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [ACK] Seq=82 Ack=2956 Win=131328 Len=0
610	0.000577	128.119.245.12	128.119.245.12	TCP	54	1182 → 80 [FIN, ACK] Seq=82 Ack=2956 Win=131328 Len=0
620	0.036049	128.119.245.12	10.26.128.169	TCP	56	80 → 1182 [FIN, ACK] Seq=2956 Ack=83 Win=29312 Len=0
621	0.000067	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [ACK] Seq=83 Ack=2957 Win=131328 Len=0
1968	0.002495	10.26.128.169	128.119.245.12	TCP	66	13761 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
1977	0.010828	128.119.245.12	10.26.128.169	TCP	66	80 → 13761 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
1978	0.000095	10.26.128.169	128.119.245.12	TCP	54	13761 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0
1979	0.000206	10.26.128.169	128.119.245.12	HTTP	135	GET / HTTP/1.1
2035	0.083367	128.119.245.12	10.26.128.169	TCP	56	80 → 13761 [ACK] Seq=1 Ack=82 Win=29312 Len=0
2036	0.005980	128.119.245.12	10.26.128.169	TCP	1514	80 → 13761 [ACK] Seq=1 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembled...
2037	0.000000	128.119.245.12	10.26.128.169	TCP	1514	80 → 13761 [ACK] Seq=1461 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembled...
2038	0.000000	128.119.245.12	10.26.128.169	HTTP	89	HTTP/1.1 200 OK (text/html)
2039	0.000101	10.26.128.169	128.119.245.12	TCP	54	13761 → 80 [ACK] Seq=82 Ack=2956 Win=65536 Len=0
2040	0.002782	10.26.128.169	128.119.245.12	TCP	54	13761 → 80 [FIN, ACK] Seq=82 Ack=2956 Win=65536 Len=0
2056	0.134263	128.119.245.12	10.26.128.169	TCP	56	80 → 13761 [FIN, ACK] Seq=2956 Ack=83 Win=29312 Len=0
2057	0.000130	10.26.128.169	128.119.245.12	TCP	54	13761 → 80 [ACK] Seq=83 Ack=2957 Win=65536 Len=0
3974	0.002147	10.26.128.169	128.119.245.12	TCP	66	14930 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
3992	0.003325	128.119.245.12	10.26.128.169	TCP	66	80 → 14930 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
3993	0.000287	10.26.128.169	128.119.245.12	TCP	54	14930 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0
3996	0.001484	10.26.128.169	128.119.245.12	HTTP	135	GET / HTTP/1.1
4005	0.175004	128.119.245.12	10.26.128.169	TCP	56	80 → 14930 [ACK] Seq=1 Ack=82 Win=29312 Len=0

Q5. SYNACK fields

Select one SYNACK packet:

*WLAN

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(I) 帮助(H)

ip.addr == 128.119.245.12

No.	Time	Source	Destination	Protocol	Length	Info
589	0.002443	10.26.128.169	128.119.245.12	TCP	66	1182 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
596	0.046580	128.119.245.12	10.26.128.169	TCP	66	80 → 1182 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
597	0.000138	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
598	0.014207	10.26.128.169	128.119.245.12	HTTP	135	GET / HTTP/1.1
605	0.007730	128.119.245.12	10.26.128.169	TCP	56	80 → 1182 [ACK] Seq=1 Ack=82 Win=29312 Len=0
606	0.000000	128.119.245.12	10.26.128.169	TCP	1514	80 → 1182 [ACK] Seq=1 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembl...
607	0.000000	128.119.245.12	10.26.128.169	TCP	1514	80 → 1182 [ACK] Seq=1461 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembl...
608	0.000000	128.119.245.12	10.26.128.169	HTTP	89	HTTP/1.1 200 OK (text/html)
609	0.000096	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [ACK] Seq=82 Ack=2956 Win=131328 Len=0
610	0.000577	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [FIN, ACK] Seq=82 Ack=2956 Win=131328 Len=0
620	0.036049	128.119.245.12	10.26.128.169	TCP	56	80 → 1182 [FIN, ACK] Seq=2956 Ack=83 Win=29312 Len=0
621	0.000067	10.26.128.169	128.119.245.12	TCP	54	1182 → 80 [ACK] Seq=83 Ack=2957 Win=131328 Len=0
1968	0.002495	10.26.128.169	128.119.245.12	TCP	66	13761 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
1977	0.010828	128.119.245.12	10.26.128.169	TCP	66	80 → 13761 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
1978	0.000095	10.26.128.169	128.119.245.12	TCP	54	13761 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0
1979	0.000206	10.26.128.169	128.119.245.12	HTTP	135	GET / HTTP/1.1
2035	0.083367	128.119.245.12	10.26.128.169	TCP	56	80 → 13761 [ACK] Seq=1 Ack=82 Win=29312 Len=0
2036	0.005980	128.119.245.12	10.26.128.169	TCP	1514	80 → 13761 [ACK] Seq=1 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembl...
2037	0.000000	128.119.245.12	10.26.128.169	TCP	1514	80 → 13761 [ACK] Seq=1461 Ack=82 Win=29312 Len=1460 [TCP segment of a reassembl...
2038	0.000000	128.119.245.12	10.26.128.169	HTTP	89	HTTP/1.1 200 OK (text/html)
2039	0.000101	10.26.128.169	128.119.245.12	TCP	54	13761 → 80 [ACK] Seq=82 Ack=2956 Win=65536 Len=0

- Sequence number: 0
- Acknowledgement value: 1

Wireshark · 分组 573 · WLAN

> Frame 573: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface \Device\NPF_...
 > Ethernet II, Src: JuniperN_d0:83:c1 (3c:8c:93:d0:83:c1), Dst: IntelCor_ed:ef:59 (04:33:c2:ed:e...
 > Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.26.128.169
 > Transmission Control Protocol, Src Port: 80, Dst Port: 7624, Seq: 0, Ack: 1, Len: 0

Source Port: 80
 Destination Port: 7624
 [Stream index: 18]
 [Conversation completeness: Complete, WITH_DATA (31)]
 [TCP Segment Len: 0]
 Sequence Number: 0 (relative sequence number)
 Sequence Number (raw): 1468577679
 [Next Sequence Number: 1 (relative sequence number)]
 Acknowledgment Number: 1 (relative ack number)
 Acknowledgment number (raw): 2418070015
 1000 = Header Length: 32 bytes (8)
 > Flags: 0x012 (SYN, ACK)
 Window: 29200
 [Calculated window size: 29200]

- The value is determined by increasing 1 to the initial sequence number.
- The flag is set as (SYN, ACK), to identify the SYNACK segment.

```

[Conversation completeness: Complete, WITH_DATA (31)]
[TCP Segment Len: 0]
Sequence Number: 0    (relative sequence number)
Sequence Number (raw): 1468577679
[Next Sequence Number: 1    (relative sequence number)]
Acknowledgment Number: 1    (relative ack number)
Acknowledgment number (raw): 2418070015
1000 .... = Header Length: 32 bytes (8)
Flags: 0x012 (SYN, ACK)
Window: 29200
[Calculated window size: 29200]
Checksum: 0x6d59 [unverified]
[Checksum Status: Unverified]
Urgent Pointer: 0
> Options: (12 bytes), Maximum segment size, No-Operation (NOP), No-Operation (NOP), SACK perm
> [Timestamps]
> [SEQ/ACK analysis]
[Community ID: 1:B8qQHnlzAwWTzJveOnNZto2YUAo=]

```

Q6. POST

Select one PST packet:

正在捕获 WLAN

文件(E) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(I) 帮助(H)

ip.addr == 128.119.245.12

No.	Time	Source	Destination	Protocol	Length	Info
116	0.006536	10.26.128.169	128.119.245.12	TCP	54	9688 → 80 [FIN, ACK] Seq=1 Ack=1 Win=510 Len=0
119	0.000694	10.26.128.169	128.119.245.12	HTTP	1306	POST /wireshark-labs/lab3-1-reply.htm HTTP/1.1
129	0.067895	128.119.245.12	10.26.128.169	TCP	56	80 → 9688 [ACK] Seq=1 Ack=2 Win=263 Len=0
130	0.022379	128.119.245.12	10.26.128.169	TCP	56	80 → 9687 [ACK] Seq=1 Ack=1253 Win=251 Len=0
131	0.004432	128.119.245.12	10.26.128.169	HTTP	428	HTTP/1.1 412 Precondition Failed
134	0.023807	10.26.128.169	128.119.245.12	TCP	54	9687 → 80 [ACK] Seq=1253 Ack=375 Win=511 Len=0
181	0.001831	10.26.128.169	128.119.245.12	TCP	54	9546 → 80 [FIN, ACK] Seq=1 Ack=1 Win=513 Len=0
1124	0.000083	10.26.128.169	128.119.245.12	TCP	54	9545 → 80 [FIN, ACK] Seq=1 Ack=1 Win=513 Len=0
1251	0.005414	128.119.245.12	10.26.128.169	TCP	56	80 → 9687 [FIN, ACK] Seq=375 Ack=1253 Win=251 Len=0
1252	0.000065	10.26.128.169	128.119.245.12	TCP	54	9687 → 80 [ACK] Seq=1253 Ack=376 Win=511 Len=0
1435	0.006785	128.119.245.12	10.26.128.169	TCP	66	80 → 9689 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
1436	0.000053	10.26.128.169	128.119.245.12	TCP	66	9689 → 80 [ACK] Seq=1 Ack=1 Win=513 Len=0 SLE=0 SRE=1
1736	0.046153	10.26.128.169	128.119.245.12	TCP	54	9687 → 80 [FIN, ACK] Seq=1253 Ack=376 Win=511 Len=0
1781	0.014592	128.119.245.12	10.26.128.169	TCP	56	80 → 9687 [ACK] Seq=376 Ack=1254 Win=251 Len=0
1796	0.001604	10.26.128.169	128.119.245.12	TCP	55	[TCP Retransmission] 9545 → 80 [ACK] Seq=0 Ack=1 Win=513 Len=1
1805	0.022811	10.26.128.169	128.119.245.12	TCP	55	[TCP Retransmission] 9546 → 80 [ACK] Seq=0 Ack=1 Win=513 Len=1
1949	0.156721	10.26.128.169	128.119.245.12	TCP	55	[TCP Keep-Alive] 9689 → 80 [ACK] Seq=0 Ack=1 Win=513 Len=1
1959	0.075747	128.119.245.12	10.26.128.169	TCP	66	[TCP Window Update] 80 → 9689 [ACK] Seq=1 Ack=1 Win=29312 Len=0 SLE=0 SRE=1
2060	0.002234	10.26.128.169	128.119.245.12	TCP	54	9546 → 80 [RST, ACK] Seq=2 Ack=1 Win=0 Len=0
2126	0.045295	10.26.128.169	128.119.245.12	TCP	54	9545 → 80 [RST, ACK] Seq=2 Ack=1 Win=0 Len=0
2223	0.010807	128.119.245.12	10.26.128.169	TCP	56	80 → 9689 [FIN, ACK] Seq=1 Ack=1 Win=29312 Len=0
2224	0.000073	10.26.128.169	128.119.245.12	TCP	54	9689 → 80 [ACK] Seq=1 Ack=2 Win=513 Len=0
4374	0.000115	10.26.128.169	128.119.245.12	TCP	55	[TCP Keep-Alive] 9689 → 80 [ACK] Seq=0 Ack=2 Win=513 Len=1
4943	0.001853	10.26.128.169	128.119.245.12	TCP	54	9689 → 80 [FIN, ACK] Seq=1 Ack=2 Win=513 Len=0
4998	0.045191	10.26.128.169	128.119.245.12	TCP	54	[TCP Retransmission] 9689 → 80 [FIN, ACK] Seq=1 Ack=2 Win=513 Len=0
5172	0.016603	10.26.128.169	128.119.245.12	TCP	54	[TCP Retransmission] 9689 → 80 [FIN, ACK] Seq=1 Ack=2 Win=513 Len=0
5504	0.018411	10.26.128.169	128.119.245.12	TCP	54	[TCP Retransmission] 9689 → 80 [FIN, ACK] Seq=1 Ack=2 Win=513 Len=0
5838	0.016961	10.26.128.169	128.119.245.12	TCP	54	[TCP Retransmission] 9689 → 80 [FIN, ACK] Seq=1 Ack=2 Win=513 Len=0
6490	0.007745	10.26.128.169	128.119.245.12	TCP	54	[TCP Retransmission] 9689 → 80 [FIN, ACK] Seq=1 Ack=2 Win=513 Len=0

▼ Frame 119: 1306 bytes on wire (10448 bits) · 1306 bytes captured (10448 bits) on interface \Device\NPF{80988E7E-F074-AE3E-960E-18F5E268F876} id 0

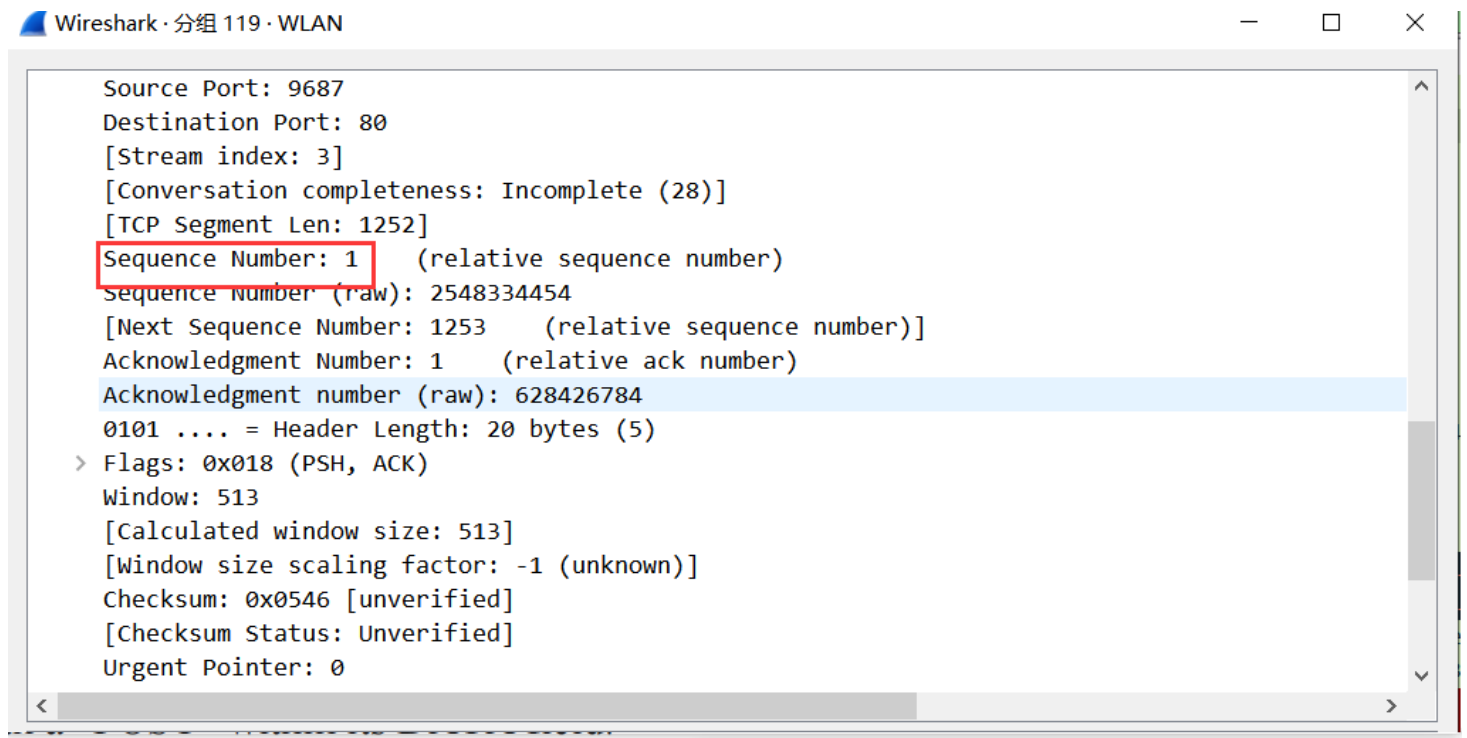
```

0000  3c 8c 93 d0 83 c1 04 33 c2 ed ef 59 08 00 45 00  <.....3...Y...E.
0010  05 0c 3e 05 40 00 80 06 00 00 0a 1a 80 a9 80 77  >...@... ..w
0020  f5 0c 25 d7 00 50 97 e4 7f 76 25 75 08 20 50 18  %*..P...v%u. P.
0030  02 01 05 46 00 00 50 4f 53 54 20 2f 77 69 72 65  ...F..PO ST /wire
0040  73 68 61 72 6b 2d 6c 61 62 73 2f 6c 61 62 33 2d  shark-la bs/lab3-
0050  b1 2d 72 65 70 6c 79 2e 68 74 6d 20 48 54 54 50  1-reply.htm HTTP

```

WLAN: <live capture in progress> 分组: 9815 · 已显示: 31 (0.3%) 配置: Default

Here is the sequence number, it is 1:



Q7. POST, TCP, RTT

Consider the first six segments:

*WLAN

文件(E) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(I) 帮助(H)

ip.addr == 128.119.245.12

No.	Time	Source	Destination	Protocol	Length	Info
11157	50.522...	10.26.128.169	128.119.245.12	TCP	66	3870 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
11158	50.523...	10.26.128.169	128.119.245.12	TCP	66	3871 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
11214	50.792...	128.119.245.12	10.26.128.169	TCP	66	80 → 3871 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=1
11215	50.792...	10.26.128.169	128.119.245.12	TCP	54	3871 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
11216	50.796...	128.119.245.12	10.26.128.169	TCP	66	80 → 3870 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=1
11217	50.796...	10.26.128.169	128.119.245.12	TCP	54	3870 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
11472	52.024...	10.26.128.169	128.119.245.12	TCP	1035	3871 → 80 [PSH, ACK] Seq=1 Ack=1 Win=131328 Len=981 [TCP segment of a reas
11473	52.025...	10.26.128.169	128.119.245.12	TCP	13194	3871 → 80 [ACK] Seq=982 Ack=1 Win=131328 Len=13140 [TCP segment of a reas
11545	52.296...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=982 Win=31232 Len=0
11546	52.296...	10.26.128.169	128.119.245.12	TCP	1514	3871 → 80 [ACK] Seq=14122 Ack=1 Win=131328 Len=1460 [TCP segment of a reas
11557	52.301...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=2442 Win=34176 Len=0
11558	52.301...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [PSH, ACK] Seq=15582 Ack=1 Win=131328 Len=2920 [TCP segment of a
11559	52.302...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=3902 Win=37120 Len=0
11560	52.302...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=18502 Ack=1 Win=131328 Len=2920 [TCP segment of a reas
11561	52.304...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=5362 Win=39936 Len=0
11562	52.304...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=21422 Ack=1 Win=131328 Len=2920 [TCP segment of a reas
11563	52.308...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=6822 Win=42880 Len=0
11564	52.308...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=24342 Ack=1 Win=131328 Len=2920 [TCP segment of a reas
11565	52.312...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=8282 Win=45824 Len=0
11566	52.312...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=27262 Ack=1 Win=131328 Len=2920 [TCP segment of a reas
11567	52.315...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=9742 Win=48768 Len=0
11572	52.315...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=30182 Ack=1 Win=131328 Len=2920 [TCP segment of a reas
11573	52.318...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=11202 Win=51712 Len=0
11574	52.318...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [PSH, ACK] Seq=33102 Ack=1 Win=131328 Len=2920 [TCP segment of a
11575	52.322...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=12662 Win=54528 Len=0
11576	52.322...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=36022 Ack=1 Win=131328 Len=2920 [TCP segment of a reas
11577	52.326...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=14122 Win=57472 Len=0
11578	52.326...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=38942 Ack=1 Win=131328 Len=2920 [TCP segment of a reas

< Frame 11215: 54 bytes on wire (432 bits) 54 bytes captured (432 bits) on interface \Device\NPF{80888E7E-F074-AE3E-960E-18E5F268ER76} id 0

```

0000 3c 8c 93 d0 83 c1 04 33 c2 ed ef 59 08 00 45 00 <.....3...Y..E.
0010 00 28 3f 00 40 00 80 06 00 00 0a 1a 80 a9 80 77 .(?.@....w
0020 f5 0c 0f 1f 00 50 23 25 40 32 0d 50 51 c0 50 10 .....P## @2.PQ.P.
0030 02 01 00 62 00 00 ....b..

```

wireshark_WLANEFO9J1.pcapng 分组: 13494 · 已显示: 147 (1.1%) · 已丢弃: 0 (0.0%) 配置: Default

Their sequence numbers are: 1, 982, 2442, 3902, 5362, 6822

Their sent time are: 50.792192s, 52.025106s, 52.296217s, 52.301677s, 52.302708s, 52.304825s

Their ACK received time are: 50.796298s, 52.296150s, 52.301602s, 52.302651s, 52.304747s, 52.308065s

Thus RTT are: 0.004106s, 0.003044s, 0.005385s, 0.000974s, 0.002039s, 0.003240s

Q9. Buffer space

The minimum buffer space is 29200, and maximum is 131328.

*WLAN

文件(E) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(I) 帮助(H)

ip.addr == 128.119.245.12

No.	Time	Source	Destination	Protocol	Length	Info
1737	0.000406	10.26.128.169	128.119.245.12	TCP	66	7336 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
1752	0.000000	128.119.245.12	10.26.128.169	TCP	66	80 → 7336 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
1753	0.000248	10.26.128.169	128.119.245.12	TCP	54	7336 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
1754	0.000246	10.26.128.169	128.119.245.12	HTTP	887	GET /wireshark-labs/TCP-wireshark-file1.html HTTP/1.1
1760	0.001768	128.119.245.12	10.26.128.169	TCP	56	80 → 7336 [ACK] Seq=1 Ack=834 Win=30976 Len=0
1761	0.000000	128.119.245.12	10.26.128.169	HTTP	238	HTTP/1.1 304 Not Modified
1763	0.039420	10.26.128.169	128.119.245.12	TCP	54	7336 → 80 [ACK] Seq=834 Ack=185 Win=131072 Len=0
1968	0.028617	128.119.245.12	10.26.128.169	TCP	56	80 → 7336 [FIN, ACK] Seq=185 Ack=834 Win=30976 Len=0
1969	0.000195	10.26.128.169	128.119.245.12	TCP	54	7336 → 80 [ACK] Seq=834 Ack=186 Win=131072 Len=0
1970	0.000166	10.26.128.169	128.119.245.12	TCP	54	7336 → 80 [FIN, ACK] Seq=834 Ack=186 Win=131072 Len=0
1973	0.054740	128.119.245.12	10.26.128.169	TCP	56	80 → 7336 [ACK] Seq=186 Ack=835 Win=30976 Len=0
2160	0.014210	10.26.128.169	128.119.245.12	TCP	66	7350 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
2185	0.030835	128.119.245.12	10.26.128.169	TCP	66	80 → 7350 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
2186	0.000100	10.26.128.169	128.119.245.12	TCP	54	7350 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
2187	0.000197	10.26.128.169	128.119.245.12	TCP	1008	7350 → 80 [PSH, ACK] Seq=1 Ack=1 Win=131328 Len=954 [TCP segment of a reassemb...
2188	0.000072	10.26.128.169	128.119.245.12	HTTP	242	POST /wireshark-labs/lab3-1-reply.htm HTTP/1.1
2198	0.010586	128.119.245.12	10.26.128.169	TCP	56	80 → 7350 [ACK] Seq=1 Ack=955 Win=31232 Len=0
2199	0.001099	10.26.128.169	128.119.245.12	TCP	56	80 → 7350 [ACK] Seq=1 Ack=1143 Win=33024 Len=0
2200	0.002199	128.119.245.12	10.26.128.169	HTTP	775	HTTP/1.1 200 OK (text/html)
2201	0.043277	10.26.128.169	128.119.245.12	TCP	54	7350 → 80 [ACK] Seq=1143 Ack=722 Win=130560 Len=0
2477	0.004497	128.119.245.12	10.26.128.169	TCP	56	80 → 7350 [FIN, ACK] Seq=722 Ack=1143 Win=33024 Len=0
2478	0.000089	10.26.128.169	128.119.245.12	TCP	54	7350 → 80 [ACK] Seq=1143 Ack=723 Win=130560 Len=0
2479	0.000096	10.26.128.169	128.119.245.12	TCP	54	7350 → 80 [FIN, ACK] Seq=1143 Ack=723 Win=130560 Len=0
2498	0.017804	128.119.245.12	10.26.128.169	TCP	56	80 → 7350 [ACK] Seq=723 Ack=1144 Win=33024 Len=0

Frame 1737: 66 bytes on wire (528 bits) 66 bytes captured (528 bits) on interface \Device\NPF{80B88E7E-F07A-4E3E-969E-18E5E268EB76} id 0

0000 3c 8c 93 d0 83 c1 04 33 c2 ed ef 59 08 00 45 00 <.....3...Y...E..

0010 00 34 3e 3a 40 00 00 00 00 0a 1a 80 a9 80 77 +4>:@.....w

0020 f5 0c 1c a8 00 50 e6 f5 49 55 00 00 00 00 80 02P...IU.....

0030 fa f0 00 6e 00 00 02 04 05 b4 01 03 03 08 01 01n.....

0040 04 02 ..

wireshark_WLANL5XSJ1.pcapng 分组: 47842 · 已显示: 24 (0.1%) 配置: Default

The lack of receiver buffer space does not throttle the sender.

Q10 Retransmission

Select one TCP packet with PSH and ACK:

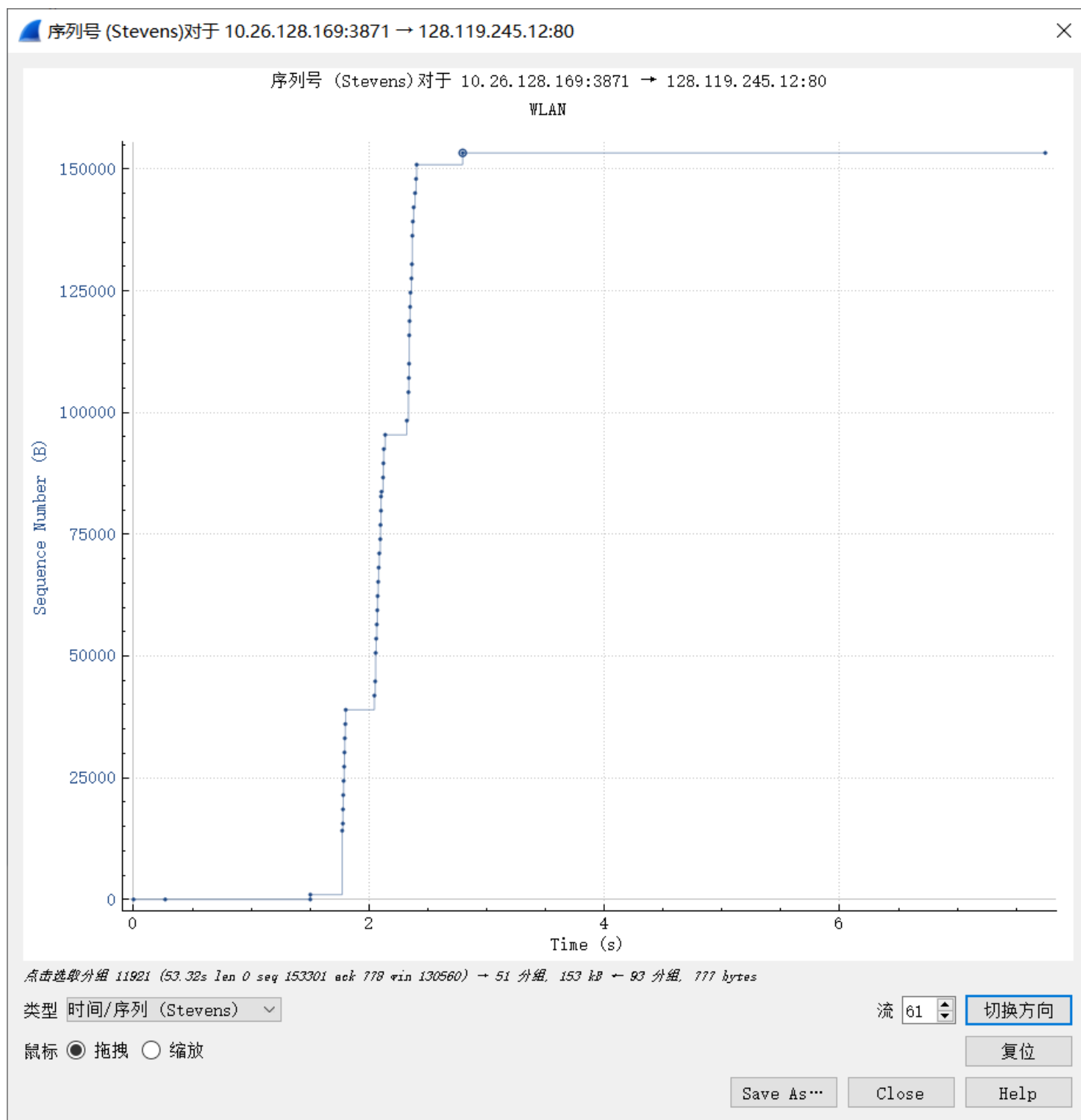
*WLAN

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(T) 帮助(H)

ip.addr == 128.119.245.12

No.	Time	Source	Destination	Protocol	Length	Info
11157	50.522...	10.26.128.169	128.119.245.12	TCP	66	3870 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
11158	50.523...	10.26.128.169	128.119.245.12	TCP	66	3871 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
11214	50.792...	128.119.245.12	10.26.128.169	TCP	66	80 → 3871 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=1
11215	50.792...	10.26.128.169	128.119.245.12	TCP	54	3871 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
11216	50.796...	128.119.245.12	10.26.128.169	TCP	66	80 → 3870 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=1
11217	50.796...	10.26.128.169	128.119.245.12	TCP	54	3870 → 80 [ACK] Seq=1 Ack=1 Win=131328 Len=0
11472	52.024...	10.26.128.169	128.119.245.12	TCP	1035	3871 → 80 [PSH, ACK] Seq=1 Ack=1 Win=131328 Len=981 [TCP segment of a reas...
11473	52.025...	10.26.128.169	128.119.245.12	TCP	13194	3871 → 80 [ACK] Seq=982 Ack=1 Win=131328 Len=13140 [TCP segment of a reas...
11545	52.296...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=982 Win=31232 Len=0
11546	52.296...	10.26.128.169	128.119.245.12	TCP	1514	3871 → 80 [ACK] Seq=14122 Ack=1 Win=131328 Len=1460 [TCP segment of a reas...
11557	52.301...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=2442 Win=34176 Len=0
11558	52.301...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [PSH, ACK] Seq=15582 Ack=1 Win=131328 Len=2920 [TCP segment of a reas...
11559	52.302...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=3902 Win=37120 Len=0
11560	52.302...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=18502 Ack=1 Win=131328 Len=2920 [TCP segment of a reas...
11561	52.304...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=5362 Win=39936 Len=0
11562	52.304...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=21422 Ack=1 Win=131328 Len=2920 [TCP segment of a reas...
11563	52.308...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=6822 Win=42880 Len=0
11564	52.308...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=24342 Ack=1 Win=131328 Len=2920 [TCP segment of a reas...
11565	52.312...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=8282 Win=45824 Len=0
11566	52.312...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=27262 Ack=1 Win=131328 Len=2920 [TCP segment of a reas...
11567	52.315...	128.119.245.12	10.26.128.169	TCP	56	80 → 3871 [ACK] Seq=1 Ack=9742 Win=48768 Len=0
11572	52.315...	10.26.128.169	128.119.245.12	TCP	2974	3871 → 80 [ACK] Seq=30182 Ack=1 Win=131328 Len=2920 [TCP segment of a reas...

Then consider the Time/Sequence Graph.



We can see that the sequence number is increased with time. Thus there is no data retransmission. If there is retransmission, the sequence number will have a "local minimum".

Q12 Throughput

First and last TCP packet:

*WLAN

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(I) 帮助(H)

ip.addr == 128.119.245.12

No.	Time	Source	Destination	Protocol	Length	Info
120	3.623846	10.26.128.169	128.119.245.12	TCP	66	12840 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
127	3.896795	128.119.245.12	10.26.128.169	TCP	66	80 → 12840 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1460 SACK_PERM=1 WS=128
128	3.897002	10.26.128.169	128.119.245.12	TCP	54	12840 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0
129	3.897338	10.26.128.169	128.119.245.12	TCP	1008	12840 → 80 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=954 [TCP segment of a reassemb...
130	3.897422	10.26.128.169	128.119.245.12	HTTP	242	POST /wireshark-labs/lab3-1-reply.htm HTTP/1.1
140	4.169689	128.119.245.12	10.26.128.169	TCP	56	80 → 12840 [ACK] Seq=1 Ack=955 Win=31232 Len=0
141	4.170782	128.119.245.12	10.26.128.169	TCP	56	80 → 12840 [ACK] Seq=1 Ack=1143 Win=33024 Len=0
142	4.173028	128.119.245.12	10.26.128.169	HTTP	775	HTTP/1.1 200 OK (text/html)
145	4.220920	10.26.128.169	128.119.245.12	TCP	54	12840 → 80 [ACK] Seq=1143 Ack=722 Win=64768 Len=0
375	9.182335	128.119.245.12	10.26.128.169	TCP	56	80 → 12840 [FIN, ACK] Seq=722 Ack=1143 Win=33024 Len=0
376	9.182455	10.26.128.169	128.119.245.12	TCP	54	12840 → 80 [ACK] Seq=1143 Ack=723 Win=64768 Len=0
377	9.182607	10.26.128.169	128.119.245.12	TCP	54	12840 → 80 [FIN, ACK] Seq=1143 Ack=723 Win=64768 Len=0
392	9.455048	128.119.245.12	10.26.128.169	TCP	56	80 → 12840 [ACK] Seq=723 Ack=1144 Win=33024 Len=0

Time = $9.455048 - 3.623846 = 5.831202$ s

Amount of data transferred: $1144 - 0 = 1144$ bytes

Throughput = $1144 / 5.831202 = 196$ bytes/sec