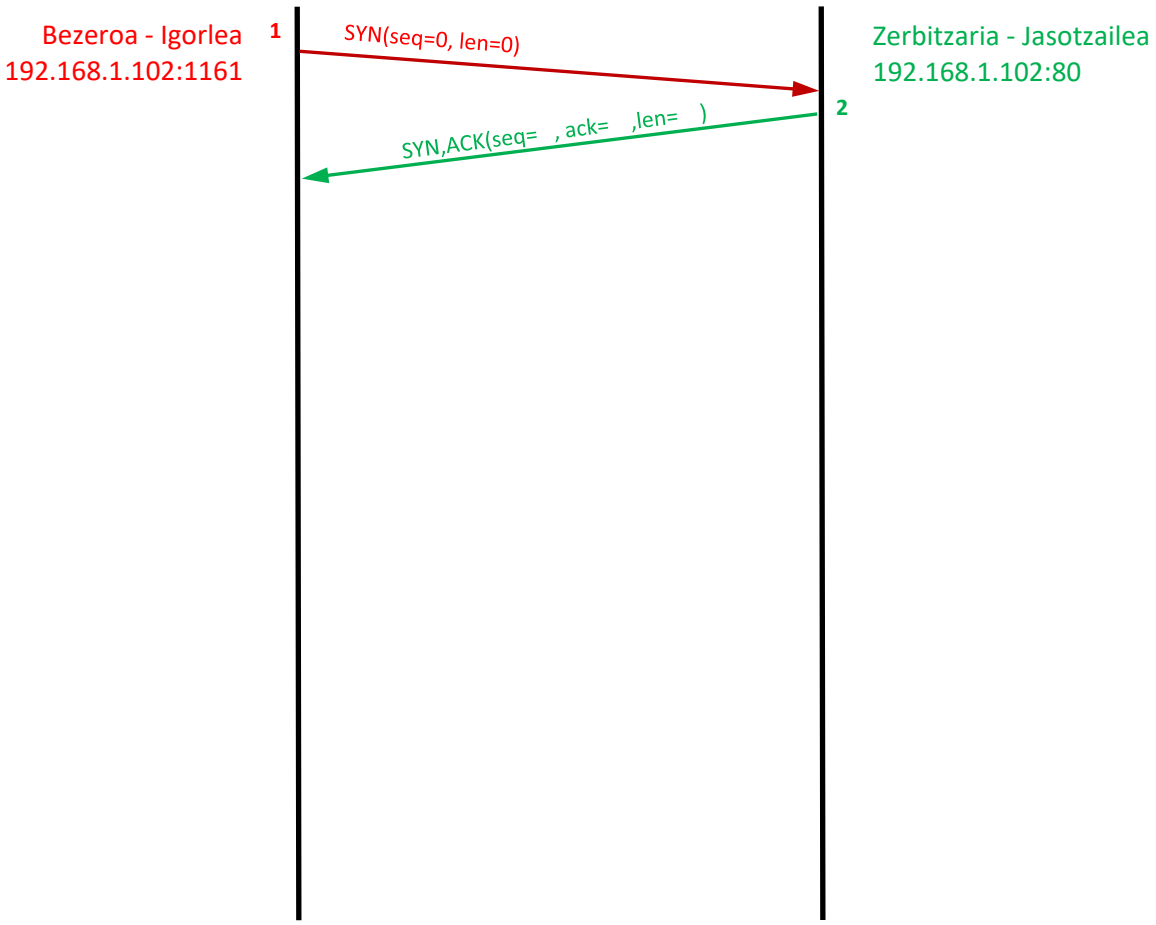
KONPUTAGAILU SAREEN OINARRIAK (3. Ariketa – C)

Izena:

1. Erabiltzaile batek fitxategi bat igotzen ari da zerbitzari batera. WireShark erabilita transferentziaren hasierako tramak hartu dira:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	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	0.023172	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	0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=17520 Len=565 [TCP segment of a reassembled PDU]
5	0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=566 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
6	0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=2026 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
8	0.054690	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=3486 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
9	0.077294	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	0.077405	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=4946 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
11	0.078157	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=6406 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
12	0.124085	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	0.124185	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 Win=17520 Len=1147 [TCP segment of a reassembled PDU]
14	0.169118	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=4946 Win=14600 Len=0
15	0.217299	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=6406 Win=17520 Len=0
16	0.267802	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=7866 Win=20440 Len=0
17	0.304807	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=9013 Win=23360 Len=0
18	0.305040	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=9013 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
19	0.305813	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=10473 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
20	0.306692	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=11933 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
21	0.307571	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=13393 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
22	0.308699	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=14853 Ack=1 Win=17520 Len=1460 [TCP segment of a reassembled PDU]
23	0.309553	192.168.1.102	128.119.245.12	TCP	946	1161 → 80 [PSH, ACK] Seq=16313 Ack=1 Win=17520 Len=892 [TCP segment of a reassembled PDU]
24	0.356437	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=1 Ack=10473 Win=26280 Len=0

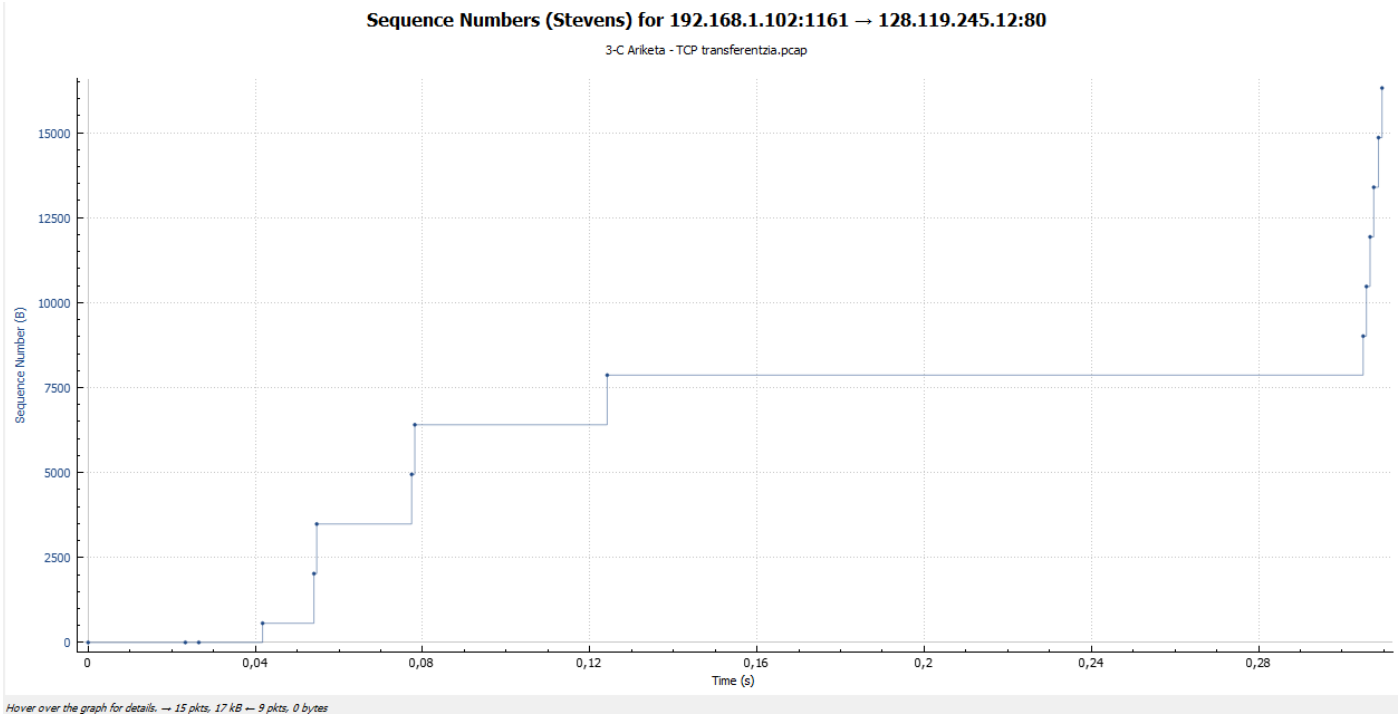
Informazio transferentziaren denbora lerroa irudikatu, non bidaltzen diren segmentuen eta ACKen zenbakiak (erlatiboak) agertzen diren. ACK, SYN eta PSH bitak agertu behar dira ere aktibatuta daudenean. Era berean, bidalitako segmentuen kargaren luzera ere agertu behar da.
Egonez gero, birbidalitako segmentuak markatu.



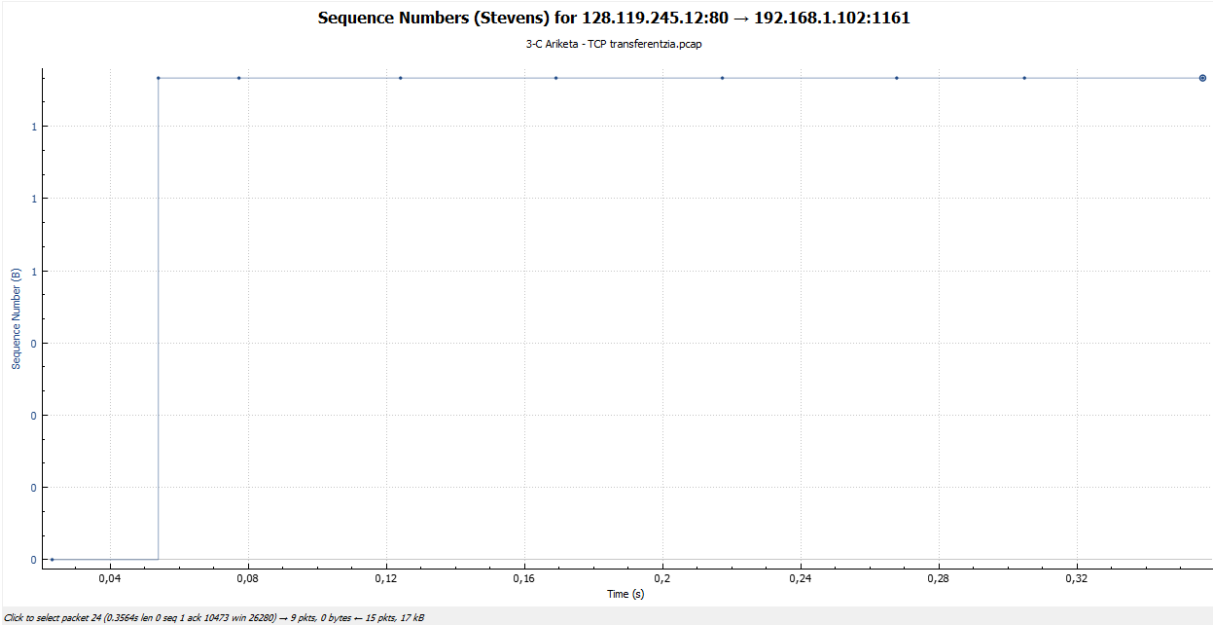
Azterketa egiteko, WireShark-ek dituen estatistika tresnak erabili ditzakegu. Horrela, *Statistics>>Flow Graph* tresna erabilita, eskatzen diguten fluxu transferentzia ikus dezakegu, beti ere WhireShark erabiltzen duen konputagailuaren ikuspuntutik (Bezeroa - 192.168.1.102:1161). Kontutan izan behar da WireShark-en agertzen den denbora lerroa bezeroarena dela.

Time	192.168.1.102		128.119.245.12	Comment
0.000000	1161	1161 → 80 [SYN] Seq=0 Win=16384 Len=0...	80	TCP: 1161 → 80 [SYN] Seq=0 Win=16384 Len=0 ...
0.023172	1161	80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win...	80	TCP: 80 → 1161 [SYN, ACK] Seq=0 Ack=1 Win=...
0.023265	1161	1161 → 80 [ACK] Seq=1 Ack=1 Win=1752...	80	TCP: 1161 → 80 [ACK] Seq=1 Ack=1 Win=17520...
0.026477	1161	1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win...	80	TCP: 1161 → 80 [PSH, ACK] Seq=1 Ack=1 Win=...
0.041737	1161	1161 → 80 [PSH, ACK] Seq=566 Ack=1 W...	80	TCP: 1161 → 80 [PSH, ACK] Seq=566 Ack=1 Wi...
0.053937	1161	80 → 1161 [ACK] Seq=1 Ack=566 Win=67...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=566 Win=678...
0.054026	1161	1161 → 80 [ACK] Seq=2026 Ack=1 Win=1...	80	TCP: 1161 → 80 [ACK] Seq=2026 Ack=1 Win=17...
0.054690	1161	1161 → 80 [ACK] Seq=3486 Ack=1 Win=1...	80	TCP: 1161 → 80 [ACK] Seq=3486 Ack=1 Win=17...
0.077294	1161	80 → 1161 [ACK] Seq=1 Ack=2026 Win=8...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=2026 Win=87...
0.077405	1161	1161 → 80 [ACK] Seq=4946 Ack=1 Win=1...	80	TCP: 1161 → 80 [ACK] Seq=4946 Ack=1 Win=17...
0.078157	1161	1161 → 80 [ACK] Seq=6406 Ack=1 Win=1...	80	TCP: 1161 → 80 [ACK] Seq=6406 Ack=1 Win=17...
0.124085	1161	80 → 1161 [ACK] Seq=1 Ack=3486 Win=1...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=3486 Win=11...
0.124185	1161	1161 → 80 [PSH, ACK] Seq=7866 Ack=1 ...	80	TCP: 1161 → 80 [PSH, ACK] Seq=7866 Ack=1 W...
0.169118	1161	80 → 1161 [ACK] Seq=1 Ack=4946 Win=1...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=4946 Win=14...
0.217299	1161	80 → 1161 [ACK] Seq=1 Ack=6406 Win=1...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=6406 Win=17...
0.267802	1161	80 → 1161 [ACK] Seq=1 Ack=7866 Win=2...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=7866 Win=20...
0.304807	1161	80 → 1161 [ACK] Seq=1 Ack=9013 Win=2...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=9013 Win=23...
0.305040	1161	1161 → 80 [ACK] Seq=9013 Ack=1 Win=1...	80	TCP: 1161 → 80 [ACK] Seq=9013 Ack=1 Win=17...
0.305813	1161	1161 → 80 [ACK] Seq=10473 Ack=1 Win=...	80	TCP: 1161 → 80 [ACK] Seq=10473 Ack=1 Win=1...
0.306692	1161	1161 → 80 [ACK] Seq=11933 Ack=1 Win=...	80	TCP: 1161 → 80 [ACK] Seq=11933 Ack=1 Win=1...
0.307571	1161	1161 → 80 [ACK] Seq=13393 Ack=1 Win=...	80	TCP: 1161 → 80 [ACK] Seq=13393 Ack=1 Win=1...
0.308699	1161	1161 → 80 [ACK] Seq=14853 Ack=1 Win=...	80	TCP: 1161 → 80 [ACK] Seq=14853 Ack=1 Win=1...
0.309553	1161	1161 → 80 [PSH, ACK] Seq=16313 Ack=1...	80	TCP: 1161 → 80 [PSH, ACK] Seq=16313 Ack=1 ...
0.356437	1161	80 → 1161 [ACK] Seq=1 Ack=10473 Win=...	80	TCP: 80 → 1161 [ACK] Seq=1 Ack=10473 Win=2...

Denborarekiko azterketa ere egin daiteke, *Statistics>>Time Sequence*: Hauexek dira bezeroak bidalitako paketeen **sekuentzia zenbaki – denbora** grafikoa



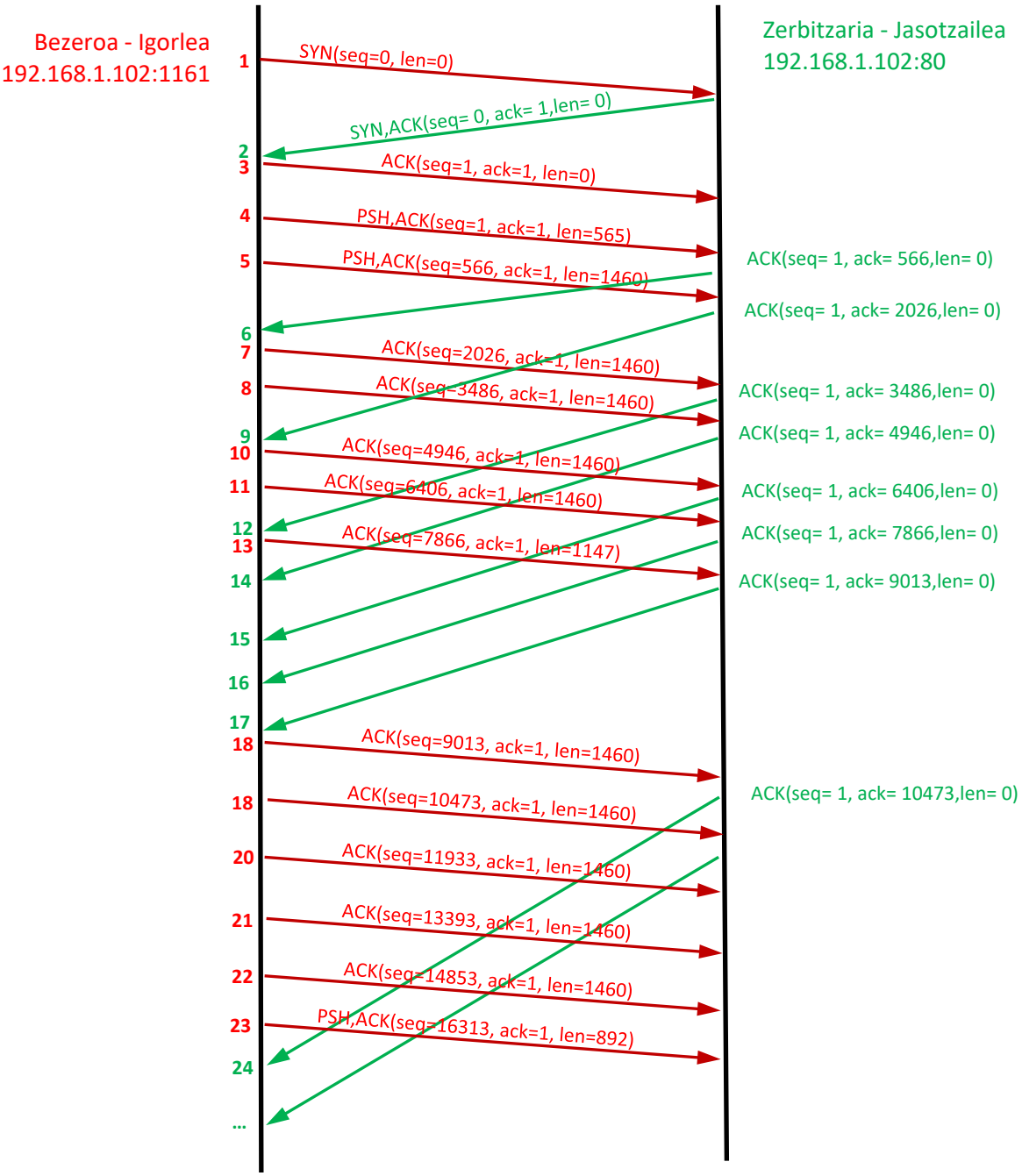
Eta hau da zerbitzariari dagokiona (Beti ere bezeroaren denbora lerroan). Kasu honetan, hasieraketako ACK eta gero zerbait bidaltzen duenean sekuentziaren 01 byte izango dela adierazten du (baina nola bidaltzen diren mezu guztiak len = 0 duten ACK-ak direnez, balio hau konstante mantentzen da)



Adierazpen grafikoan ikus daitekeenez, tramen ordena bezeroan finkatuta dago. Horrek du WireShark eta taulan agertzen diren denborak jasotze eta prozesatzeari dagozkie. Zerbitzariaren igorpenak ez dago finkatuta eta teorian emandakoarekin bat etortzeko jarrita daude.

Beste aldetik, ikasitakoarekin bat ez datorren jokaera ikus dezakegu 5. tramatik 16.era. Bezeroak jarraitzen du tramak bidaltzen azkenengoaren ACK oraindik jaso ez bada ere: 7. trama bidaltzen da 6.ak 4.aren ACK eman ez badu ere (ez 5.arena). Hau azaltzeko, bezeroak duen bidaltze-buferrera jo behar dugu: bufferrean dagoena bidaltzen da jasotzailearen leihoan gordeko delakoan nahiz eta ACK ez jaso. Bufferraren informazio guztia bidaltzen denean falta diren ACK-ak kudeatuko dira. 17. Tramatik aurrera, jokaera arrunta ikus daiteke. Bidaltzen den trama bakoitzak horren ACK jasotzen du.

Klasean aipatu zen bezala, garatzaileak inplementatzen ditu TCPri dagozkion espezifikazio batzuk eta kasu honetan hauek ez datoz klasean azaldutako oinarrizko ereduarekin bat.


Bezeroa - Igorlea
192.168.1.102:1161
Zerbitzaria - Jasotzailea
192.168.1.102:80
1
SYN(seq=0, len=0)
SYN,ACK(seq= 0, ack= 1,len= 0)
2
3
ACK(seq=1, ack=1, len=0)
4
PSH,ACK(seq=1, ack=1, len=565)
5
PSH,ACK(seq=566, ack=1, len=1460)
ACK(seq= 1, ack= 566,len= 0)
ACK(seq= 1, ack= 2026,len= 0)
6
7
ACK(seq=2026, ack=1, len=1460)
8
ACK(seq=3486, ack=1, len=1460)
ACK(seq= 1, ack= 3486,len= 0)
ACK(seq= 1, ack= 4946,len= 0)
9
10
ACK(seq=4946, ack=1, len=1460)
11
ACK(seq=6406, ack=1, len=1460)
ACK(seq= 1, ack= 6406,len= 0)
12
ACK(seq= 1, ack= 7866,len= 0)
13
ACK(seq=7866, ack=1, len=1147)
14
ACK(seq= 1, ack= 9013,len= 0)
15
16
17
18
ACK(seq=9013, ack=1, len=1460)
18
ACK(seq=10473, ack=1, len=1460)
ACK(seq= 1, ack= 10473,len= 0)
20
ACK(seq=11933, ack=1, len=1460)
21
ACK(seq=13393, ack=1, len=1460)
22
ACK(seq=14853, ack=1, len=1460)
23
PSH,ACK(seq=16313, ack=1, len=892)
24
...