

EEM-413 Bilgisayar Ağları Lab4 (TCP)

İlk olarak <http://gaia.cs.umass.edu/wireshark-labs/wireshark-traces.zip> adresinden trace'leri

1) Source(Client computer) IP adresi 192.168.1.102 dir. Ayrıca source port 1161'dir.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	128.119.245.12	TCP	62	health-polling > http [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	http > health-polling [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	health-polling > http [ACK] Seq=1 Ack=1 Win=17520 Len=0
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	[TCP segment of a reassembled PDU]
5	0.041737	192.168.1.102	128.119.245.12	TCP	1514	[TCP segment of a reassembled PDU]
6	0.053937	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=566 Win=6780 Len=0
7	0.054026	192.168.1.102	128.119.245.12	TCP	1514	[TCP segment of a reassembled PDU]
8	0.054690	192.168.1.102	128.119.245.12	TCP	1514	[TCP segment of a reassembled PDU]
9	0.077294	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=2026 Win=8760 Len=0
10	0.077403	192.168.1.102	128.119.245.12	TCP	1514	[TCP segment of a reassembled PDU]
11	0.078137	192.168.1.102	128.119.245.12	TCP	1514	[TCP segment of a reassembled PDU]
12	0.124085	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=3486 Win=11680 Len=0
13	0.124185	192.168.1.102	128.119.245.12	TCP	1201	[TCP segment of a reassembled PDU]
14	0.169118	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=4946 Win=14600 Len=0
15	0.217299	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=6406 Win=17520 Len=0
16	0.267802	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=7866 Win=20440 Len=0

Frame 1: 62 bytes on wire (496 bits), 62 bytes captured (496 bits) on interface 0
Ethernet II, Src: Actiontec_8a:70:1a (00:20:e0:8a:70:1a), Dst: Linksys_ea:af:73 (00:0c:29:ea:af:73)
Internet Protocol Version 4, Src: 192.168.1.102 (192.168.1.102), Dst: 128.119.245.12 (128.119.245.12)
Transmission Control Protocol, Src Port: health-polling (1161), Dst Port: http (80), Seq: 0, Len: 0
Source port: health-polling (1161)
Destination port: http (80)
[Stream index: 0]
Sequence number: 0 (relative sequence number)
Header length: 28 bytes
Flags: 0x02 (SYN)
Window size value: 16384
[Calculated window size: 16384]
Checksum: 0xf6e9 (validation disabled)
Options: (8 bytes)

2) Hedef (destination) IP adresi, 128.119.245.12'dir. Port 80'den alışveriş yapılmıştır. Yani HTTP portu. Bu 1. Sorunun resminde görülmektedir.

3) Bu sorunun cevabı 1. Soruda verilmiştir.

Wireshark programında analysis -> enabled protocols'e girip http'yi devre dışı bıraktım.

4) Değerler aşağıda görüldüğü gibidir. SYN flag 1 olmuştur. Sequence numarası 0'dır.

Internet Protocol Version 4, Src: 192.168.1.102 (192.168.1.102), Dst: 128.119.245.12 (128.119.245.12)
Transmission Control Protocol, Src Port: health-polling (1161), Dst Port: http (80), Seq: 0, Len: 0
Source port: health-polling (1161)
Destination port: http (80)
[Stream index: 0]
Sequence number: 0 (relative sequence number)
Header length: 28 bytes
Flags: 0x02 (SYN)
000. = Reserved: Not set
...0 = Nonce: Not set
...0 = Congestion window Reduced (CWR): Not set
....0.. = ECN-Echo: Not set
......0. = Urgent: Not set
......0. = Acknowledgement: Not set
.... ..0. = Push: Not set
.... ..0. = Reset: Not set
... ..1. = Syn: Set
[Expert Info (Chat/Sequence): Connection establish request (SYN): server port http]
[Message: Connection establish request (SYN): server port http]
[Severity level: chat]
[Group: Sequence]
.... ..0 = Fin: Not set
Window size value: 16384
[Calculated window size: 16384]

5) Değerler aşağıda görüldüğü gibidir. Acknowledgement bayrağı set olmuştur. Sequence numarası 1'dir.

Filter: tcp

Expression: Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	128.119.245.12	TCP	62	health-polling > http [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	http > health-polling [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	health-polling > http [ACK] Seq=1 Ack=1 win=17520 Len=0
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	health-polling > http [PSH, ACK] Seq=1 Ack=1 win=17520 Len=565

Filter: tcp

Expression: Clear Apply

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	128.119.245.12	TCP	62	health-polling > http [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	http > health-polling [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	health-polling > http [ACK] Seq=1 Ack=1 win=17520 Len=0
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	TCP segment of a reassembled PDU
5	0.041737	192.168.1.102	128.119.245.12	TCP	1514	TCP segment of a reassembled PDU
6	0.053937	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=566 win=6780 Len=0
7	0.054026	192.168.1.102	128.119.245.12	TCP	1514	TCP segment of a reassembled PDU
8	0.054690	192.168.1.102	128.119.245.12	TCP	1514	TCP segment of a reassembled PDU
9	0.077294	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=2026 win=8760 Len=0
10	0.077405	192.168.1.102	128.119.245.12	TCP	1514	TCP segment of a reassembled PDU
11	0.078157	192.168.1.102	128.119.245.12	TCP	1514	TCP segment of a reassembled PDU
12	0.124985	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=3486 win=11680 Len=0
13	0.124985	192.168.1.102	128.119.245.12	TCP	1201	TCP segment of a reassembled PDU
14	0.169118	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=4946 win=14600 Len=0
15	0.217299	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=6406 win=17520 Len=0
16	0.267802	128.119.245.12	192.168.1.102	TCP	60	http > health-polling [ACK] Seq=1 Ack=7866 win=20440 Len=0

Stream index: 0

Sequence number: 1 (relative sequence number)
Next sequence number: 566 (relative sequence number)
Acknowledgement number: 1 (relative ack number)
Header length: 20 bytes
Flags: 0x18 (PSH, ACK)
Window size value: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x1fbd (validation disabled)
[SEQ/ACK analysis]
TCP segment data (565 bytes)

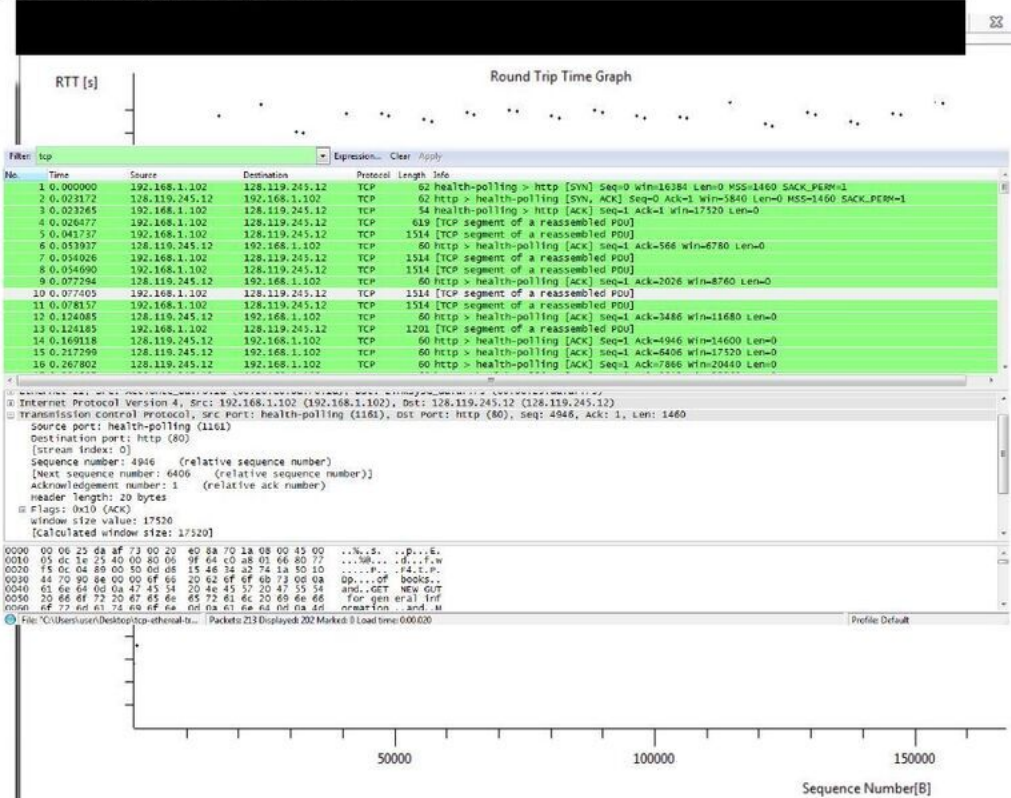
0000 00 06 25 da af 73 00 20 e0 8a 70 1a 08 00 45 00 .N..S...P...E.
0010 02 3d 1e 21 40 00 80 06 a2 e7 c0 a8 01 66 80 77 .1.0... f.w
0020 f5 0c 04 89 00 50 00 06 01 f5 34 a2 74 1a 35 18 P...4.L.P.
0030 44 70 1f 8d 00 00 50 4f 53 54 20 2f 65 74 68 65 dp...po st /ethe
0040 72 65 61 6c 2d 6c 61 62 73 2f 6c 61 62 33 2d 31 real-lab z/labz-1
0050 2d 17 65 70 6c 79 2e 68 74 6d 20 48 54 54 50 2f -reply.h to HTTP/
0060 31 7e 31 6d 0a 48 6f 73 74 3a 70 67 61 69 61 7e s.I.HMS t- naia

File: C:\Users\User\Desktop\Tcp-eternal-hex... Packets: 212 Displayed: 202 Marked: 0 Load time: 0:00:02

Profile: Default

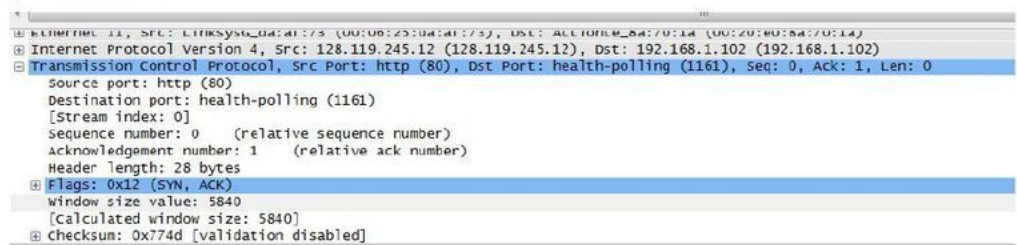
6) 4 numaralı segmenttir. HTTP POST komutu içeren TCP segmentidir. Bu segmentin dizi numarası 1 dir.

7) Elde edilen grafik bu şekildedir.



8) İlk TCP segmentinin boyutu 565 byte'tır. Diğer 5 TCP segmentinin her birinin boyu ise 1460 byte'tır.

görülmektedir.



10) Transferlerde tekrar gönderilen bir paket görülmektedir. Yani kayıp söz konusu değildir. Bunu TCP segmentlerinin dizi numaralarını kontrol ederek gördüm.

11) Aşağıdaki tabloda istenen bilgiler görülmektedir.

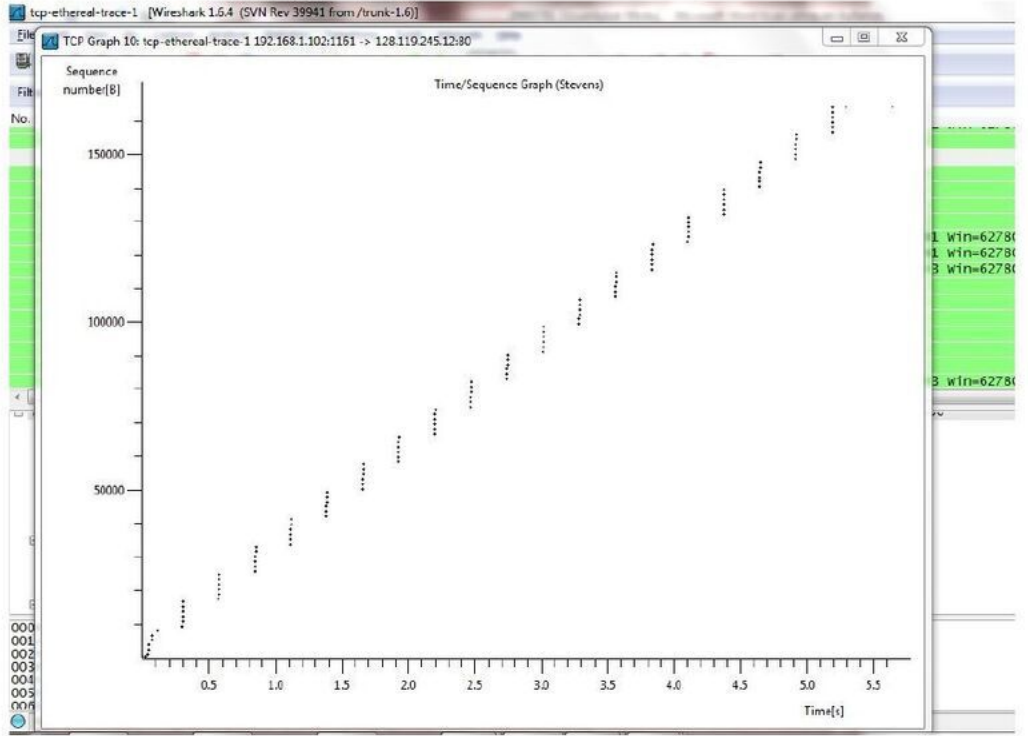
	Acknowledged Sequence Number	Acknowledged Data
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ACK1	1	776
ACK2	777	1426
ACK3	2203	1426
ACK4	3629	1426
ACK5	5505	1426
ACK6	6481	1426
ACK7	7907	1062
ACK8	8969	1426
ACK9	10395	126

12) TCP için througput değeri aşağıdaki gibi hesaplanmaktadır.

$$\text{Throughput} = \text{Bytes Send} / \text{Time to send} = 152959 / (6.317617 - 6.030425) = 539791$$

13) Grafik aşağıdaki gibidir.



YORUM

internet üzerinde bir server'a yükledik. Sequence ve acknowledge numaralarını inceledik. Ayrıca TCP'nin congestion control, slow-start ve congestion avoidance yapılarını gördük.