## **Connection establishment**

```
127.0.0.1 wrote:
1 0 5 0 0 None
                                                            Sent message to server to establish connection
                                                           SYNbit: 1
 recevied symbit: 1
                                                           ACKbit: 0
recevied ackbit: 0
                                                           SEQnum: 5
recevied seqnum: 5
                                                           ACKnum: 0
recevied acknum: 0
                                                           FINbit: 0
sending message to acknowledge connection from client
SYNbit: 1
                                                           Received message:
ACKbit: 1
                                                           SYNbit: 1
SEQnum: 10
                                                           ACKbit: 1
ACKnum: 6
                                                           SEOnum: 10
 essage: None
                                                           ACKnum: 6
127.0.0.1 wrote:
0 1 6 11 0 0 None
                                                           Sent message:
 received message:
                                                           SYNbit: 0
SYNbit: 0
                                                           ACKbit: 1
ACKbit: 1
                                                           SEQnum: 6
SEQnum: 6
                                                           ACKnum: 11
ACKnum: 11
                                                           FINbit: 0
 FINbit: 0
                                                           checksum: 0
 checksum: 0
                                                           message: None
 message: None
                                                           Connection established
Connection established
                                                       Command Prompt - python client.py
```

```
Connection established
127.0.0.1 wrote:
                                                         Enter message: GET index.html
0 0 7 11 0 1275 GET index.html
                                                         Sent message:
received message:
                                                         SYNbit: 0
```

SYNbit: 0 ACKbit: 0 ACKbit: 0 SEQnum: 7 SEQnum: 7 ACKnum: 11 ACKnum: 11 FINbit: 0 FINbit: 0 checksum: 1275 checksum: 1275 message: GET index.html

No error detected in checksum GET command received

checksum: 2203 127.0.0.1 wrote: 0 0 8 11 0 1829 POST index.html hola received message:

SYNbit: 0 ACKbit: 0 SEQnum: 8

ACKnum: 11

FINbit: 0 checksum: 1829 essage: POST index.html hola

message: GET index.html

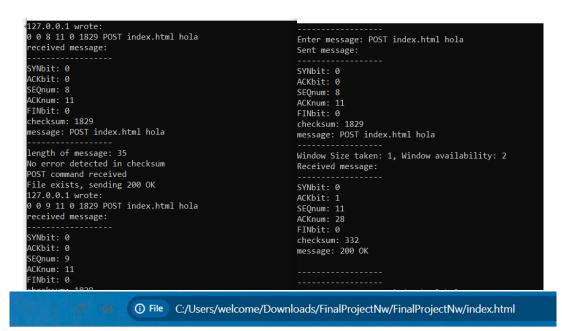
Window Size taken: 1, Window availability: 2

Received message: SYNbit: 0

ACKbit: 1 SEQnum: 11 ACKnum: 21 FINbit: 0 checksum: 2203

page opened

message: HTTP/1.0 200 OK ->



hola

## **Corruption:**

```
Command Prompt - python client.py
 Command Prompt - python server.py
                                                   page opened
checksum: 1829
message: PƊST index.html hola
                                                  Enter message: POST index.html hola
length of message: 35
                                                  Packet corrupted
Error detected in checksum
                                                  Sent message:
127.0.0.1 wrote:
0 0 9 11 0 1829 P⊡ST index.html hola
                                                  SYNbit: 0
received message:
                                                  ACKbit: 0
                                                  SEQnum: 9
SYNbit: 0
                                                  ACKnum: 11
ACKbit: 0
                                                  FINbit: 0
SEQnum: 9
                                                  checksum: 1829
ACKnum: 11
                                                  message: PDST index.html hola
FINbit: 0
checksum: 1829
                                                  Window Size taken: 1, Window availability: 2
Timeout occurred. Resending unacknowledged packets.
message: P団ST index.html hola
                                                  Resent message:
length of message: 35
 Error detected in checksum
                                                  SYNbit: 0
                                                  ACKbit: 0
                                                  SEQnum: 9
                                                  ACKnum: 11
                                                  FINbit: 0
                                                   message: P②ST index.html hola
                                                   Enter message: _
```

```
No.
         Time
                       Source
                                            Destination
                                                                  Protocol Lenatl Info
      19 8.309485
                       127.0.0.1
                                            127.0.0.1
                                                                  UDP
                                                                           47 64540 → 9999 Len=15
      20 8.334668
                        127.0.0.1
                                             127.0.0.1
                                                                             46 9999 → 64540 Len=14
      21 8.340176
                       127.0.0.1
                                            127.0.0.1
                                                                  UDP
                                                                             50 64540 → 9999 Len=18
      22 11.867333
                       127.0.0.1
                                            127.0.0.1
                                                                            45 58895 → 58894 [PSH, ACK] Seg=1 Ack=1 Win=10233 Len=1
                                                                  TCP
                                                                             44 58894 → 58895 [ACK] Seq=1 Ack=2 Win=10231 Len=0
      23 11.867533
                        127.0.0.1
                                             127.0.0.1
      24 13.245508
                       127.0.0.1
                                             127.0.0.1
                                                                  TCP
                                                                            84 49676 → 49802 [PSH, ACK] Seq=81 Ack=161 Win=10016 Len=40
                                                                            44 49802 → 49676 [ACK] Seg=161 Ack=121 Win=10125 Len=0
      25 13.245838
                       127.0.0.1
                                            127.0.0.1
                                                                  TCP
      26 13.245977
                       127.0.0.1
                                             127.0.0.1
                                                                            124 49802 → 49676 [PSH, ACK] Seq=161 Ack=121 Win=10125 Len=80
                                                                  TCP
      27 13.246074
                       127.0.0.1
                                             127.0.0.1
                                                                  TCP
                                                                            44 49676 → 49802 [ACK] Seq=121 Ack=241 Win=10016 Len=0
                                                                       63 64540 → 9999 Len=31
      28 15.530633
                       127.0.0.1
                                            127.0.0.1
                                                                  UDP
                                                                             85 9999 → 64540 Len=53
      29 16.135053
                                             127.0.0.1
                       127.0.0.1
                                                                  UDP
                                                                             84 49676 → 49802 [PSH, ACK] Seq=121 Ack=241 Win=10016 Len=40
       30 18.259952
                       127.0.0.1
                                             127.0.0.1
      31 18.260201
                       127.0.0.1
                                            127.0.0.1
                                                                  TCP
                                                                            44 49802 → 49676 [ACK] Seq=241 Ack=161 Win=10124 Len=0
                                                                            124 49802 → 49676 [PSH, ACK] Seq=241 Ack=161 Win=10124 Len=80
      32 18.260242
                       127.0.0.1
                                             127.0.0.1
                                                                  TCP
      33 18.260295
                       127.0.0.1
                                            127.0.0.1
                                                                  TCP
                                                                            44 49676 → 49802 [ACK] Seq=161 Ack=321 Win=10016 Len=0
      34 20.170467
                       127.0.0.1
                                                                  UDP
                                             127.0.0.1
                                                                             69 64540 → 9999 Len=37
      35 20.199270
                       127.0.0.1
                                            127.0.0.1
                                                                  UDP
                                                                             55 9999 → 64540 Len=23
                                                                               0000 02 00 00 00 45 00 00 3b 4c 2c 00 00 80 11 00 00
0010 7f 00 00 01 7f 00 00 01 fc 1c 27 0f 00 27 ac de
                                                                                                                                         ····E··; L,····
  Frame 28: 63 bytes on wire (504 bits), 63 bytes captured (504 bits) on in
   Null/Loopback
                                                                               0020 30 20 30 20 37 20 31 31 20 30 20 31 32 37 35 20
0030 47 45 54 20 69 6e 64 65 78 2e 68 74 6d 6c 0a
                                                                                                                                         0 0 7 11 0 1275
GET inde x.html
  Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
  User Datagram Protocol, Src Port: 64540, Dst Port: 9999
  Data (31 bytes)
       19 8.309485
                         127.0.0.1
                                               127.0.0.1
                                                                      UDP
                                                                                 47 64540 → 9999 Len=15
       20 8.334668
                         127.0.0.1
                                               127.0.0.1
                                                                      UDP
                                                                                  46 9999 → 64540 Len=14
       21 8.340176
                         127.0.0.1
                                                127.0.0.1
                                                                      UDP
                                                                                  50 64540 → 9999 Len=18
       22 11.867333
                         127.0.0.1
                                                127.0.0.1
                                                                      TCP
                                                                                  45 58895 → 58894 [PSH, ACK] Seq=1 Ack=1 Win=10233 Len=1
       23 11.867533
                         127.0.0.1
                                                127.0.0.1
                                                                      TCP
                                                                                  44 58894 → 58895 [ACK] Seq=1 Ack=2 Win=10231 Len=0
       24 13 245508
                         127.0.0.1
                                                127.0.0.1
                                                                      TCP
                                                                                  84 49676 \rightarrow 49802 [PSH, ACK] Seq=81 Ack=161 Win=10016 Len=40
       25 13.245838
                                                                                 44 49802 → 49676 [ACK] Seg=161 Ack=121 Win=10125 Len=0
                         127.0.0.1
                                               127.0.0.1
                                                                      TCP
       26 13.245977
                                                                                124 49802 → 49676 [PSH, ACK] Seq=161 Ack=121 Win=10125 Len=80
                         127.0.0.1
                                                127.0.0.1
                                                                      TCP
       27 13.246074
                         127.0.0.1
                                               127.0.0.1
                                                                      ТСР
                                                                                 44 49676 → 49802 [ACK] Seq=121 Ack=241 Win=10016 Len=0
       28 15.530633
                                                                                  63 64540 → 9999 Len=31
                         127.0.0.1
                                                127.0.0.1
                                                                       UDP
       29 16.135053
                         127.0.0.1
                                               127.0.0.1
                                                                      UDP
                                                                                85 9999 → 64540 Len=53
       30 18.259952
                         127.0.0.1
                                                127.0.0.1
                                                                       ТСР
                                                                                  84 49676 → 49802 [PSH, ACK] Seq=121 Ack=241 Win=10016 Len=40
       31 18.260201
                         127.0.0.1
                                                127.0.0.1
                                                                      TCP
                                                                                  44 49802 \rightarrow 49676 [ACK] Seq=241 Ack=161 Win=10124 Len=0
                                                                                124 49802 → 49676 [PSH, ACK] Seq=241 Ack=161 Win=10124 Len=80
       32 18.260242
                         127.0.0.1
                                               127.0.0.1
                                                                      TCP
                                                                                  44 49676 → 49802 [ACK] Seg=161 Ack=321 Win=10016 Len=0
       33 18.260295
                         127.0.0.1
                                                127.0.0.1
                                                                      TCP
       34 20.170467
                                                                                  69 64540 → 9999 Len=37
                         127.0.0.1
                                               127.0.0.1
                                                                      UDP
                         127.0.0.1
       35 20.199270
                                               127.0.0.1
                                                                                  55 9999 → 64540 Len=23
                                                                                                                                                    ·-E--Q L---
   Frame 29: 85 bytes on wire (680 bits), 85 bytes captured (680 bits) on in
                                                                                   0000 02 00 00 00 45 00 00 51 4c 2d 00 00 80 11 00 00
                                                                                    0010 7f 00 00 01 7f 00 00 01 27 0f fc 1c 00 3d ec a9
   Null/Loopback
                                                                                   0020 30 20 31 20 31 31 20 32 31 20 30 20 32 32 30 33 0030 20 48 54 54 50 2f 31 2e 30 20 32 30 30 20 4f 4b
                                                                                                                                                 0 1 11 2 1 0 2203
   Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
                                                                                                                                                  HTTP/1. 0 200 OK
  User Datagram Protocol, Src Port: 9999, Dst Port: 64540
                                                                                   0040 20 2d 3e 20 0d 0a 0d 0a 20 70 61 67 65 20 6f 70
                                                                                                                                                  -> · · · · page op
```

0050 65 6e 65 64 0a

ened.

> Data (53 bytes)