

בתמונה א' ניתן לראות את צד השרת (server), רואים כי הביטים נשלחים אל הקליינט (Tzach), כל הביטים נשלחו במלואם. (83879/83879)

בתמונה ב' זו ניתן לראות את הצד של הלקוח (client), בו הלקוח מבקש את רשימת הקבצים, מבקש לבקש להוריד את הקבצים ולאחר מכן מוריד את הקבצים, ניתן לראות כמה ביטים התקבלו וכמה נשלחו.

ללא איבוד פאקטות.

```
tzach@tzach-VirtualBox:~/Desktop/Chat$ python3 server.py
~~~ Server is Running and listening ~~~
User Tzach Joined.
sent: 3996 / 83879 bytes to Tzach
sent: 7992 / 83879 bytes to Tzach
sent: 11988 / 83879 bytes to Tzach
sent: 15984 / 83879 bytes to Tzach
sent: 19980 / 83879 bytes to Tzach
sent: 23976 / 83879 bytes to Tzach
sent: 27972 / 83879 bytes to Tzach
sent: 31968 / 83879 bytes to Tzach
sent: 35964 / 83879 bytes to Tzach
sent: 39960 / 83879 bytes to Tzach
sent: 43956 / 83879 bytes to Tzach
sent: 47952 / 83879 bytes to Tzach
sent: 51948 / 83879 bytes to Tzach
sent: 55944 / 83879 bytes to Tzach
sent: 59940 / 83879 bytes to Tzach
sent: 63936 / 83879 bytes to Tzach
sent: 67932 / 83879 bytes to Tzach
sent: 71928 / 83879 bytes to Tzach
sent: 75924 / 83879 bytes to Tzach
sent: 79920 / 83879 bytes to Tzach
sent: 83879 / 83879 bytes to Tzach
```

```
tzach@tzach-VirtualBox:~/Desktop/Chat$ python3 client.py
---Client Manual---
  To connect the chat "connect"
  To send a private message to Another user write "<set_msg<Name>"
  To send a message to all the online users write "<set_msg_all>"
  To get a list of online users enter write "<get_users>"
  To get a list of server files ..."<get_list_file>"
  In order to receive a specific file from the server, write "**filename"
  To download the file after requesting it enter "<download><test.txt>"
  Please select one of the options:
You are connected from:('127.0.0.1', 43426)
hl
Enter your message:<connect><Tzach>
Enter your message:<get_list_file>
Enter your message:<server_files> : bent.txt, pic9.png
hl
<download><pic9.png>
Enter your message:file - pic9.png request received, proceed, and file name to save as
hl
<proceed><pic9.png>
Enter your message:hl
received: 3996 / 83879 bytes
sent: 3996 / 83879
hl
received: 7992 / 83879 bytes
sent: 7992 / 83879
hl
received: 11988 / 83879 bytes
sent: 11988 / 83879
hl
received: 15984 / 83879 bytes
sent: 15984 / 83879
hl
received: 19980 / 83879 bytes
sent: 19980 / 83879
hl
received: 23976 / 83879 bytes
received: 27972 / 83879 bytes
received: 31968 / 83879 bytes
received: 35964 / 83879 bytes
received: 39960 / 83879 bytes
received: 43956 / 83879 bytes
received: 47952 / 83879 bytes
received: 51948 / 83879 bytes
received: 55944 / 83879 bytes
received: 59940 / 83879 bytes
```

בתמונה ג'ד' אנחנו רואים כי לא כל הביטים נשלחו למשתמש מהשרת מכיוון שמדובר באיבוד פאקטות של 10%.

```
tzach@tzach-VirtualBox:~/Desktop/Chat$ python3 server.py
~~~ Server is Running and listening ~~~
User Tzach Joined.
sent: 4 / 4 bytes to Tzach
sent: 3996 / 83879 bytes to Tzach
sent: 7992 / 83879 bytes to Tzach
sent: 11988 / 83879 bytes to Tzach
sent: 15984 / 83879 bytes to Tzach
```

```
<download><pic9.png>
Enter your message:file - pic9.png request received, proceed, and file name to save as
hi
<proceed><pic9.png>
Enter your message:hi
received: 3996 / 83879 bytes
sent: 3996 / 83879
hi
received: 7992 / 83879 bytes
sent: 7992 / 83879
hi
received: 11988 / 83879 bytes
sent: 11988 / 83879
hi
received: 15984 / 83879 bytes
sent: 15984 / 83879
hi
received: 19980 / 83879 bytes
```

בתמונה ה' ניתן לראות שאכן כל הביטים נשלחו (למרות איבוד הפקטות) וזאת מכיוון שהקובץ שנשלח הפעם הוא קובץ מאוד קטן!

```
tzach@tzach-VirtualBox:~/Desktop/Chat$ python3 client.py
---Client Manual---
To connect the chat "<connect>"
To send a private message to Another user write "<set_msg><Name>"
To send a message to all the online users write "<set_msg_all>"
To get a list of online users enter write "<get_users>"
To get a list of server files ..."<get_list_file>"
In order to receive a specific file from the server, write "*filename"
To download the file after requesting it enter "<download><test.txt>"
Please select one of the options:
You are connected from:('127.0.0.1', 58600)
hi
Enter your message:<connect><Tzach>
Enter your message:<get_list_file>
Enter your message:<server_files> : beni.txt, pic9.png
hi
<download><beni.txt>
Enter your message:file - beni.txt request received, proceed, and file name to save as
hi
<proceed><beni.txt>
Enter your message:hi
received: 4 / 4 bytes
completed
```

בתמונה ו' אנחנו רואים כי ישנה בעיה כאשר הקובץ גדול ויש איבוד פקטות של 10%

| | | | | |
|---|------|-----------|-----------|-----------------|
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 22.039103077 64 |
| Destination unreachable (Port unreachable) 79 | ICMP | 127.0.0.1 | 127.0.0.1 | 22.039129001 65 |
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 23.040763606 66 |
| Destination unreachable (Port unreachable) 79 | ICMP | 127.0.0.1 | 127.0.0.1 | 23.040828363 67 |
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 24.042669289 68 |
| Destination unreachable (Port unreachable) 79 | ICMP | 127.0.0.1 | 127.0.0.1 | 24.042690378 69 |
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 25.044338922 70 |
| Destination unreachable (Port unreachable) 79 | ICMP | 127.0.0.1 | 127.0.0.1 | 25.044366013 71 |
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 26.046011879 72 |
| Destination unreachable (Port unreachable) 79 | ICMP | 127.0.0.1 | 127.0.0.1 | 26.046031281 73 |
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 27.047076039 74 |
| Destination unreachable (Port unreachable) 79 | ICMP | 127.0.0.1 | 127.0.0.1 | 27.047102330 75 |
| Len=7 55000 → 55448 51 | UDP | 127.0.0.1 | 127.0.0.1 | 28.048227330 76 |

מנגד, בתמונה ז' ניתן לראות כי הכל תקין מכיוון שאין איבוד פאקטות ואכן קיבלנו את הקובץ ותכולתו באופן תקין

The image shows a Wireshark packet capture of a network session. The top pane shows the packet list with 32 packets. The middle pane shows the packet details for packet 20, which is a UDP datagram from 127.0.0.1 to 127.0.0.1 on port 37021 to 55000. The bottom pane shows the raw data of the packet, which is a 7-byte payload: 3c 30 3e 6f 6d 65 72.

| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|--------------|-------------|-------------|----------|--------|---|
| 20 | 32.138734839 | 127.0.0.1 | 127.0.0.1 | UDP | 51 | 37021 → 55000 Len=7 |
| 21 | 32.138992267 | 127.0.0.1 | 127.0.0.1 | UDP | 49 | 39006 → 55001 Len=5 |
| 24 | 34.902073699 | 10.0.2.4 | 91.189.94.4 | NTP | 92 | NTP Version 4, client |
| 25 | 34.977615083 | 91.189.94.4 | 10.0.2.4 | NTP | 92 | NTP Version 4, server |
| 26 | 35.958857308 | 127.0.0.1 | 224.0.0.251 | MDNS | 89 | Standard query 0x0000 PTR _ipp._tcp.local, "QM" |
| 27 | 37.423784827 | 10.0.2.4 | 192.168.5.1 | DNS | 102 | Standard query 0x8dfd AAAA connectivity-check.ult |
| 28 | 37.437847213 | 192.168.5.1 | 10.0.2.4 | DNS | 163 | Standard query response 0x8dfd AAAA connectivity |
| 29 | 37.438379765 | 127.0.0.1 | 127.0.0.53 | DNS | 91 | Standard query 0x048e AAAA connectivity-check.ult |
| 30 | 37.438458514 | 10.0.2.4 | 192.168.5.1 | DNS | 102 | Standard query 0x475e AAAA connectivity-check.ult |
| 31 | 37.494069521 | 192.168.5.1 | 10.0.2.4 | DNS | 163 | Standard query response 0x475e AAAA connectivity |
| 32 | 37.494107570 | 127.0.0.1 | 127.0.0.1 | DNS | 91 | Standard query response 0x048e AAAA connectivity |

Frame 20: 51 bytes on wire (408 bits), 51 bytes captured (408 bits) on interface any, id 0
Linux cooked capture v1
Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 37021, Dst Port: 55000
Data (7 bytes)
Data: 3c303e6f6d6572
[Length: 7]

```

0000  00 00 03 04 00 06 00 00 00 00 00 00 00 00 08 00  .....
0010  45 00 00 23 38 ba 40 00 40 11 04 0e 7f 00 00 01  E..#8.@...
0020  7f 00 00 01 90 9d d6 d8 00 0f fe 22 3c 30 3e 6f  ...<0>...
0030  6d 65 72                                     ...Bf...
  
```