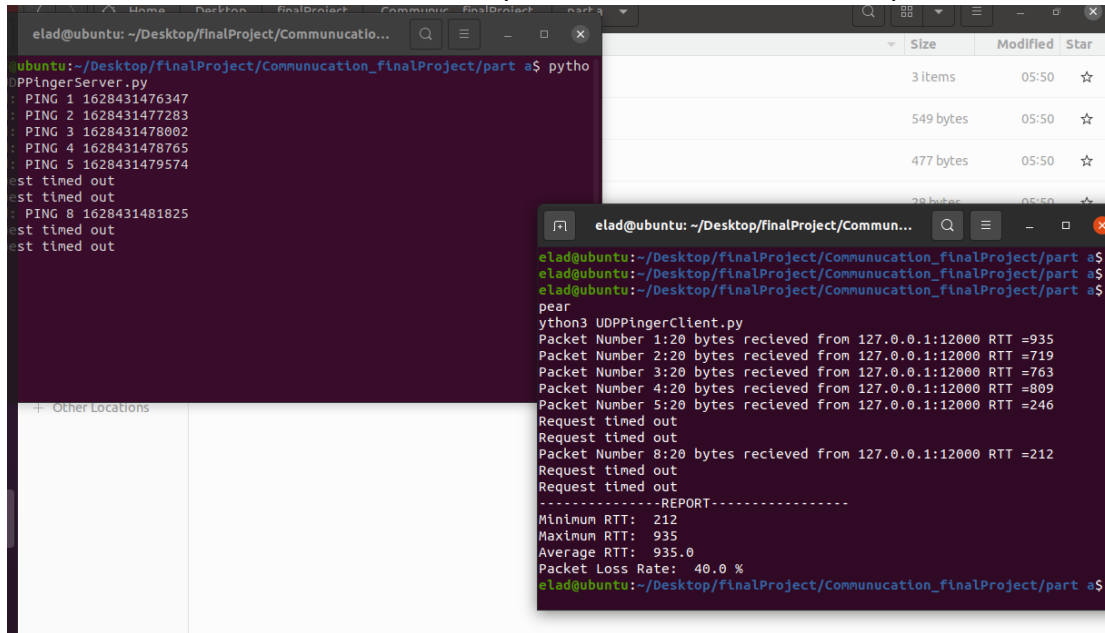


פרויקט סוף קורס – אלעד ווקבין והילה שושן.

חלק ראשון:

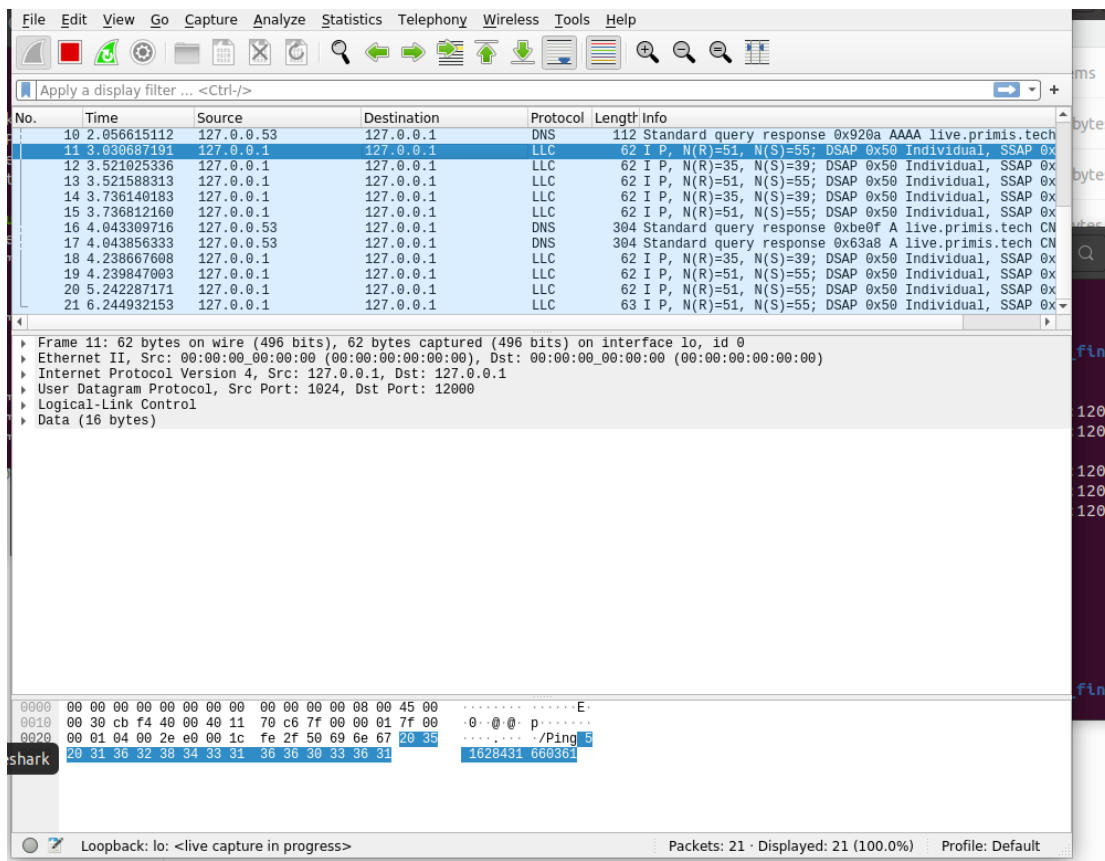
שליחת 10 פינגים, קבלתם, חישוב הRTD וחישוב הפאקטות שנאבדו.



```
elad@ubuntu: ~/Desktop/finalProject/Communcation_finalProject/part a$ python3 UDPpingServer.py
PING 1 1628431476347
PING 2 1628431477283
PING 3 1628431478002
PING 4 1628431478765
PING 5 1628431479574
st timed out
st timed out
PING 8 1628431481825
st timed out
st timed out

elad@ubuntu: ~/Desktop/finalProject/Communcation_finalProject/part a$ python3 UDPpingClient.py
Packet Number 1:20 bytes recieved from 127.0.0.1:12000 RTT =935
Packet Number 2:20 bytes recieved from 127.0.0.1:12000 RTT =719
Packet Number 3:20 bytes recieved from 127.0.0.1:12000 RTT =763
Packet Number 4:20 bytes recieved from 127.0.0.1:12000 RTT =809
Packet Number 5:20 bytes recieved from 127.0.0.1:12000 RTT =246
Request timed out
Request timed out
Packet Number 8:20 bytes recieved from 127.0.0.1:12000 RTT =212
Request timed out
Request timed out
Request timed out
-----REPORT-----
Minimum RTT: 212
Maximum RTT: 935
Average RTT: 935.0
Packet Loss Rate: 40.0 %
elad@ubuntu: ~/Desktop/finalProject/Communcation_finalProject/part a$
```

הצגה של הנתונים ב wireshark (שליחה וקבלה מול פורטים 12000,1024 – localhost 127.0.0.1)



חלק שני :

האזנה לפורט 5060 עם IPv4 עם פקודת netstat -an:

```
elad@ubuntu: ~/Desktop/finalProject/Communcation_final...
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ ./Udp
-Client
Hello, from the Server
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ ./Udp
-Client
Hello, from the Server
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ netst
at -an
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN
tcp6       0      0 :::1:631                :::*                    LISTEN
udp        0      0 0.0.0.0:631             0.0.0.0:*               LISTEN
udp        0      0 192.168.63.129:5060     0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:5353            0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:59580           0.0.0.0:*               LISTEN
udp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
udp        0      0 192.168.63.129:68      192.168.63.254:67      ESTABLISHED
udp6       0      0 :::5353                 :::*                    LISTEN
udp6       0      0 :::57183                 :::*                    LISTEN
raw6       0      0 :::58                    :::*                    LISTEN
7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags               Type               State         I-Node   Path
```

קבלת הפאקטות מ IP הנדרש :

```
elad@ubuntu:~/Desktop/finalProject/Communcation_final...
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ ./Udp
-Server
After bind(). Waiting for clientsReceived packet from 192.168.63.129:55320
Data is: Good morning from Elad and Hila :)

elad@ubuntu:~/Desktop/finalProject/Communcation_final...
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ ./Udp
-Client
Hello, from the Server
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ S
```

האזנה של Src port ל5060:

The screenshot shows a Wireshark capture window titled "Capturing from Loopback: lo". The packet list shows two packets. The second packet is selected, showing details for Ethernet II, Internet Protocol Version 4, and User Datagram Protocol. The UDP section shows the source port as 5060 and the destination port as 36267. The packet data is displayed in hexadecimal and ASCII, showing the text "Hello, from the Server".

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	192.168.63.129	192.168.63.129	UDP	79	36267 → 5060 Len=37
2	0.000206528	192.168.63.129	192.168.63.129	UDP	66	5060 → 36267 Len=24

Frame 2: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface lo, id 0
Ethernet II, Src: 00:00:00:00:00:00 (00:00:00:00:00:00), Dst: 00:00:00:00:00:00 (00:00:00:00:00:00)
Internet Protocol Version 4, Src: 192.168.63.129, Dst: 192.168.63.129
User Datagram Protocol, Src Port: 5060, Dst Port: 36267
Data (24 bytes)

0000 00 00 00 00 00 00 00 00 00 00 00 00 08 00 45 00E:
0010 00 34 20 7b 40 00 00 11 19 eb c0 a8 3f 81 c0 a8 -4 { @ }?
0020 3f 81 13 c4 8d ab 00 20 00 85 48 65 6c 6c 6f 2c ?.....Hello,
0030 20 66 72 6f 6d 20 74 68 65 20 53 65 72 76 65 72 from the Server
0040 2a 00 *

האזנה של Dst port ל5060:

The screenshot shows a Wireshark capture window titled "Capturing from Loopback: lo". The packet list shows six packets. The first packet is selected, showing details for Ethernet II, Internet Protocol Version 4, and User Datagram Protocol. The UDP section shows the source port as 5060 and the destination port as 36267. The packet data is displayed in hexadecimal and ASCII, showing the text "A 20 @? ... Good m ... rning f rom Elad and Hil a :) ...".

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	192.168.63.129	192.168.63.129	UDP	79	36267 → 5060 Len=37
2	0.000206528	192.168.63.129	192.168.63.129	UDP	66	5060 → 36267 Len=24
3	35.431530871	127.0.0.1	127.0.0.53	DNS	100	Standard query 0x80c0 AAAA connectivity-check.ubuntu.com OPT
4	35.480042455	127.0.0.1	127.0.0.53	DNS	100	Standard query response 0x80c0 AAAA connectivity-check.ubuntu...
5	35.480544992	127.0.0.1	127.0.0.53	DNS	112	Standard query 0xc00a AAAA connectivity-check.ubuntu.com. loca...
6	35.577465432	127.0.0.1	127.0.0.53	DNS	112	Standard query response 0xc00a No such name AAAA connectivity...

Frame 1: 79 bytes on wire (632 bits), 79 bytes captured (632 bits) on interface lo, id 0
Ethernet II, Src: 00:00:00:00:00:00 (00:00:00:00:00:00), Dst: 00:00:00:00:00:00 (00:00:00:00:00:00)
Internet Protocol Version 4, Src: 192.168.63.129, Dst: 192.168.63.129
User Datagram Protocol, Src Port: 36267, Dst Port: 5060
Data (37 bytes)

0000 00 00 00 00 00 00 00 00 00 00 00 00 08 00 45 00E:
0010 00 41 20 7a 40 00 00 11 19 df c0 a8 3f 81 c0 a8 -A 20 @? ...
0020 3f 81 8d ab 13 c4 00 20 00 92 47 6f 6f 64 20 6d ?.....Good m
0030 6f 72 6e 69 6e 67 20 66 72 6f 6d 20 45 6c 61 64 orning f rom Elad
0040 20 61 6e 64 20 48 69 6c 61 20 3a 29 20 0a 00 and Hil a :) ...

מעבר ל IPv6 :

```
elad@ubuntu: ~/Desktop/finalProject/Communucation_final...
Try: sudo apt install <deb name>

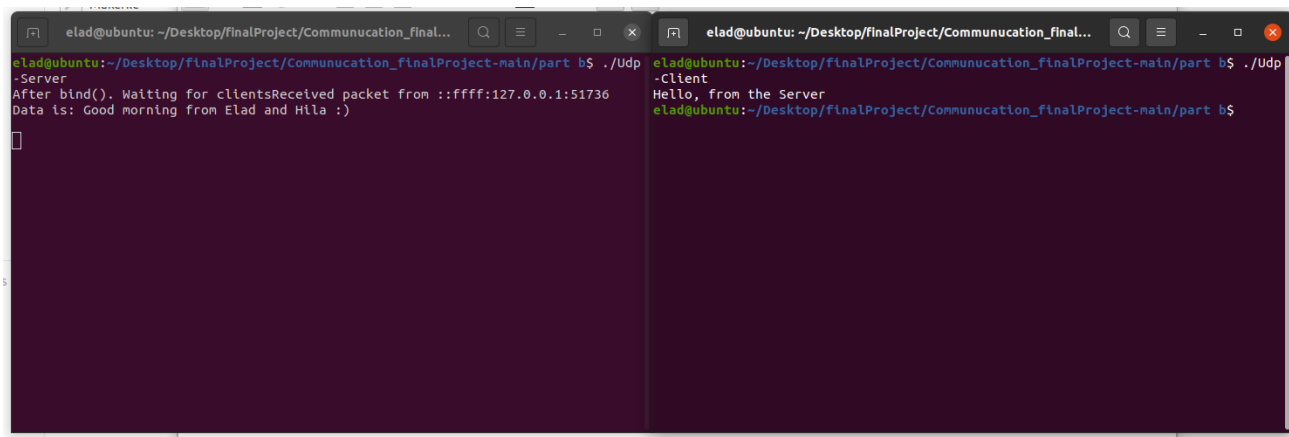
elad@ubuntu:~/Desktop/finalProject/Communucation_finalProject-main/part b$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.63.129 netmask 255.255.255.0 broadcast 192.168.63.255
    inet6 fe80::b2e7:837f:c4b1:f594 prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:af:e8:df txqueuelen 1000 (Ethernet)
    RX packets 186391 bytes 235583290 (235.5 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 82916 bytes 5537784 (5.5 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 3057 bytes 300393 (300.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 3057 bytes 300393 (300.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

elad@ubuntu:~/Desktop/finalProject/Communucation_finalProject-main/part b$
```

IPv6 עם פקודת netstat -an :

```
elad@ubuntu:~/Desktop/finalProject/Communucation_fina...
elad@ubuntu:~/Desktop/finalProject/Communucation_finalProject-main/part b$ netstat -an
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN
tcp6       0      0 :::1:631                :::*                   LISTEN
udp        0      0 0.0.0.0:631             0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:5353            0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:59580           0.0.0.0:*               LISTEN
udp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
udp        0      0 192.168.63.129:68       192.168.63.254:67      ESTABLISHED
udp6       0      0 :::5060                 :::*                   LISTEN
udp6       0      0 :::5353                 :::*                   LISTEN
udp6       0      0 :::57183                :::*                   LISTEN
raw6       0      0 :::58                   :::*                   LISTEN
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags               Type               State              I-Node      Path
unix   2      [ ACC ]               STREAM             LISTENING          410047      @/tmp/dbus-pSjjWpx1
unix   2      [ ACC ]               STREAM             LISTENING          49820       @/tmp/.ICE-unix/1698
unix   2      [ ACC ]               SEQPACKET          LISTENING          24996       /run/udev/control
unix   2      [ ACC ]               STREAM             LISTENING          253822      /run/systemd/userdb/
io.systemd.DynamicUser
unix   2      [ ACC ]               STREAM             LISTENING          654461      /tmp/CoreFxPipe_a078
```



```
elad@ubuntu: ~/Desktop/finalProject/Communcation_final...
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ ./Udp
-Server
After bind(). Waiting for clients
Received packet from ::ffff:127.0.0.1:51736
Data is: Good morning from Elad and Hila :)

elad@ubuntu:~/Desktop/finalProject/Communcation_final...
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$ ./Udp
-Client
Hello, from the Server
elad@ubuntu:~/Desktop/finalProject/Communcation_finalProject-main/part b$
```

ההבדל העיקרי בין IPv4 ל IPv6 :

IPv4 משתמש בפורמט כתובת של 32 סיביות, ואילו **IPv6** משתמש בתבנית 128 סיביות המאפשרות כמות כתובות גדולה יותר משמעותית.

בנוסף פיתוח IPv6 כולל מספר חידושים שנועדו להתגבר על חולשות שזוהו לאורך השנים ב IPv4- ולהתאים אותו לטכנולוגיות הרשת האחרונות.