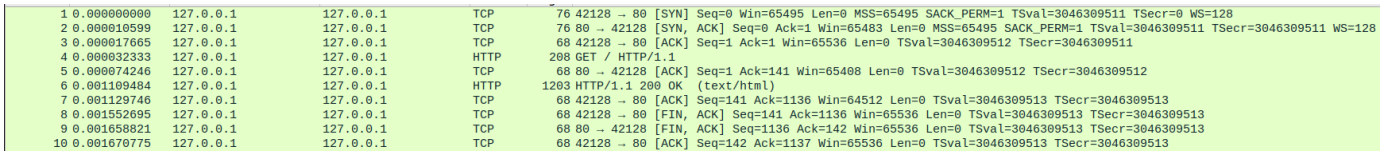
3- Wireshark

Apachee Server :

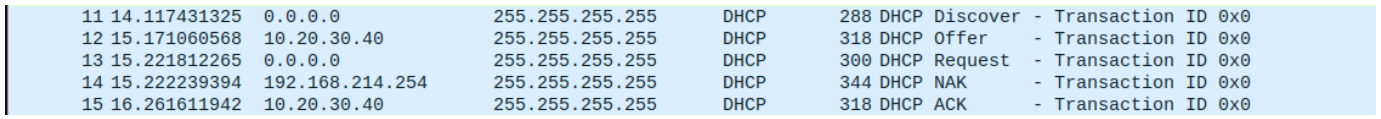


1	0.000000000	127.0.0.1	127.0.0.1	TCP	76	42128 → 80 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=3046309511 TSecr=0 WS=128
2	0.000010599	127.0.0.1	127.0.0.1	TCP	76	80 → 42128 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3046309511 TSecr=3046309511 WS=128
3	0.000017665	127.0.0.1	127.0.0.1	TCP	68	42128 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=3046309512 TSecr=3046309511
4	0.000032333	127.0.0.1	127.0.0.1	HTTP	208	GET / HTTP/1.1
5	0.000074246	127.0.0.1	127.0.0.1	TCP	68	80 → 42128 [ACK] Seq=1 Ack=141 Win=65408 Len=0 TSval=3046309512 TSecr=3046309512
6	0.001109484	127.0.0.1	127.0.0.1	HTTP	1203	HTTP/1.1 200 OK (text/html)
7	0.001129746	127.0.0.1	127.0.0.1	TCP	68	42128 → 80 [ACK] Seq=141 Ack=1136 Win=64512 Len=0 TSval=3046309513 TSecr=3046309513
8	0.001552695	127.0.0.1	127.0.0.1	TCP	68	42128 → 80 [FIN, ACK] Seq=141 Ack=1136 Win=65536 Len=0 TSval=3046309513 TSecr=3046309513
9	0.001658821	127.0.0.1	127.0.0.1	TCP	68	80 → 42128 [FIN, ACK] Seq=1136 Ack=142 Win=65536 Len=0 TSval=3046309513 TSecr=3046309513
10	0.001670775	127.0.0.1	127.0.0.1	TCP	68	42128 → 80 [ACK] Seq=142 Ack=1137 Win=65536 Len=0 TSval=3046309513 TSecr=3046309513

In our code scrap.py , we accessed to the http server 127.0.0.1 to analyse the website and get the list of files.

- These packets 1 to 3 , it's a TCP 3-Way Handshake Process.
- The packet 4 : GET we are asking for the html code and all that makes up the site
- The packet 5 : ACK to respond that the server get our demand GET
- The packet 6 : This packet is the server response to the previous HTTP request. "HTTP/1.1" indicates the protocol version used, "200" is the response status code: means that the request was processed successfully. The content of the requested resource (for example, the HTML code for the home page) is also included in this package.
- The packet 7 : ACK to respond that we get the reponse from the server
- These packet 8 to 10 : To close the TCP connection

DHCP Server :

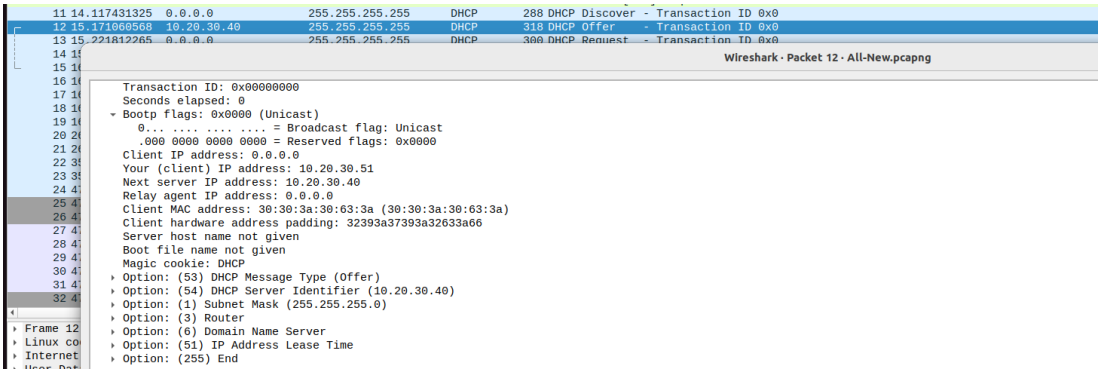


11	14.117431325	0.0.0.0	255.255.255.255	DHCP	288	DHCP Discover - Transaction ID 0x0
12	15.171060568	10.20.30.40	255.255.255.255	DHCP	318	DHCP Offer - Transaction ID 0x0
13	15.221812265	0.0.0.0	255.255.255.255	DHCP	300	DHCP Request - Transaction ID 0x0
14	15.222239394	192.168.214.254	255.255.255.255	DHCP	344	DHCP NAK - Transaction ID 0x0
15	16.261611942	10.20.30.40	255.255.255.255	DHCP	318	DHCP ACK - Transaction ID 0x0

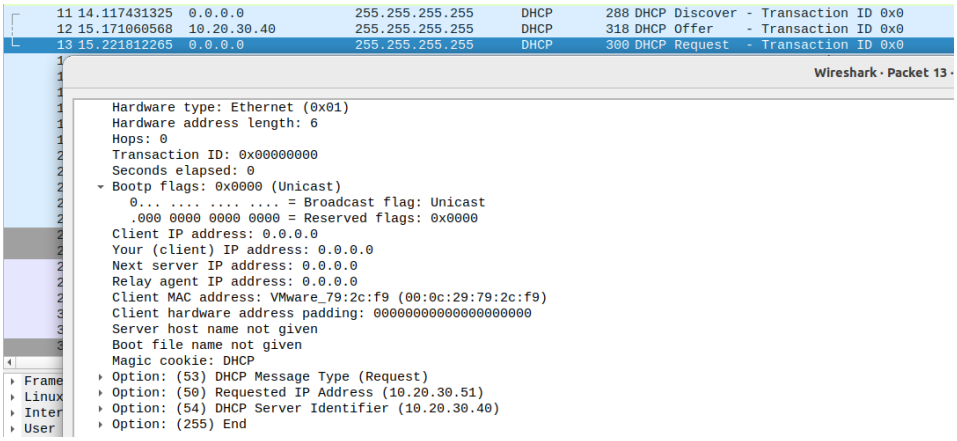
These packets represent the communication beetween the client and the DHCP server.

- The packet 11 : DHCP Discover: This packet is sent by the DHCP client to discover the DHCP servers available on the local network. The client essentially requests that any DHCP server respond with an IP address offer and other configuration information.

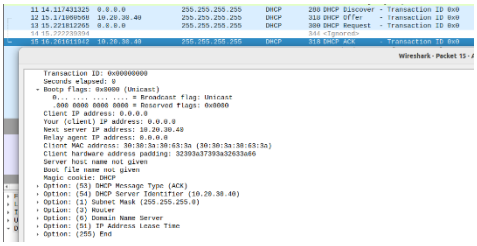
- The packet 12 : DHCP Offer: This packet is sent by a DHCP server in response to a DHCP Discover packet. It contains an IP address offer for the client, along with other configuration information, such as subnet mask, default gateway, and DNS servers.



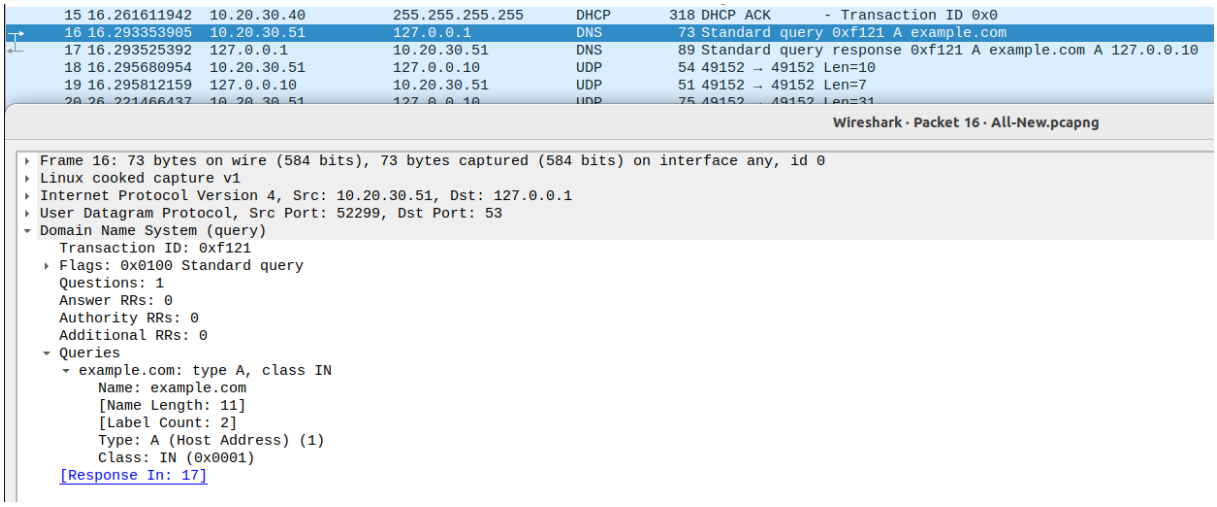
- This is the packet 12 : DHCP Offer , as we can see the DHCP Server (10.20.30.40) send the IP : 10.20.30.51 and also different option like Subnet Mask.
- The packet 13 : DHCP Request: This packet is sent by the DHCP client to accept the IP address offer and configuration information received from the DHCP server. It also informs other DHCP servers on the network that the client has accepted a particular server's offer, and that other offers (if any) are no longer needed. As we can see the request from the client , ask for the IP 10.20.30.51 to the Server 10.20.30.40.



- The packet 15 : DHCP ACK: This packet is sent by the DHCP server to confirm that the client has received the IP address offer and configuration information. This completes the IP address assignment process and the client can begin using the assigned IP address and configuration information to communicate on the network.



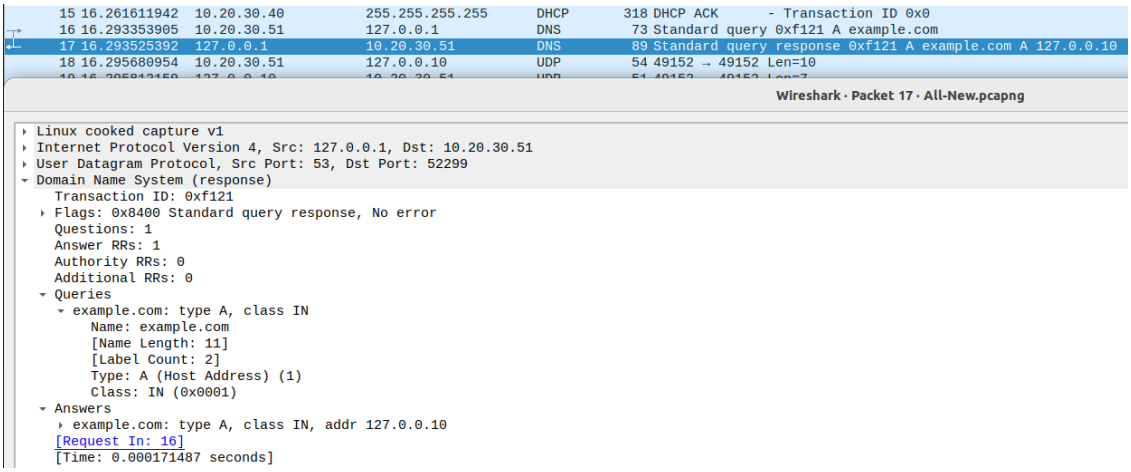
DNS Server :



The packet 16 and 17 is the communication between the client and the server DNS.

- Packet 16 : The client send a Querie to our DNS Server with the domain name "example.com" when the Type is : A. As we can see the reponse of the Querie is in Packet 17.

- Packet 17 : The DNS Server sent to the client the IP of the "example.com" Type A when the adress of this domain is : 127.0.0.10

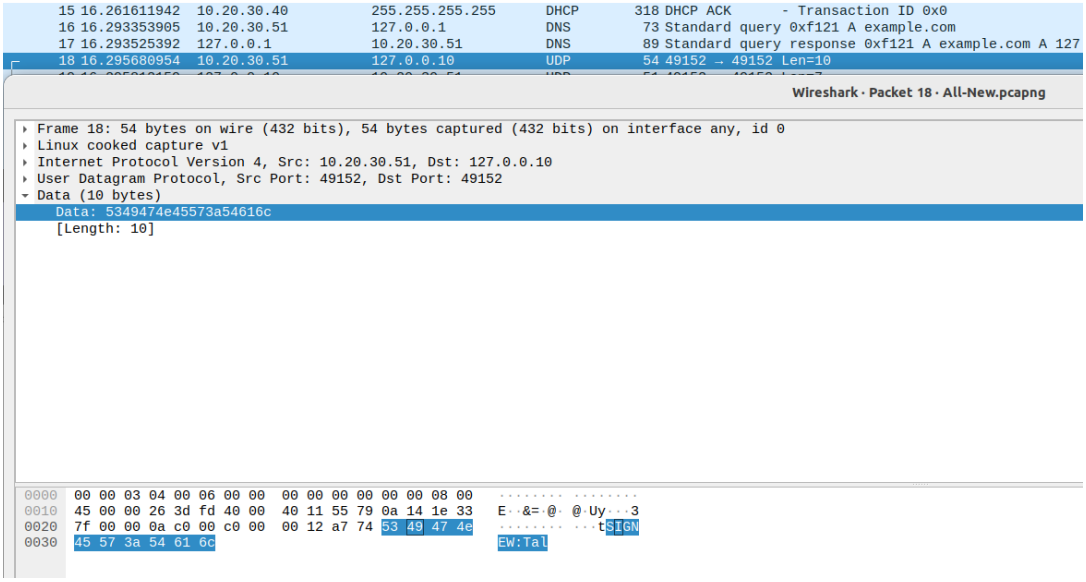


RUDP Connection : Client ⟷ Rudproxy

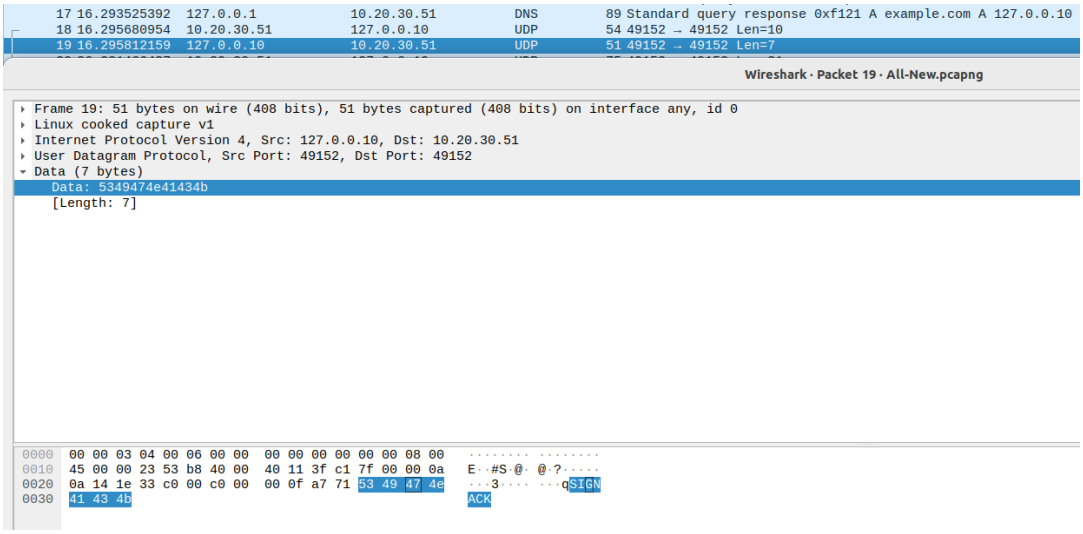
Now we are going to analyse the differents packets between the Client and the rudproxy. The communication going to be in RUDP.

Client : 10.20.30.51

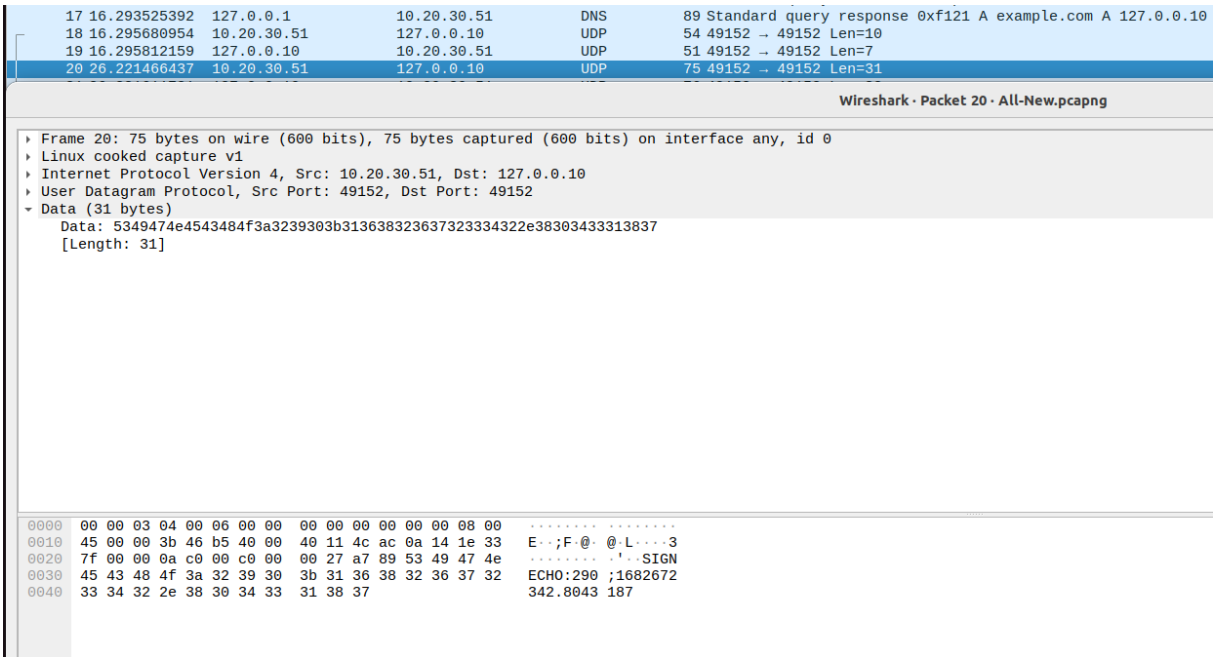
RUDP Server : 127.0.0.10



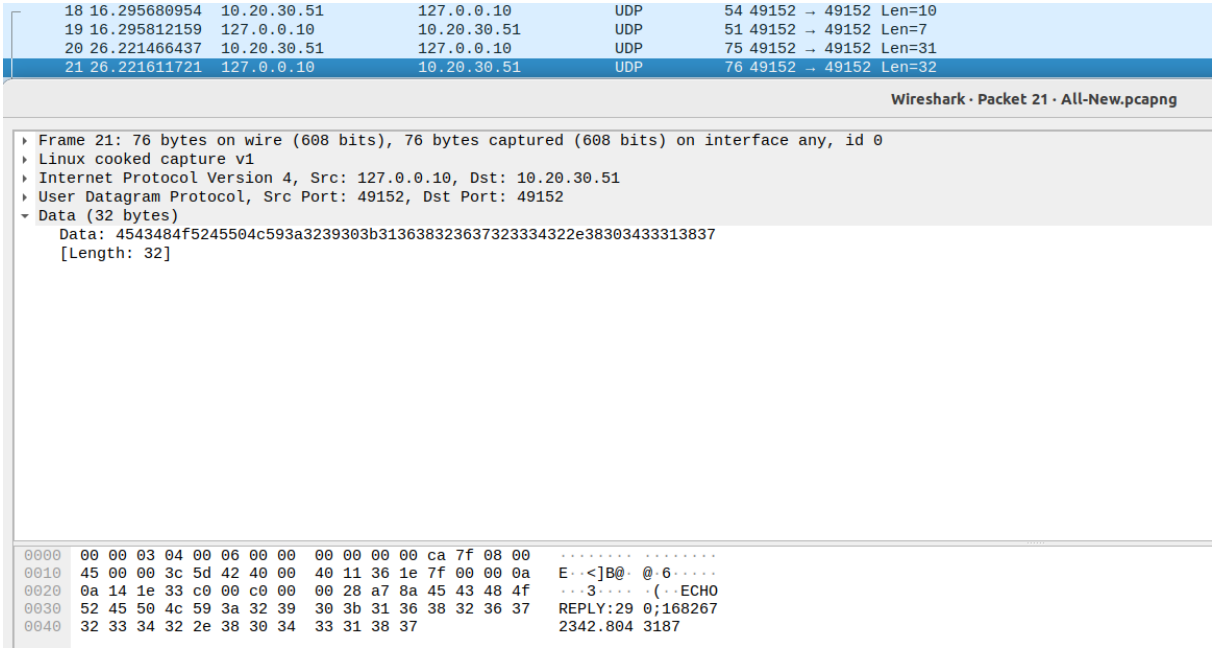
- The packet 18 : The client start a new connection with the Proxy Server. As we can see in the Data the client sent a SIGNEW + name of user to start the discusion.



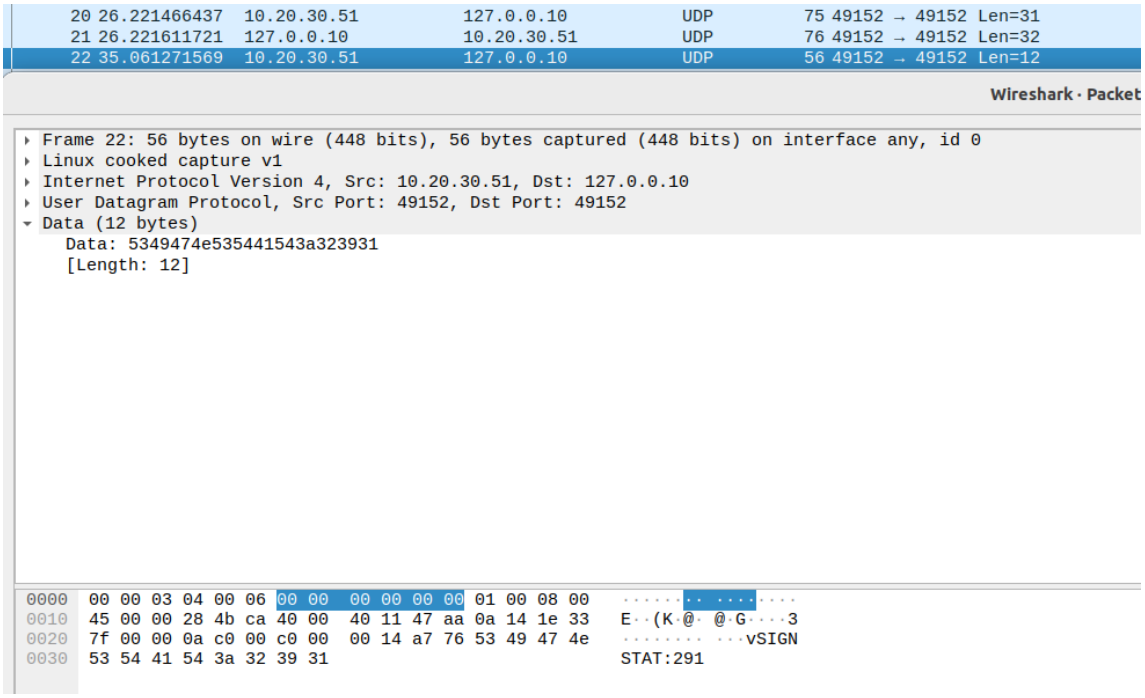
- The packet 19 : This is the response of the Server with the SIGNACK that he accept the connection with the Client.



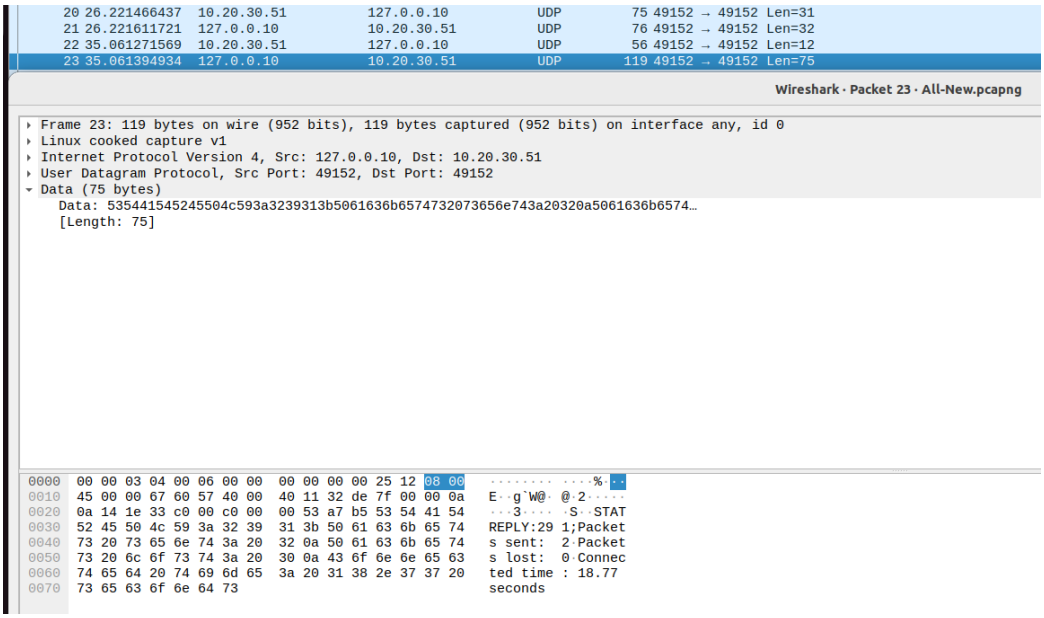
- Packet 20 : The client sent to the Server a new SIGNAL : SIGNECHO to know the ping between him and the Server. Packet ID : 290



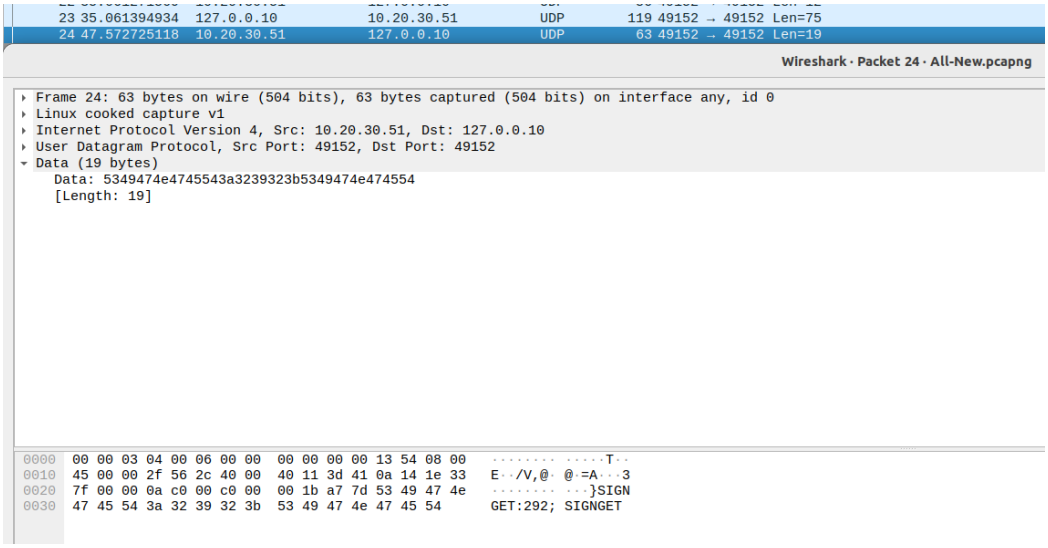
- The packet 21 : This is the response of the SIGNECHO , the server sent the time and also the SIGN : ECHOREPLY to the client.



- The packet 22 : The client sent to the Proxy Server a new SIGNAL : SIGNSTAT to know some information about the connection (packet sent , packet lost , time …). Packet ID : 291.

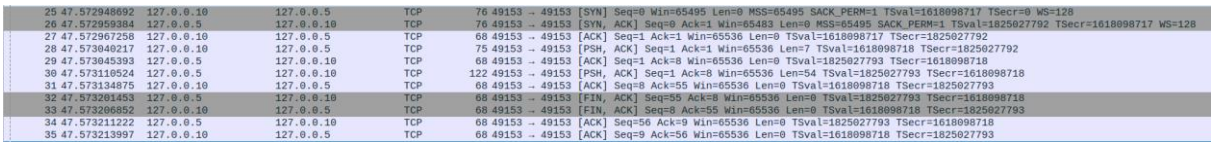


- The packet 23 : The Server sent a reponse after the SIGNSTAT with a the flag : STATREPLY , as we can see in the Data the server sent him different information.



- The packet 24 : The client sent to the server a new SIGNAL : SIGNGET to get the list of files that he can download. Packet ID : 292

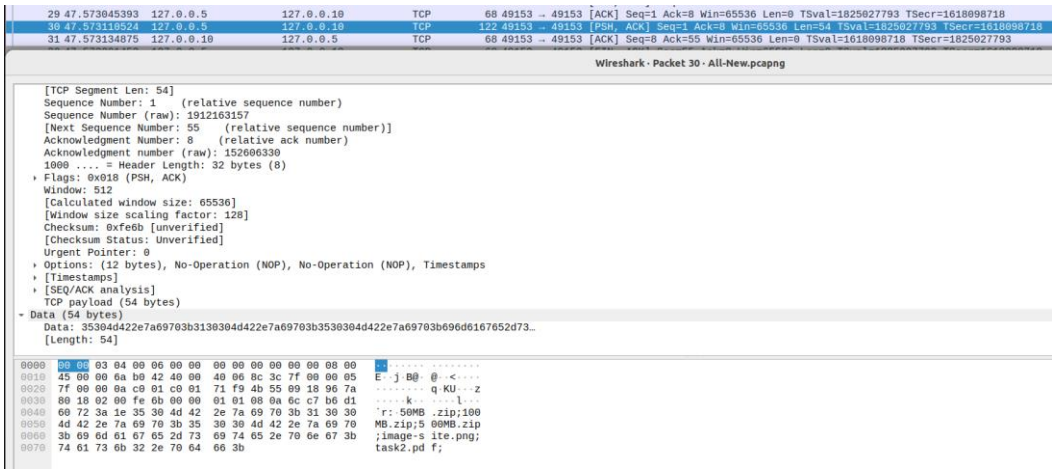
Connection TCP : Proxy Server ⟷ Scrap Server / Redirect



25	47.572948692	127.0.0.10	127.0.0.5	TCP	76 49153 → 49153 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=1618098717 TSecr=0 WS=128
26	47.572959384	127.0.0.5	127.0.0.10	TCP	76 49153 → 49153 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=1825027792 TSecr=1618098717 WS=128
27	47.572967258	127.0.0.10	127.0.0.5	TCP	68 49153 → 49153 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=1618098717 TSecr=1825027792
28	47.573040217	127.0.0.10	127.0.0.5	TCP	75 49153 → 49153 [PSH, ACK] Seq=1 Ack=1 Win=65536 Len=7 TSval=1618098718 TSecr=1825027792
29	47.573045393	127.0.0.5	127.0.0.10	TCP	68 49153 → 49153 [ACK] Seq=1 Ack=8 Win=65536 Len=0 TSval=1825027793 TSecr=1618098718
30	47.573110524	127.0.0.5	127.0.0.10	TCP	122 49153 → 49153 [PSH, ACK] Seq=1 Ack=8 Win=65536 Len=54 TSval=1825027793 TSecr=1618098718
31	47.573134875	127.0.0.10	127.0.0.5	TCP	68 49153 → 49153 [ACK] Seq=8 Ack=55 Win=65536 Len=0 TSval=1618098718 TSecr=1825027793
32	47.573201453	127.0.0.5	127.0.0.10	TCP	68 49153 → 49153 [FIN, ACK] Seq=55 Ack=8 Win=65536 Len=0 TSval=1825027793 TSecr=1618098718
33	47.573206852	127.0.0.10	127.0.0.5	TCP	68 49153 → 49153 [FIN, ACK] Seq=8 Ack=55 Win=65536 Len=0 TSval=1618098718 TSecr=1825027793
34	47.573211222	127.0.0.5	127.0.0.10	TCP	68 49153 → 49153 [ACK] Seq=56 Ack=9 Win=65536 Len=0 TSval=1825027793 TSecr=1618098718
35	47.573213997	127.0.0.10	127.0.0.5	TCP	68 49153 → 49153 [ACK] Seq=9 Ack=56 Win=65536 Len=0 TSval=1618098718 TSecr=1825027793

The client ask the list of differents files that he can download.The proxy Server perform a redirect to the Scrap Server with a connection TCP.

- The packets 25 to 27 : it's a TCP 3-Way Handshake Process. As we can see the connection it's between 127.0.0.10 and 127.0.0.5 (Proxy Server and Scrap Server)
- The packet 28 : [PSH,ACK] 127.0.0.10 → 127.0.0.5 The Proxy Server sent the request to the Scrap Server to get the list of files.
- The packet 29 : The scrap Server sent to the Proxy an ACK to assure to him that he get his request. We can see the list in Data (54 bytes)
- The packet 30 : [PSH,ACK] 127.0.0.5 → 127.0.0.10 The Scrap Server sent the list of files to the Proxy Server.

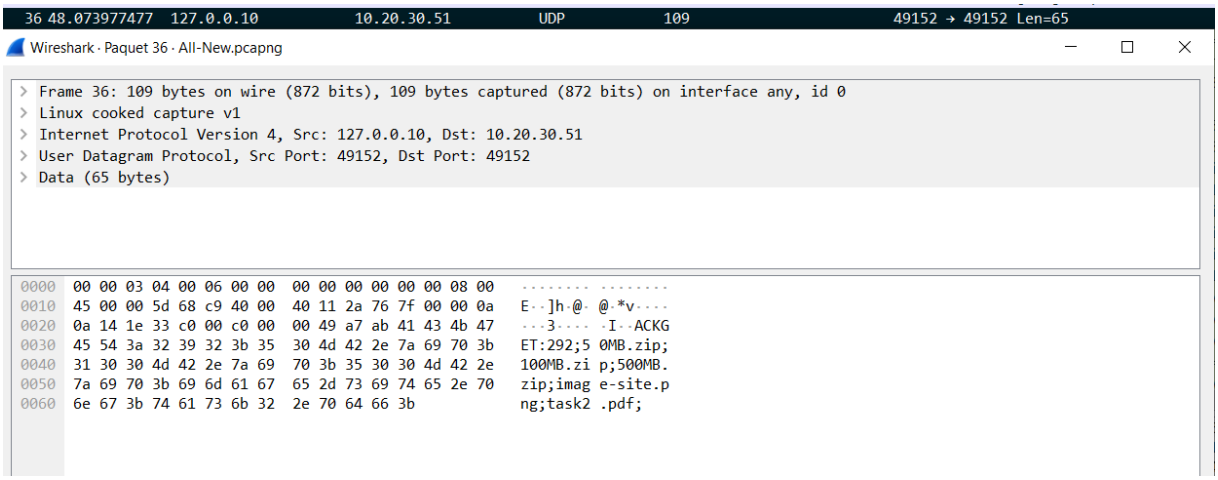


```
29 47.573045393  127.0.0.5          127.0.0.10          TCP      68 49153 → 49153 [ACK] Seq=1 Ack=8 Win=65536 Len=0 TSval=1825027793 TSecr=1618098718
30 47.573110524  127.0.0.5          127.0.0.10          TCP     122 49153 → 49153 [PSH, ACK] Seq=1 Ack=8 Win=65536 Len=54 TSval=1825027793 TSecr=1618098718
31 47.573134875  127.0.0.10         127.0.0.5           TCP      68 49153 → 49153 [ACK] Seq=8 Ack=55 Win=65536 Len=0 TSval=1618098718 TSecr=1825027793

Wireshark · Packet 30 · All-New.pcapng

    [TCP Segment Len: 54]
    Sequence Number: 1    (relative sequence number)
    Sequence Number (raw): 1912163157
    [Next Sequence Number: 55    (relative sequence number)]
    Acknowledgment Number: 8    (relative ack number)
    Acknowledgment number (raw): 152606330
    1000 .... = Header Length: 32 bytes (8)
  ▸ Flags: 0x018 (PSH, ACK)
    Window: 512
    [Calculated window size: 65536]
    [Window size scaling factor: 128]
    Checksum: 0xfe6b [unverified]
    [Checksum Status: Unverified]
    Urgent Pointer: 0
  ▸ Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  ▸ [Timestamps]
  ▸ [SEQ/ACK analysis]
    TCP payload (54 bytes)
▾ Data (54 bytes)
    Data: 35304d422e7a69703b3130304d422e7a69703b3530304d422e7a69703b696d6167652d73…
    [Length: 54]

0000  00 0c 03 04 00 06 00 00  00 00 00 00 00 00 08 00   ·· ····· ·····
0010  45 00 00 6a b0 42 40 00  40 06 8c 3c 7f 00 00 05   E··j·B@· @··<····
0020  7f 00 00 0a c0 01 c0 01  71 f9 4b 55 09 18 96 7a   ········ q·KU···z
0030  80 18 02 00 fe 6b 00 00  01 01 08 0a 6c c7 b6 d1   ·····k·· ····l···
0040  60 72 3a 1e 35 30 4d 42  2e 7a 69 70 3b 31 30 30   `r:·50MB .zip;100
0050  4d 42 2e 7a 69 70 3b 35  30 30 4d 42 2e 7a 69 70   MB.zip;5 00MB.zip
0060  3b 69 6d 61 67 65 2d 73  69 74 65 2e 70 6e 67 3b   ;image-s ite.png;
0070  74 61 73 6b 32 2e 70 64  66 3b                     task2.pd f;
```

- The packet 31 : The proxy Server sent an ACK to the Scrap Server to assure that he got the list of files from him.

- The packets 32 to 35 : To close the connection between the Proxy Server and Scrap Server.

Now the Proxy Server going to send the list to the Client.



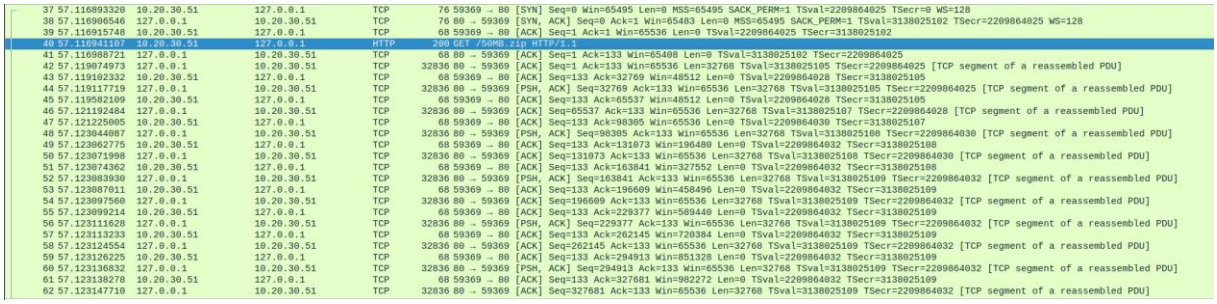
The packet 36 : 127.0.0.10 → 10.20.30.51 , the Proxy Server sent now the list of files to the Client. He used the SIGNAL : ACKGET and as we can see in the Data (65 bytes) the differents file to download.

The list is :

1. 50MB.zip
2. 100MB.zip
3. 500MB.zip
4. Image-site.png
5. Task2.pdf

For the explication the client going to download every files.

The first file : 50MB.zip



```
37 57.116893320  10.20.30.51   127.0.0.1    TCP    76 59369 → 80 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=2209864025 TSecr=0 WS=128
38 57.116906546  127.0.0.1    10.20.30.51  TCP    76 80 → 59369 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3138025102 TSecr=2209864025 WS=128
39 57.116915748  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=2209864025 TSecr=3138025102
40 57.116941107  10.20.30.51   127.0.0.1    HTTP   200 GET /50MB.zip HTTP/1.1
41 57.116988721  127.0.0.1    10.20.30.51  TCP    68 80 → 59369 [ACK] Seq=1 Ack=133 Win=65408 Len=0 TSval=3138025102 TSecr=2209864025
42 57.119074973  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [ACK] Seq=1 Ack=133 Win=65536 Len=32768 TSval=3138025105 TSecr=2209864025 [TCP segment of a reassembled PDU]
43 57.119102332  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=32769 Win=48512 Len=0 TSval=2209864028 TSecr=3138025105
44 57.119117719  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [PSH, ACK] Seq=32769 Ack=133 Win=65536 Len=32768 TSval=3138025105 TSecr=2209864025 [TCP segment of a reassembled PDU]
45 57.119582109  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=65537 Win=48512 Len=0 TSval=2209864028 TSecr=3138025105
46 57.121192484  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [ACK] Seq=65537 Ack=133 Win=65536 Len=32768 TSval=3138025107 TSecr=2209864028 [TCP segment of a reassembled PDU]
47 57.121225005  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=98305 Win=65536 Len=0 TSval=2209864030 TSecr=3138025107
48 57.123044087  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [PSH, ACK] Seq=98305 Ack=133 Win=65536 Len=32768 TSval=3138025108 TSecr=2209864030 [TCP segment of a reassembled PDU]
49 57.123062775  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=131073 Win=196480 Len=0 TSval=2209864032 TSecr=3138025108
50 57.123071998  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [ACK] Seq=131073 Ack=133 Win=65536 Len=32768 TSval=3138025108 TSecr=2209864030 [TCP segment of a reassembled PDU]
51 57.123074362  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=163841 Win=327552 Len=0 TSval=2209864032 TSecr=3138025108
52 57.123083930  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [PSH, ACK] Seq=163841 Ack=133 Win=65536 Len=32768 TSval=3138025109 TSecr=2209864032 [TCP segment of a reassembled PDU]
53 57.123087011  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=196609 Win=458496 Len=0 TSval=2209864032 TSecr=3138025109
54 57.123097560  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [ACK] Seq=196609 Ack=133 Win=65536 Len=32768 TSval=3138025109 TSecr=2209864032 [TCP segment of a reassembled PDU]
55 57.123099214  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=229377 Win=589440 Len=0 TSval=2209864032 TSecr=3138025109
56 57.123111628  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [PSH, ACK] Seq=229377 Ack=133 Win=65536 Len=32768 TSval=3138025109 TSecr=2209864032 [TCP segment of a reassembled PDU]
57 57.123113233  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=262145 Win=720384 Len=0 TSval=2209864032 TSecr=3138025109
58 57.123124554  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [ACK] Seq=262145 Ack=133 Win=65536 Len=32768 TSval=3138025109 TSecr=2209864032 [TCP segment of a reassembled PDU]
59 57.123126225  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=294913 Win=851328 Len=0 TSval=2209864032 TSecr=3138025109
60 57.123136832  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [PSH, ACK] Seq=294913 Ack=133 Win=65536 Len=32768 TSval=3138025109 TSecr=2209864032 [TCP segment of a reassembled PDU]
61 57.123138278  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [ACK] Seq=133 Ack=327681 Win=982272 Len=0 TSval=2209864032 TSecr=3138025109
62 57.123147710  127.0.0.1    10.20.30.51  TCP    32836 80 → 59369 [ACK] Seq=327681 Ack=133 Win=65536 Len=32768 TSval=3138025109 TSecr=2209864032 [TCP segment of a reassembled PDU]
```

- The packet 37 to 39 : it's a TCP 3-Way Handshake Process.

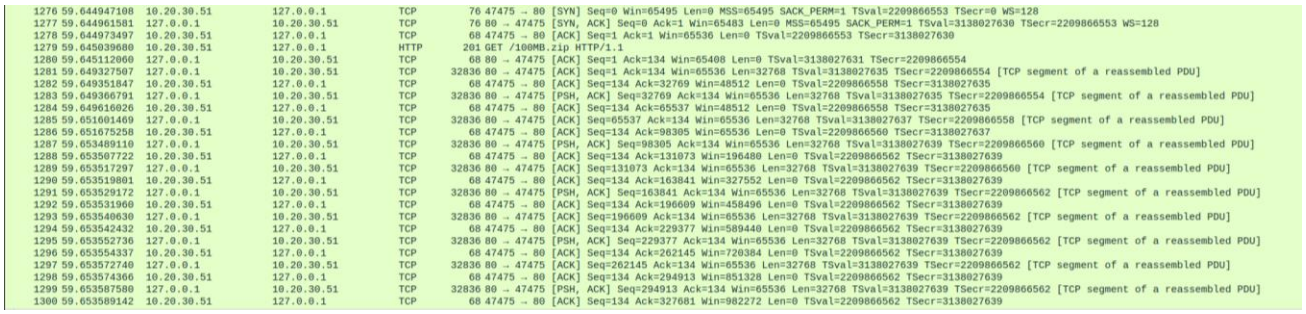
- The packet 40 : [200 GET /50MB.zip HTTP/1.1] The client asking the file : 50MB.zip .

- The next packets going to be the download of this file , as we can see many packets of [ACK] and [PSH,ACK].

```
1273 57.290518245  10.20.30.51   127.0.0.1    TCP    68 59369 → 80 [FIN, ACK] Seq=133 Ack=52429101 Win=3112448 Len=0 TSval=2209864199 TSecr=3138025275
1274 57.290733825  127.0.0.1    10.20.30.51  TCP    68 80 → 59369 [FIN, ACK] Seq=52429101 Ack=134 Win=65536 Len=0 TSval=3138025276 TSecr=2209864199
```

- The packet 1273 and 1274 : The client got the file 50MB.zip , so now he can close the connection with the flag [FIN, ACK].

The second file : 100MB.zip

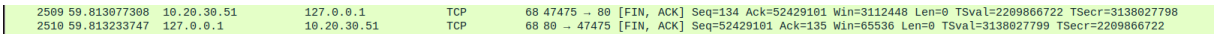


```
1276 59.644947108  10.20.30.51    127.0.0.1     TCP      76 47475 → 80 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=2209866553 TSecr=0 WS=128
1277 59.644961581  127.0.0.1     10.20.30.51   TCP      76 80 → 47475 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3138027630 TSecr=2209866553 WS=128
1278 59.644973497  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=2209866553 TSecr=3138027630
1279 59.645039680  10.20.30.51    127.0.0.1     HTTP    201 GET /100MB.zip HTTP/1.1
1280 59.645112060  127.0.0.1     10.20.30.51   TCP      68 80 → 47475 [ACK] Seq=1 Ack=134 Win=65408 Len=0 TSval=3138027631 TSecr=2209866554
1281 59.649327507  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [ACK] Seq=1 Ack=134 Win=65536 Len=32768 TSval=3138027635 TSecr=2209866554 [TCP segment of a reassembled PDU]
1282 59.649351847  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=32769 Win=48512 Len=0 TSval=2209866558 TSecr=3138027635
1283 59.649360791  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [PSH, ACK] Seq=32769 Ack=134 Win=65536 Len=32768 TSval=3138027635 TSecr=2209866554 [TCP segment of a reassembled PDU]
1284 59.649616026  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=65537 Win=48512 Len=0 TSval=2209866558 TSecr=3138027635
1285 59.651601469  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [ACK] Seq=65537 Ack=134 Win=65536 Len=32768 TSval=3138027637 TSecr=2209866558 [TCP segment of a reassembled PDU]
1286 59.651675258  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=98305 Win=65536 Len=0 TSval=2209866560 TSecr=3138027637
1287 59.653489110  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [PSH, ACK] Seq=98305 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866560 [TCP segment of a reassembled PDU]
1288 59.653507722  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=131073 Win=196480 Len=0 TSval=2209866562 TSecr=3138027639
1289 59.653517297  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [ACK] Seq=131073 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866560 [TCP segment of a reassembled PDU]
1290 59.653519801  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=163841 Win=327552 Len=0 TSval=2209866562 TSecr=3138027639
1291 59.653529172  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [PSH, ACK] Seq=163841 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866562 [TCP segment of a reassembled PDU]
1292 59.653531960  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=196609 Win=458496 Len=0 TSval=2209866562 TSecr=3138027639
1293 59.653540630  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [ACK] Seq=196609 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866562 [TCP segment of a reassembled PDU]
1294 59.653542432  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=229377 Win=589440 Len=0 TSval=2209866562 TSecr=3138027639
1295 59.653552736  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [PSH, ACK] Seq=229377 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866562 [TCP segment of a reassembled PDU]
1296 59.653554337  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=262145 Win=720384 Len=0 TSval=2209866562 TSecr=3138027639
1297 59.653572740  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [ACK] Seq=262145 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866562 [TCP segment of a reassembled PDU]
1298 59.653574366  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=294913 Win=851328 Len=0 TSval=2209866562 TSecr=3138027639
1299 59.653587580  127.0.0.1     10.20.30.51   TCP    32836 80 → 47475 [PSH, ACK] Seq=294913 Ack=134 Win=65536 Len=32768 TSval=3138027639 TSecr=2209866562 [TCP segment of a reassembled PDU]
1300 59.653589142  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [ACK] Seq=134 Ack=327681 Win=982272 Len=0 TSval=2209866562 TSecr=3138027639
```

- The packets 1276 to 1278 : it's a TCP 3-Way Handshake Process.

- The packet 1279 : [200 GET /100MB.zip HTTP/1.1] The client asking the file : 100MB.zip .

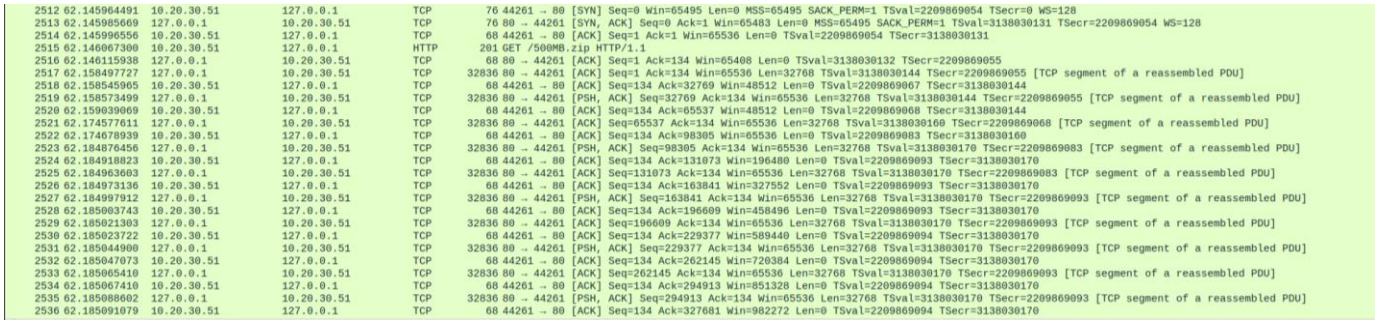
- The next packets going to be the download of this file , as we can see many packets of [ACK] and [PSH,ACK].



```
2509 59.813077308  10.20.30.51    127.0.0.1     TCP      68 47475 → 80 [FIN, ACK] Seq=134 Ack=52429101 Win=3112448 Len=0 TSval=2209866722 TSecr=3138027798
2510 59.813233747  127.0.0.1     10.20.30.51   TCP      68 80 → 47475 [FIN, ACK] Seq=52429101 Ack=135 Win=65536 Len=0 TSval=3138027799 TSecr=2209866722
```

- The packet 2509 and 2510 : The client got the file 100MB.zip , so now he can close the connection with the flag [FIN, ACK].

The third file : 500MB.zip

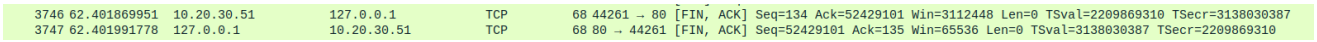


```
2512 62.145964491  10.20.30.51   127.0.0.1     TCP      76 44261 → 80 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=2209869054 TSecr=0 WS=128
2513 62.145985669  127.0.0.1     10.20.30.51   TCP      76 80 → 44261 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3138030131 TSecr=2209869054 WS=128
2514 62.145996556  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=2209869054 TSecr=3138030131
2515 62.146067300  10.20.30.51   127.0.0.1     HTTP    201 GET /500MB.zip HTTP/1.1
2516 62.146115938  127.0.0.1     10.20.30.51   TCP      68 80 → 44261 [ACK] Seq=1 Ack=134 Win=65408 Len=0 TSval=3138030132 TSecr=2209869055
2517 62.158497727  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [ACK] Seq=1 Ack=134 Win=65536 Len=32768 TSval=3138030144 TSecr=2209869055 [TCP segment of a reassembled PDU]
2518 62.158545965  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=32769 Win=48512 Len=0 TSval=2209869067 TSecr=3138030144
2519 62.158573499  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [PSH, ACK] Seq=32769 Ack=134 Win=65536 Len=32768 TSval=3138030144 TSecr=2209869055 [TCP segment of a reassembled PDU]
2520 62.159039069  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=65537 Win=48512 Len=0 TSval=2209869068 TSecr=3138030144
2521 62.174577611  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [ACK] Seq=65537 Ack=134 Win=65536 Len=32768 TSval=3138030160 TSecr=2209869068 [TCP segment of a reassembled PDU]
2522 62.174678939  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=98305 Win=65536 Len=0 TSval=2209869083 TSecr=3138030160
2523 62.184876456  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [PSH, ACK] Seq=98305 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869083 [TCP segment of a reassembled PDU]
2524 62.184918823  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=131073 Win=196480 Len=0 TSval=2209869093 TSecr=3138030170
2525 62.184963603  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [ACK] Seq=131073 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869083 [TCP segment of a reassembled PDU]
2526 62.184973136  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=163841 Win=327552 Len=0 TSval=2209869093 TSecr=3138030170
2527 62.184997912  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [PSH, ACK] Seq=163841 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869093 [TCP segment of a reassembled PDU]
2528 62.185003743  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=196609 Win=458496 Len=0 TSval=2209869093 TSecr=3138030170
2529 62.185021303  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [ACK] Seq=196609 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869093 [TCP segment of a reassembled PDU]
2530 62.185023722  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=229377 Win=589440 Len=0 TSval=2209869094 TSecr=3138030170
2531 62.185044900  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [PSH, ACK] Seq=229377 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869093 [TCP segment of a reassembled PDU]
2532 62.185047073  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=262145 Win=720384 Len=0 TSval=2209869094 TSecr=3138030170
2533 62.185065410  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [ACK] Seq=262145 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869093 [TCP segment of a reassembled PDU]
2534 62.185067410  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=294913 Win=851328 Len=0 TSval=2209869094 TSecr=3138030170
2535 62.185088602  127.0.0.1     10.20.30.51   TCP   32836 80 → 44261 [PSH, ACK] Seq=294913 Ack=134 Win=65536 Len=32768 TSval=3138030170 TSecr=2209869093 [TCP segment of a reassembled PDU]
2536 62.185091079  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [ACK] Seq=134 Ack=327681 Win=982272 Len=0 TSval=2209869094 TSecr=3138030170
```

- The packets 2512 to 2514 : it's a TCP 3-Way Handshake Process.

- The packet 2515 : [200 GET /500MB.zip HTTP/1.1] The client asking the file : 500MB.zip .

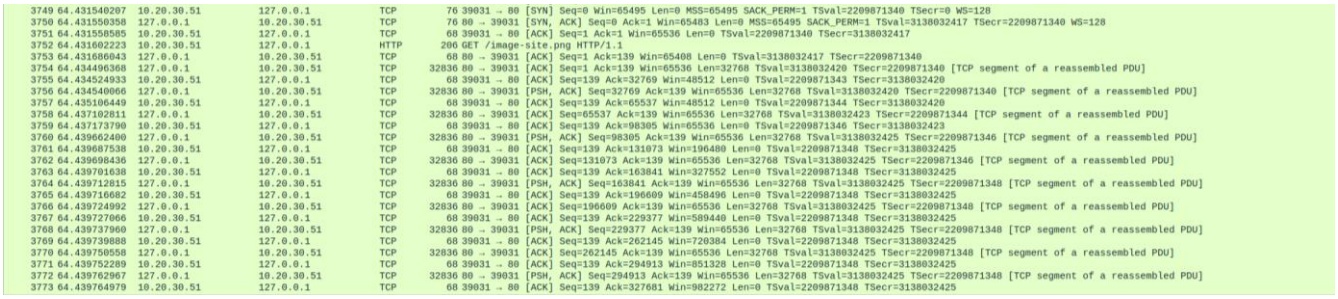
- The next packets going to be the download of this file , as we can see many packets of [ACK] and [PSH,ACK].



```
3746 62.401869951  10.20.30.51   127.0.0.1     TCP      68 44261 → 80 [FIN, ACK] Seq=134 Ack=52429101 Win=3112448 Len=0 TSval=2209869310 TSecr=3138030387
3747 62.401991778  127.0.0.1     10.20.30.51   TCP      68 80 → 44261 [FIN, ACK] Seq=52429101 Ack=135 Win=65536 Len=0 TSval=3138030387 TSecr=2209869310
```

- The packet 3746 and 3747 : The client got the file 500MB.zip , so now he can close the connection with the flag [FIN, ACK].

The fourth file : image-site.png

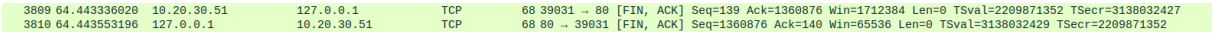


```
3749 64.431540207  10.20.30.51    127.0.0.1     TCP      76 39031 → 80 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=2209871340 TSecr=0 WS=128
3750 64.431550358  127.0.0.1     10.20.30.51   TCP      76 80 → 39031 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3138032417 TSecr=2209871340 WS=128
3751 64.431558585  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=2209871340 TSecr=3138032417
3752 64.431602223  10.20.30.51    127.0.0.1     HTTP    206 GET /image-site.png HTTP/1.1
3753 64.431686043  127.0.0.1     10.20.30.51   TCP      68 80 → 39031 [ACK] Seq=1 Ack=139 Win=65408 Len=0 TSval=3138032417 TSecr=2209871340
3754 64.434496368  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [ACK] Seq=1 Ack=139 Win=65536 Len=32768 TSval=3138032420 TSecr=2209871340 [TCP segment of a reassembled PDU]
3755 64.434524933  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=32769 Win=48512 Len=0 TSval=2209871343 TSecr=3138032420
3756 64.434540066  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [PSH, ACK] Seq=32769 Ack=139 Win=65536 Len=32768 TSval=3138032420 TSecr=2209871340 [TCP segment of a reassembled PDU]
3757 64.435106449  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=65537 Win=48512 Len=0 TSval=2209871344 TSecr=3138032420
3758 64.437102811  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [ACK] Seq=65537 Ack=139 Win=65536 Len=32768 TSval=3138032423 TSecr=2209871344 [TCP segment of a reassembled PDU]
3759 64.437173790  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=98305 Win=65536 Len=0 TSval=2209871346 TSecr=3138032423
3760 64.439662400  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [PSH, ACK] Seq=98305 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871346 [TCP segment of a reassembled PDU]
3761 64.439687538  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=131073 Win=196480 Len=0 TSval=2209871348 TSecr=3138032425
3762 64.439698436  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [ACK] Seq=131073 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871346 [TCP segment of a reassembled PDU]
3763 64.439701638  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=163841 Win=327552 Len=0 TSval=2209871348 TSecr=3138032425
3764 64.439712815  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [PSH, ACK] Seq=163841 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871348 [TCP segment of a reassembled PDU]
3765 64.439716682  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=196609 Win=458496 Len=0 TSval=2209871348 TSecr=3138032425
3766 64.439724992  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [ACK] Seq=196609 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871348 [TCP segment of a reassembled PDU]
3767 64.439727066  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=229377 Win=589440 Len=0 TSval=2209871348 TSecr=3138032425
3768 64.439737960  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [PSH, ACK] Seq=229377 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871348 [TCP segment of a reassembled PDU]
3769 64.439739888  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=262145 Win=720384 Len=0 TSval=2209871348 TSecr=3138032425
3770 64.439750558  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [ACK] Seq=262145 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871348 [TCP segment of a reassembled PDU]
3771 64.439752289  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=294913 Win=851328 Len=0 TSval=2209871348 TSecr=3138032425
3772 64.439762967  127.0.0.1     10.20.30.51   TCP   32836 80 → 39031 [PSH, ACK] Seq=294913 Ack=139 Win=65536 Len=32768 TSval=3138032425 TSecr=2209871348 [TCP segment of a reassembled PDU]
3773 64.439764979  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [ACK] Seq=139 Ack=327681 Win=982272 Len=0 TSval=2209871348 TSecr=3138032425
```

- The packets 3749 to 3751 : it's a TCP 3-Way Handshake Process.

- The packet 3752 : [200 GET /image-site.png HTTP/1.1] The client asking the file : image-site.png.

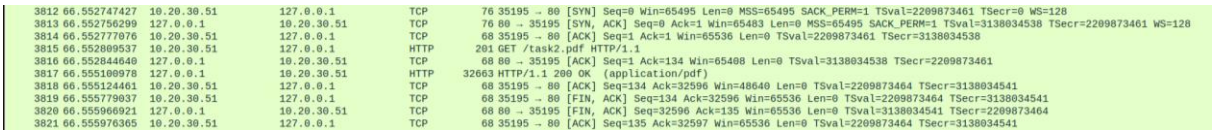
- The next packets going to be the download of this file , as we can see many packets of [ACK] and [PSH,ACK].



```
3809 64.443336020  10.20.30.51    127.0.0.1     TCP      68 39031 → 80 [FIN, ACK] Seq=139 Ack=1360876 Win=1712384 Len=0 TSval=2209871352 TSecr=3138032427
3810 64.443553196  127.0.0.1     10.20.30.51   TCP      68 80 → 39031 [FIN, ACK] Seq=1360876 Ack=140 Win=65536 Len=0 TSval=3138032429 TSecr=2209871352
```

- The packet 3809 and 3810 : The client got the file 500MB.zip , so now he can close the connection with the flag [FIN, ACK].

The last file : task2.pdf



```
3812 66.552747427  10.20.30.51    127.0.0.1     TCP        76 35195 → 80 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=2209873461 TSecr=0 WS=128
3813 66.552756299  127.0.0.1     10.20.30.51   TCP        76 80 → 35195 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=3138034538 TSecr=2209873461 WS=128
3814 66.552777076  10.20.30.51   127.0.0.1     TCP        68 35195 → 80 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=2209873461 TSecr=3138034538
3815 66.552809537  10.20.30.51   127.0.0.1     HTTP      201 GET /task2.pdf HTTP/1.1
3816 66.552844640  127.0.0.1     10.20.30.51   TCP        68 80 → 35195 [ACK] Seq=1 Ack=134 Win=65408 Len=0 TSval=3138034538 TSecr=2209873461
3817 66.555100978  127.0.0.1     10.20.30.51   HTTP    32663 HTTP/1.1 200 OK  (application/pdf)
3818 66.555124461  10.20.30.51   127.0.0.1     TCP        68 35195 → 80 [ACK] Seq=134 Ack=32596 Win=48640 Len=0 TSval=2209873464 TSecr=3138034541
3819 66.555779037  10.20.30.51   127.0.0.1     TCP        68 35195 → 80 [FIN, ACK] Seq=134 Ack=32596 Win=65536 Len=0 TSval=2209873464 TSecr=3138034541
3820 66.555966921  127.0.0.1     10.20.30.51   TCP        68 80 → 35195 [FIN, ACK] Seq=32596 Ack=135 Win=65536 Len=0 TSval=3138034541 TSecr=2209873464
3821 66.555976365  10.20.30.51   127.0.0.1     TCP        68 35195 → 80 [ACK] Seq=135 Ack=32597 Win=65536 Len=0 TSval=2209873464 TSecr=3138034541
```

- The packets 3812 to 3814 : it's a TCP 3-Way Handshake Process.

- The packet 3815 : [200 GET /task2.pdf HTTP/1.1] The client asking the file : task2.pdf.

- The packet 3816 : The http Server send an ACK to the Client that he got his request.

- The packet 3817 : [HTTP/1.1 200 OK …] This packet is the server response to the previous HTTP request. "HTTP/1.1" indicates the protocol version used, "200" is the response status code: means that the request was processed successfully. The content of the requested resource (task2.pdf) is included in this package

- The packet 3818 : The Client send an ACK to the HTTP , because he got with success the answer of his request.

- The packets 3819 to 3821 : To close the TCP connection