

ECE-4245-50

TLS Project

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Objective:

To research and implement TLS/SSL into a network application.

Equipment:

Hardware:

Ubuntu Virtual Machine through Hyper-V

Software:

Wireshark

Preexisting Simple HTTP Webserver source code

Preexisting Simple Webcrawler source code

Libssl-dev Linux Package

Procedure:

The first thing that was done was installing the libssl-dev package and generating an SSL certificate. Generating a certificate was done by navigating to the project folder in a terminal and entering the following command:

```
openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout campbell.pem -out  
campbell.pem
```

With the setup done, I moved to modifying the webserver and webcrawler. The end result was to convert typical socket commands into SSL commands (e.g. `recv()` -> `SSL_read()`). The primary difference in using the two categories of functions was that socket commands use need a socket file descriptor while SSL functions require an SSL object. The rest of the process is setting up that SSL object.

First, initialization functions were called to setup the library in the program. A context (ctx) object of either a client or server type is created and loaded with the certificate. Both programs continue as normal for a period after this.

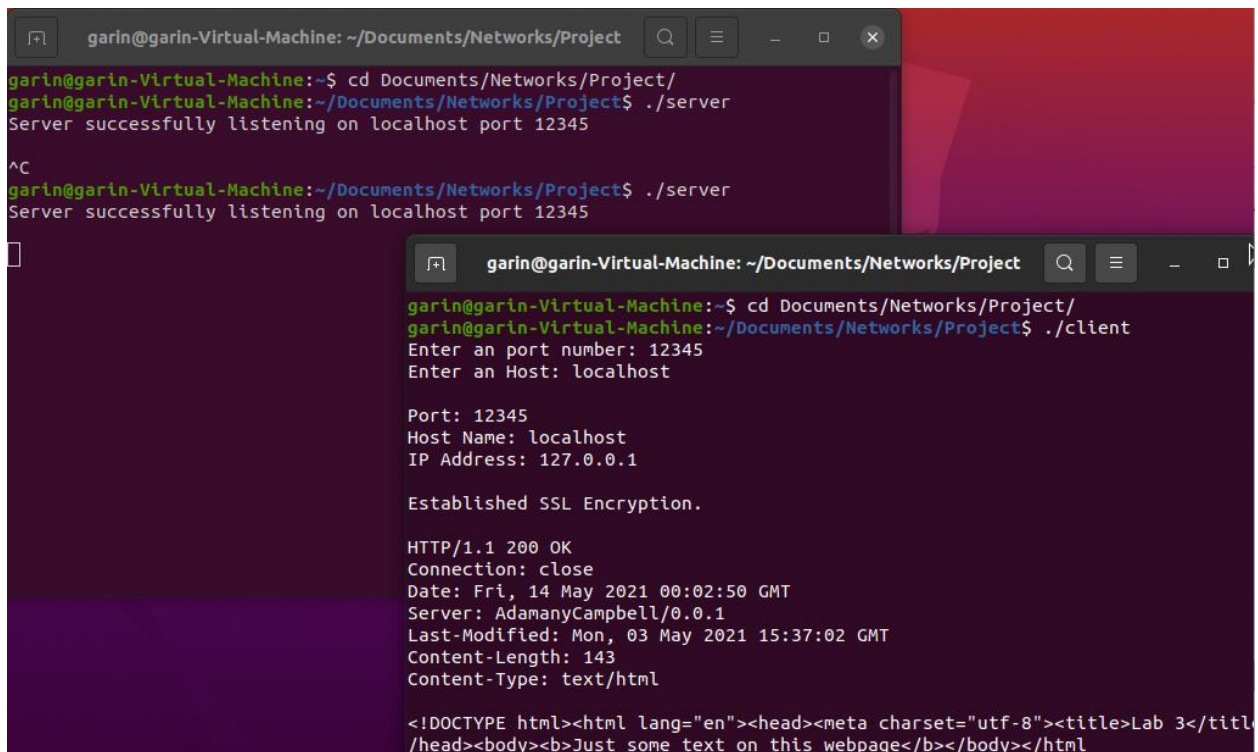
On the server, the SSL changes resumed after a socket accept. When a connection is accepted successfully, an SSL object is created and the SSL version of accept is run with this new object.

On the client, the SSL changes resumed after a socket connection. When connected successfully, an SSL object is created and the SSL version of connect is run with this new object.

After the SSL connection was implemented in both programs, the `recv()` and `send()` functions were replaced with `SSL_read()` and `SSL_write()` functions respectively. Finally, SSL cleanup functions were called along with closing the socket.

The programs were then tested by connecting to each other, accessing the webserver through Firefox, and by accessing google.com through port 443 with their connections captured in Wireshark (captures at the end of the report).

Data:



```
garin@garin-Virtual-Machine: ~/Documents/Networks/Project
garin@garin-Virtual-Machine:~$ cd Documents/Networks/Project/
garin@garin-Virtual-Machine:~/Documents/Networks/Project$ ./server
Server successfully listening on localhost port 12345

^C
garin@garin-Virtual-Machine:~/Documents/Networks/Project$ ./server
Server successfully listening on localhost port 12345

garin@garin-Virtual-Machine: ~/Documents/Networks/Project
garin@garin-Virtual-Machine:~$ cd Documents/Networks/Project/
garin@garin-Virtual-Machine:~/Documents/Networks/Project$ ./client
Enter an port number: 12345
Enter an Host: localhost

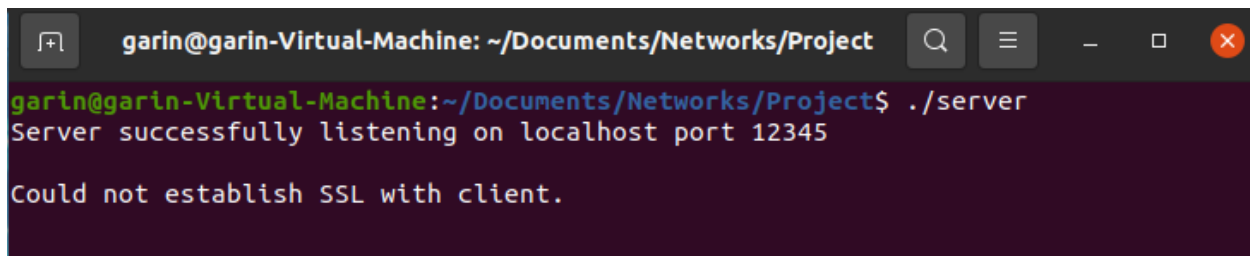
Port: 12345
Host Name: localhost
IP Address: 127.0.0.1

Established SSL Encryption.

HTTP/1.1 200 OK
Connection: close
Date: Fri, 14 May 2021 00:02:50 GMT
Server: AdamanyCampbell/0.0.1
Last-Modified: Mon, 03 May 2021 15:37:02 GMT
Content-Length: 143
Content-Type: text/html

<!DOCTYPE html><html lang="en"><head><meta charset="utf-8"><title>Lab 3</title>
</head><body><b>Just some text on this webpage</b></body></html>
```

Figure 1 - SSL Webserver (left) and Webcrawler (right) Connecting to Each Other



```
garin@garin-Virtual-Machine: ~/Documents/Networks/Project
garin@garin-Virtual-Machine:~/Documents/Networks/Project$ ./server
Server successfully listening on localhost port 12345

Could not establish SSL with client.
```

Figure 2 - Webserver-Firefox Connection Warning Due to Self-Signed Certificate

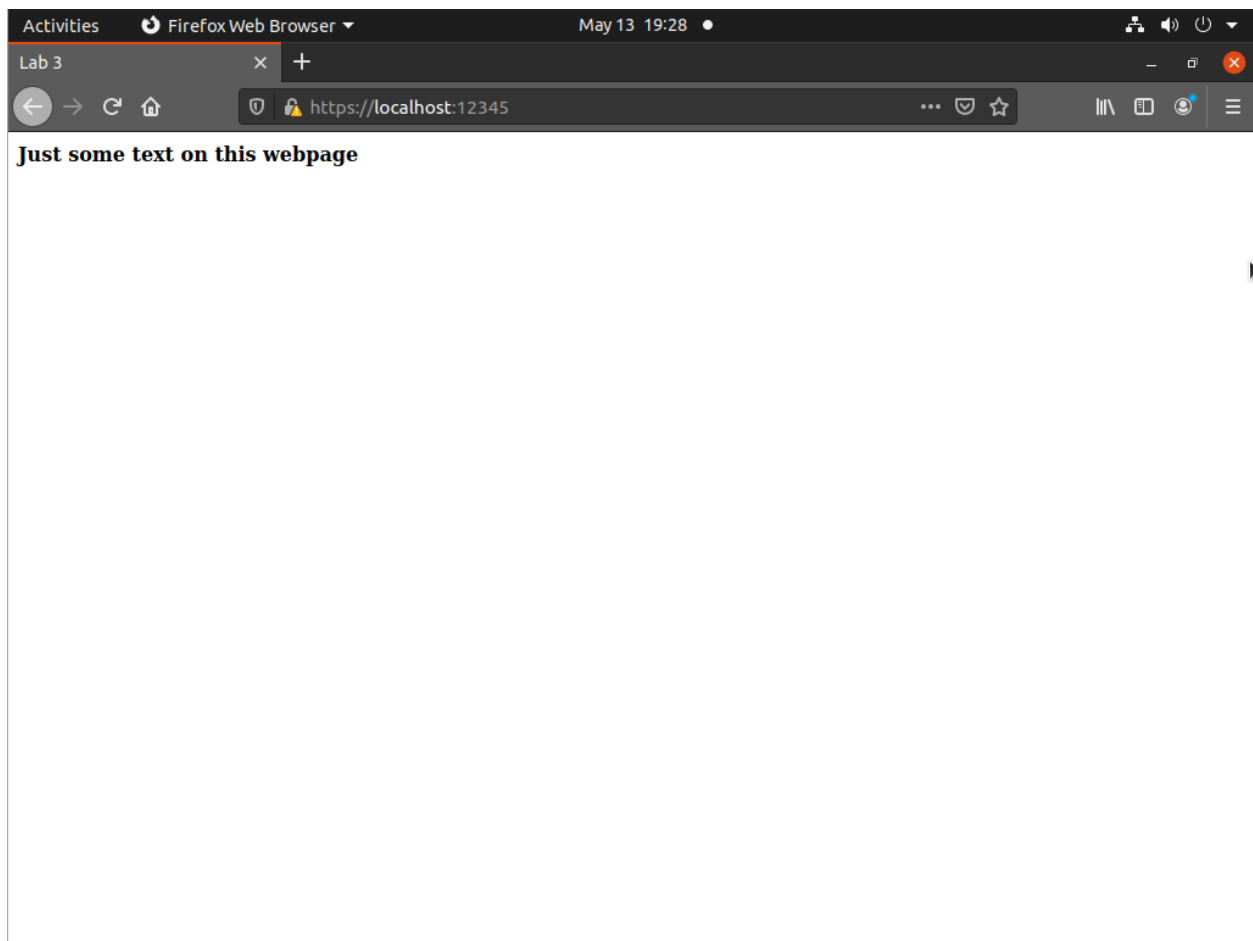


Figure 3 - Firefox After Successfully Connecting to the Webserver

```
garin@garin-Virtual-Machine: ~/Documents/Networks/Project
garin@garin-Virtual-Machine:~/Documents/Networks/Project$ ./client google.com 443
Port: 443
Host Name: google.com
IP Address: 74.125.68.139

Established SSL Encryption.

HTTP/1.1 200 OK
Date: Fri, 14 May 2021 00:30:03 GMT
Expires: -1
Cache-Control: private, max-age=0
Content-Type: text/html; charset=ISO-8859-1
P3P: CP="This is not a P3P policy! See g.co/p3phelp for more info."
Server: gws
X-XSS-Protection: 0
X-Frame-Options: SAMEORIGIN
Set-Cookie: 1P_JAR=2021-05-14-00; expires=Sun, 13-Jun-2021 00:30:03 GMT; path=/; domain=.google.com; Secure
Set-Cookie: NID=215=LKrdc_9372E54gqIi0cwzBo1964N3gR1nr2kmieTEYgz05pxe_KT491EcZFGPL9542Q4ZwST6H67p0Td05YucpeBqE_
T30LdkbSx3p0fyx_Ogc2hd8d2xN7iwSYcgp74Uk489NdpX96W5Q8GCTvEjgWfoyl-bw_JwDEgLRlMHY; expires=Sat, 13-Nov-2021 00:30:
03 GMT; path=/; domain=.google.com; HttpOnly
Alt-Svc: h3-29=":443"; ma=2592000,h3-T051=":443"; ma=2592000,h3-Q050=":443"; ma=2592000,h3-Q046=":443"; ma=25920
00,h3-Q043=":443"; ma=2592000,quic=":443"; ma=2592000; v="46,43"
Accept-Ranges: none
Vary: Accept-Encoding
Transfer-Encoding: chunked

50e9
<!doctype html><html itemscope="" itentype="http://schema.org/WebPage" lang="en"><head><meta content="Search the
world's information, including webpages, images, videos and more. Google has many special features to help you
find exactly what you're looking for." name="description"><meta content="noodp" name="robots"><meta content="tex
t/html; charset=UTF-8" http-equiv="Content-Type"><meta content="/images/branding/googleg/1x/googleg_standard_col
or_128dp.png" itemprop="image"><
```

Figure 4 - Webcrawler Output from Google.com:443

Analysis:

The programs successfully implement SSL for simple HTTP requests and responses which can be seen by the TLS packets captured by Wireshark, such as packet 6 between Client (Webcrawler) and Server (Webserver), packet 4 between Server and Firefox, and packet 8 between Client and Google, along with the successful output of the messages in each trial.

Because certificates are verified by a third party authority and the certificate generated for this project was only self-signed, Firefox stopped the initial connection to it as a security precaution. It then connected properly once a policy exception was made. As a consequence, the wireshark capture for that connection is quite lengthy.

Conclusion:

This project was successful in demonstrating how to implement SSL/TLS, how plug-and-play the functions can be with a working network application, and how opaque some of the innerworkings of at least the C OpenSSL library can be. Most of the project time spent was research and looking at different examples of implementation, working to understand what each step was trying to achieve so that I could move it into my own programs. I probably went down a

few incorrect paths in researching when I was debugging, which lead to the abovementioned of opaqueness.

I was trying to see exactly how the SSL object mapped with the socket file descriptor, since I could not get the webcrawler to make a connection and that was the only obvious difference in input between socket and SSL functions. The main thing that I learned when looking was that the details of the object do not matter, as long as the functions were being used properly. Which I was not. I accidentally used `SSL_accept()` instead of `SSL_connect()` in my Webcrawler, causing connections to fail.

However, once everything was working it all seemed relatively straight forward and like it should be direct to implement in other network applications in the future.

Server-Client Capture

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	TCP	74	59108 → 12345 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=1373576724 TSecr=0 WS=128 Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 0, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
2	0.0000009201	127.0.0.1	127.0.0.1	TCP	74	12345 → 59108 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=1373576724 TSecr=1373576724 WS=128 Frame 2: 74 bytes on wire (592 bits), 74 bytes captured (592 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 0, Ack: 1, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
3	0.000015801	127.0.0.1	127.0.0.1	TCP	66	59108 → 12345 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=1373576724 TSecr=1373576724 Frame 3: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 1, Ack: 1, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
4	0.001951987	127.0.0.1	127.0.0.1	TLSv1.3	349	Client Hello Frame 4: 349 bytes on wire (2792 bits), 349 bytes captured (2792 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 1, Ack: 1, Len: 283 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
5	0.001998990	127.0.0.1	127.0.0.1	TCP	66	12345 → 59108 [ACK] Seq=1 Ack=284 Win=65280 Len=0 TSval=1373576726 TSecr=1373576726 Frame 5: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 1, Ack: 284, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
6	0.004361895	127.0.0.1	127.0.0.1	TLSv1.3	1709	Server Hello, Change Cipher Spec, Application Data, Application Data, Application Data, Application Data Frame 6: 1709 bytes on wire (13672 bits), 1709 bytes captured (13672 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 1, Ack: 284, Len: 1643 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
7	0.004421098	127.0.0.1	127.0.0.1	TCP	66	59108 → 12345 [ACK] Seq=284 Ack=1644 Win=64128 Len=0 TSval=1373576728 TSecr=1373576728 Frame 7: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 284, Ack: 1644, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
8	0.004790014	127.0.0.1	127.0.0.1	TLSv1.3	146	Change Cipher Spec, Application Data Frame 8: 146 bytes on wire (1168 bits), 146 bytes captured (1168 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 284, Ack: 1644, Len: 80 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
9	0.004824716	127.0.0.1	127.0.0.1	TCP	66	12345 → 59108 [ACK] Seq=1644 Ack=364 Win=65536 Len=0 TSval=1373576728 TSecr=1373576728 Frame 9: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 1644, Ack: 364, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
10	0.004886219	127.0.0.1	127.0.0.1	TLSv1.3	111	Application Data Frame 10: 111 bytes on wire (888 bits), 111 bytes captured (888 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 364, Ack: 1644, Len: 45 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
11	0.004888619	127.0.0.1	127.0.0.1	TCP	66	12345 → 59108 [ACK] Seq=1644 Ack=409 Win=65536 Len=0 TSval=1373576728 TSecr=1373576728 Frame 11: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 1644, Ack: 409, Len: 0
No.      Time      Source      Destination      Protocol Length Info
    12 0.005001724    127.0.0.1    127.0.0.1        TLSv1.3   305    Application Data
Frame 12: 305 bytes on wire (2440 bits), 305 bytes captured (2440 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 1644, Ack: 409, Len: 239
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
    13 0.005005624    127.0.0.1    127.0.0.1        TCP        66      59108 → 12345 [ACK]
Seq=409 Ack=1883 Win=65408 Len=0 TSval=1373576729 TSecr=1373576729
Frame 13: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 409, Ack: 1883, Len: 0
No.      Time      Source      Destination      Protocol Length Info
    14 0.005087328    127.0.0.1    127.0.0.1        TLSv1.3   305    Application Data
Frame 14: 305 bytes on wire (2440 bits), 305 bytes captured (2440 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 1883, Ack: 409, Len: 239
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
    15 0.005089828    127.0.0.1    127.0.0.1        TCP        66      59108 → 12345 [ACK]
Seq=409 Ack=2122 Win=65280 Len=0 TSval=1373576729 TSecr=1373576729
Frame 15: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 409, Ack: 2122, Len: 0
No.      Time      Source      Destination      Protocol Length Info
    16 0.005157731    127.0.0.1    127.0.0.1        TLSv1.3   428    Application Data
Frame 16: 428 bytes on wire (3424 bits), 428 bytes captured (3424 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 2122, Ack: 409, Len: 362
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
    17 0.005159831    127.0.0.1    127.0.0.1        TCP        66      59108 → 12345 [ACK]
Seq=409 Ack=2484 Win=65024 Len=0 TSval=1373576729 TSecr=1373576729
Frame 17: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 409, Ack: 2484, Len: 0
No.      Time      Source      Destination      Protocol Length Info
    18 0.005205133    127.0.0.1    127.0.0.1        TLSv1.3   90     Application Data
Frame 18: 90 bytes on wire (720 bits), 90 bytes captured (720 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 2484, Ack: 409, Len: 24
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
    19 0.005207433    127.0.0.1    127.0.0.1        TCP        66      59108 → 12345 [ACK]
Seq=409 Ack=2508 Win=65024 Len=0 TSval=1373576729 TSecr=1373576729
Frame 19: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 409, Ack: 2508, Len: 0
No.      Time      Source      Destination      Protocol Length Info
    20 0.005220334    127.0.0.1    127.0.0.1        TCP        66      12345 → 59108 [FIN,
ACK] Seq=2508 Ack=409 Win=65536 Len=0 TSval=1373576729 TSecr=1373576729
Frame 20: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59108, Seq: 2508, Ack: 409, Len: 0
No.      Time      Source      Destination      Protocol Length Info
    21 0.005301737    127.0.0.1    127.0.0.1        TCP        66      59108 → 12345 [RST,
ACK] Seq=409 Ack=2509 Win=65536 Len=0 TSval=1373576729 TSecr=1373576729
Frame 21: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59108, Dst Port: 12345, Seq: 409, Ack: 2509, Len: 0

```

Server-Firefox Capture

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	TCP	74	59360 → 12345 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=1374915239 TSecr=0 WS=128 Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59360, Dst Port: 12345, Seq: 0, Len: 0
2	0.0000008201	127.0.0.1	127.0.0.1	TCP	74	12345 → 59360 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=1374915239 TSecr=1374915239 WS=128 Frame 2: 74 bytes on wire (592 bits), 74 bytes captured (592 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59360, Seq: 0, Ack: 1, Len: 0
3	0.0000015201	127.0.0.1	127.0.0.1	TCP	66	59360 → 12345 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=1374915239 TSecr=1374915239 Frame 3: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59360, Dst Port: 12345, Seq: 1, Ack: 1, Len: 0
4	0.002142938	127.0.0.1	127.0.0.1	TLSv1.3	583	Client Hello Frame 4: 583 bytes on wire (4664 bits), 583 bytes captured (4664 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59360, Dst Port: 12345, Seq: 1, Ack: 1, Len: 517 Transport Layer Security
5	0.002155438	127.0.0.1	127.0.0.1	TCP	66	12345 → 59360 [ACK] Seq=1 Ack=518 Win=65024 Len=0 TSval=1374915241 TSecr=1374915241 Frame 5: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59360, Seq: 1, Ack: 518, Len: 0
6	0.003432261	127.0.0.1	127.0.0.1	TLSv1.3	1693	Server Hello, Change Cipher Spec, Application Data, Application Data, Application Data, Application Data Frame 6: 1693 bytes on wire (13544 bits), 1693 bytes captured (13544 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59360, Seq: 1, Ack: 518, Len: 1627 Transport Layer Security
7	0.003440561	127.0.0.1	127.0.0.1	TCP	66	59360 → 12345 [ACK] Seq=518 Ack=1628 Win=64128 Len=0 TSval=1374915243 TSecr=1374915243 Frame 7: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59360, Dst Port: 12345, Seq: 518, Ack: 1628, Len: 0
8	0.005796603	127.0.0.1	127.0.0.1	TLSv1.3	90	Application Data Frame 8: 90 bytes on wire (720 bits), 90 bytes captured (720 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59360, Dst Port: 12345, Seq: 518, Ack: 1628, Len: 24 Transport Layer Security
9	0.005816603	127.0.0.1	127.0.0.1	TCP	66	12345 → 59360 [ACK] Seq=1628 Ack=542 Win=65536 Len=0 TSval=1374915245 TSecr=1374915245 Frame 9: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59360, Seq: 1628, Ack: 542, Len: 0
10	0.005866804	127.0.0.1	127.0.0.1	TCP	66	12345 → 59360 [FIN, ACK] Seq=1628 Ack=542 Win=65536 Len=0 TSval=1374915245 TSecr=1374915245 Frame 10: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59360, Seq: 1628, Ack: 542, Len: 0
11	0.005893504	127.0.0.1	127.0.0.1	TCP	66	59360 → 12345 [FIN, ACK] Seq=542 Ack=1629 Win=65536 Len=0 TSval=1374915245 TSecr=1374915245 Frame 11: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59360, Dst Port: 12345, Seq: 542, Ack: 1629, Len: 0

No.	Time	Source	Destination	Protocol	Length	Info
12	0.005902104	127.0.0.1	127.0.0.1	TCP	66	12345 → 59360 [ACK]

Seq=1629 Ack=543 Win=65536 Len=0 TSval=1374915245 TSecr=1374915245
Frame 12: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59360, Seq: 1629, Ack: 543, Len: 0

No.	Time	Source	Destination	Protocol	Length	Info
13	0.008501150	127.0.0.1	127.0.0.53	DNS	95	Standard query 0x8b32 A

detectportal.firefox.com OPT
Frame 13: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 49372, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
14	0.008838356	127.0.0.1	127.0.0.53	DNS	95	Standard query 0x363f

AAAA detectportal.firefox.com OPT
Frame 14: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 49372, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
15	0.009434467	127.0.0.1	127.0.0.53	DNS	95	Standard query 0x386f A

detectportal.firefox.com OPT
Frame 15: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 33704, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
16	0.063139513	127.0.0.53	127.0.0.1	DNS	206	Standard query response

0x386f A detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net A 34.107.221.82 OPT
Frame 16: 206 bytes on wire (1648 bits), 206 bytes captured (1648 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 33704
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
17	0.063199615	127.0.0.53	127.0.0.1	DNS	206	Standard query response

0x8b32 A detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net A 34.107.221.82 OPT
Frame 17: 206 bytes on wire (1648 bits), 206 bytes captured (1648 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 49372
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
18	0.067515191	127.0.0.53	127.0.0.1	DNS	218	Standard query response

0x363f AAAA detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net AAAA 2600:1901:0:38d7:: OPT
Frame 18: 218 bytes on wire (1744 bits), 218 bytes captured (1744 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 49372
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
19	0.107468495	127.0.0.1	127.0.0.53	DNS	85	Standard query 0x4dc2 A

www.google.com OPT
Frame 19: 85 bytes on wire (680 bits), 85 bytes captured (680 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 59521, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
20	0.107729800	127.0.0.1	127.0.0.53	DNS	81	Standard query 0x2d97 A

google.com OPT
Frame 20: 81 bytes on wire (648 bits), 81 bytes captured (648 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 53295, Dst Port: 53
Domain Name System (query)

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: 127.0.0.1, Dst: 127.0.0.53

User Datagram Protocol, Src Port: 49812, Dst Port: 53

Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
31	0.160138423	127.0.0.53	127.0.0.1	DNS	113	Standard query response

0x5882 A forcesafesearch.google.com A 216.239.38.120 OPT

Frame 31: 113 bytes on wire (904 bits), 113 bytes captured (904 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: 127.0.0.53, Dst: 127.0.0.1

User Datagram Protocol, Src Port: 53, Dst Port: 53010

Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
32	0.160903637	127.0.0.1	127.0.0.53	DNS	93	Standard query 0x5242 A sitereview.zscaler.com OPT

Frame 32: 93 bytes on wire (744 bits), 93 bytes captured (744 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: 127.0.0.1, Dst: 127.0.0.53

User Datagram Protocol, Src Port: 39117, Dst Port: 53

Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
33	0.237300784	127.0.0.53	127.0.0.1	DNS	100	Standard query response

0xb336 A m.youtube.com A 216.58.192.174 OPT

Frame 33: 100 bytes on wire (800 bits), 100 bytes captured (800 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: 127.0.0.53, Dst: 127.0.0.1

User Datagram Protocol, Src Port: 53, Dst Port: 35223

Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
34	0.237554288	127.0.0.1	127.0.0.53	DNS	94	Standard query 0xcbed A use-application-dns.net OPT

Frame 34: 94 bytes on wire (752 bits), 94 bytes captured (752 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: 127.0.0.1, Dst: 127.0.0.53

User Datagram Protocol, Src Port: 44174, Dst Port: 53

Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
35	0.279357425	127.0.0.53	127.0.0.1	DNS	110	Standard query response

0x7f1c A youtubei.googleapis.com A 172.217.4.74 OPT

Frame 35: 110 bytes on wire (880 bits), 110 bytes captured (880 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: 127.0.0.53, Dst: 127.0.0.1

User Datagram Protocol, Src Port: 53, Dst Port: 44568

Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
36	0.279665630	127.0.0.1	127.0.0.53	DNS	82	Standard query 0xf3e0 A example.org OPT

Frame 36: 82 bytes on wire (656 bits), 82 bytes captured (656 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: 127.0.0.1, Dst: 127.0.0.53

User Datagram Protocol, Src Port: 45612, Dst Port: 53

Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
37	0.328982401	127.0.0.53	127.0.0.1	DNS	109	Standard query response

0xe8da A youtube.googleapis.com A 172.217.9.74 OPT

Frame 37: 109 bytes on wire (872 bits), 109 bytes captured (872 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: 127.0.0.53, Dst: 127.0.0.1

User Datagram Protocol, Src Port: 53, Dst Port: 53617

Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
38	0.329239505	127.0.0.1	127.0.0.53	DNS	82	Standard query 0x0aea A example.org OPT

Frame 38: 82 bytes on wire (656 bits), 82 bytes captured (656 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: 127.0.0.1, Dst: 127.0.0.53

User Datagram Protocol, Src Port: 52648, Dst Port: 53

Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
39	0.329360607	127.0.0.1	127.0.0.53	DNS	82	Standard query 0x9dd5 AAAA example.org OPT

Frame 39: 82 bytes on wire (656 bits), 82 bytes captured (656 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: 127.0.0.1, Dst: 127.0.0.53

User Datagram Protocol, Src Port: 52648, Dst Port: 53

Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
40	0.350452080	127.0.0.53	127.0.0.1	DNS	107	Standard query response
0x54b4 A restrict.youtube.com A 216.239.38.120 OPT						
Frame 40: 107 bytes on wire (856 bits), 107 bytes captured (856 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: 127.0.0.53, Dst: 127.0.0.1						
User Datagram Protocol, Src Port: 53, Dst Port: 34071						
Domain Name System (response)						
No.	Time	Source	Destination	Protocol	Length	Info
41	0.350661683	127.0.0.1	127.0.0.53	DNS	84	Standard query 0x5e65 A
ipv4only.arpa OPT						
Frame 41: 84 bytes on wire (672 bits), 84 bytes captured (672 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: 127.0.0.1, Dst: 127.0.0.53						
User Datagram Protocol, Src Port: 59476, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
42	0.350721784	127.0.0.1	127.0.0.53	DNS	84	Standard query 0x9867
AAAA ipv4only.arpa OPT						
Frame 42: 84 bytes on wire (672 bits), 84 bytes captured (672 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: 127.0.0.1, Dst: 127.0.0.53						
User Datagram Protocol, Src Port: 59476, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
43	0.356602288	127.0.0.53	127.0.0.1	DNS	115	Standard query response
0x1bc9 A restrictmoderate.youtube.com A 216.239.38.119 OPT						
Frame 43: 115 bytes on wire (920 bits), 115 bytes captured (920 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: 127.0.0.53, Dst: 127.0.0.1						
User Datagram Protocol, Src Port: 53, Dst Port: 49812						
Domain Name System (response)						
No.	Time	Source	Destination	Protocol	Length	Info
44	0.356834492	127.0.0.1	127.0.0.53	DNS	95	Standard query 0x698b A
detectportal.firefox.com OPT						
Frame 44: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53						
User Datagram Protocol, Src Port: 48515, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
45	0.356846193	127.0.0.1	127.0.0.53	DNS	95	Standard query 0x4a88
AAAA detectportal.firefox.com OPT						
Frame 45: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53						
User Datagram Protocol, Src Port: 48515, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
46	0.393469839	127.0.0.53	127.0.0.1	DNS	109	Standard query response
0x5242 A sitereview.zscaler.com A 199.168.148.86 OPT						
Frame 46: 109 bytes on wire (872 bits), 109 bytes captured (872 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: 127.0.0.53, Dst: 127.0.0.1						
User Datagram Protocol, Src Port: 53, Dst Port: 39117						
Domain Name System (response)						
No.	Time	Source	Destination	Protocol	Length	Info
47	0.393815745	127.0.0.1	127.0.0.53	DNS	95	Standard query 0xa183 A
detectportal.firefox.com OPT						
Frame 47: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53						
User Datagram Protocol, Src Port: 38474, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
48	0.393829745	127.0.0.1	127.0.0.53	DNS	95	Standard query 0x309e
AAAA detectportal.firefox.com OPT						
Frame 48: 95 bytes on wire (760 bits), 95 bytes captured (760 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: 127.0.0.1, Dst: 127.0.0.53						
User Datagram Protocol, Src Port: 38474, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info

49 0.398583529 127.0.0.53 127.0.0.1 DNS 376 Standard query response
0x5a6d A www.youtube.com CNAME youtube-ui.l.google.com A 64.233.182.93 A 173.194.193.93 A 173.194.193.136
A 173.194.193.91 A 173.194.194.136 A 173.194.194.190 A 173.194.194.93 A 173.194.195.190 A 173.194.195.91 A
173.194.195.136 A 173.194.196.190 A 173.194.196.93 A 173.194.197.190 A 173.194.197.91 A 173.194.197.136 A
173.194.197.93 OPT
Frame 49: 376 bytes on wire (3008 bits), 376 bytes captured (3008 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 40417
Domain Name System (response)
No. Time Source Destination Protocol Length Info
50 0.398689331 127.0.0.53 127.0.0.1 DNS 385 Standard query response
0x7a1a A www.youtube-nocookie.com CNAME youtube-ui.l.google.com A 64.233.182.93 A 173.194.193.93 A
173.194.193.136 A 173.194.193.91 A 173.194.194.136 A 173.194.194.190 A 173.194.194.93 A 173.194.195.190 A
173.194.195.91 A 173.194.195.136 A 173.194.196.190 A 173.194.196.93 A 173.194.197.190 A 173.194.197.91 A
173.194.197.136 A 173.194.197.93 OPT
Frame 50: 385 bytes on wire (3080 bits), 385 bytes captured (3080 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 44578
Domain Name System (response)
No. Time Source Destination Protocol Length Info
51 0.624269512 127.0.0.53 127.0.0.1 DNS 98 Standard query response
0x0aea A example.org A 93.184.216.34 OPT
Frame 51: 98 bytes on wire (784 bits), 98 bytes captured (784 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 52648
Domain Name System (response)
No. Time Source Destination Protocol Length Info
52 0.624352514 127.0.0.53 127.0.0.1 DNS 98 Standard query response
0xf3e0 A example.org A 93.184.216.34 OPT
Frame 52: 98 bytes on wire (784 bits), 98 bytes captured (784 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 45612
Domain Name System (response)
No. Time Source Destination Protocol Length Info
53 0.629873711 127.0.0.53 127.0.0.1 DNS 110 Standard query response
0x9dd5 AAAA example.org AAAA 2606:2800:220:1:248:1893:25c8:1946 OPT
Frame 53: 110 bytes on wire (880 bits), 110 bytes captured (880 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 52648
Domain Name System (response)
No. Time Source Destination Protocol Length Info
54 0.635086503 127.0.0.53 127.0.0.1 DNS 116 Standard query response
0x5e65 A ipv4only.arpa A 192.0.0.171 A 192.0.0.170 OPT
Frame 54: 116 bytes on wire (928 bits), 116 bytes captured (928 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 59476
Domain Name System (response)
No. Time Source Destination Protocol Length Info
55 0.641380514 127.0.0.53 127.0.0.1 DNS 206 Standard query response
0x698b A detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net A 34.107.221.82 OPT
Frame 55: 206 bytes on wire (1648 bits), 206 bytes captured (1648 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 48515
Domain Name System (response)
No. Time Source Destination Protocol Length Info
56 0.641427715 127.0.0.53 127.0.0.1 DNS 206 Standard query response
0xa183 A detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net A 34.107.221.82 OPT
Frame 56: 206 bytes on wire (1648 bits), 206 bytes captured (1648 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 38474
Domain Name System (response)
No. Time Source Destination Protocol Length Info
57 0.641614518 127.0.0.53 127.0.0.1 DNS 218 Standard query response
0x4a88 AAAA detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net AAAA 2600:1901:0:38d7:: OPT
Frame 57: 218bytes on wire (1744 bits), 218 bytes captured (1744 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 48515
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
58	0.641684820	127.0.0.53	127.0.0.1	DNS	218	Standard query response

0x309e AAAA detectportal.firefox.com CNAME detectportal.prod.mozaws.net CNAME
prod.detectportal.prod.cloudops.mozgcp.net AAAA 2600:1901:0:38d7:: OPT

Frame 58: 218 bytes on wire (1744 bits), 218 bytes captured (1744 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 38474
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
59	0.646043597	127.0.0.53	127.0.0.1	DNS	84	Standard query response

0x9867 AAAA ipv4only.arpa OPT

Frame 59: 84 bytes on wire (672 bits), 84 bytes captured (672 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 59476
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
60	0.646321701	127.0.0.1	127.0.0.53	DNS	84	Standard query 0xe180 A

ipv4only.arpa OPT

Frame 60: 84 bytes on wire (672 bits), 84 bytes captured (672 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 41410, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
61	0.646371402	127.0.0.1	127.0.0.53	DNS	84	Standard query 0x9b82

AAAA ipv4only.arpa OPT

Frame 61: 84 bytes on wire (672 bits), 84 bytes captured (672 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 41410, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
62	0.647274418	127.0.0.53	127.0.0.1	DNS	116	Standard query response

0xe180 A ipv4only.arpa A 192.0.0.171 A 192.0.0.170 OPT

Frame 62: 116 bytes on wire (928 bits), 116 bytes captured (928 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 41410
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
63	0.652647713	127.0.0.53	127.0.0.1	DNS	84	Standard query response

0x9b82 AAAA ipv4only.arpa OPT

Frame 63: 84 bytes on wire (672 bits), 84 bytes captured (672 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 41410
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
64	0.671659749	127.0.0.53	127.0.0.1	DNS	94	Standard query response

0xcbed Server failure A use-application-dns.net OPT

Frame 64: 94 bytes on wire (752 bits), 94 bytes captured (752 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 44174
Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
65	0.671773951	127.0.0.1	127.0.0.53	DNS	94	Standard query 0xcbed A

use-application-dns.net OPT

Frame 65: 94 bytes on wire (752 bits), 94 bytes captured (752 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: 127.0.0.1, Dst: 127.0.0.53
User Datagram Protocol, Src Port: 60603, Dst Port: 53
Domain Name System (query)

No.	Time	Source	Destination	Protocol	Length	Info
66	0.767559941	127.0.0.53	127.0.0.1	DNS	94	Standard query response

0xcbed Server failure A use-application-dns.net OPT

Frame 66: 94 bytes on wire (752 bits), 94 bytes captured (752 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: 127.0.0.53, Dst: 127.0.0.1
User Datagram Protocol, Src Port: 53, Dst Port: 60603

Domain Name System (response)

No.	Time	Source	Destination	Protocol	Length	Info
67	4.832148943	127.0.0.1	127.0.0.1	TCP	74	59366 → 12345 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=1374920071 TSecr=0 WS=128 Frame 67: 74 bytes on wire (592 bits), 74 bytes captured (592 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 0, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
68	4.832157144	127.0.0.1	127.0.0.1	TCP	74	12345 → 59366 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=1374920071 TSecr=1374920071 WS=128 Frame 68: 74 bytes on wire (592 bits), 74 bytes captured (592 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 0, Ack: 1, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
69	4.832164744	127.0.0.1	127.0.0.1	TCP	66	59366 → 12345 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=1374920071 TSecr=1374920071 Frame 69: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 1, Ack: 1, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
70	4.833887374	127.0.0.1	127.0.0.1	TLSv1.3	583	Client Hello Frame 70: 583 bytes on wire (4664 bits), 583 bytes captured (4664 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 1, Ack: 1, Len: 517 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
71	4.833973976	127.0.0.1	127.0.0.1	TCP	66	12345 → 59366 [ACK] Seq=1 Ack=518 Win=65024 Len=0 TSval=1374920073 TSecr=1374920073 Frame 71: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 1, Ack: 518, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
72	4.834848891	127.0.0.1	127.0.0.1	TLSv1.3	1693	Server Hello, Change Cipher Spec, Application Data, Application Data, Application Data, Application Data Frame 72: 1693 bytes on wire (13544 bits), 1693 bytes captured (13544 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 1, Ack: 518, Len: 1627 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
73	4.834888892	127.0.0.1	127.0.0.1	TCP	66	59366 → 12345 [ACK] Seq=518 Ack=1628 Win=64128 Len=0 TSval=1374920074 TSecr=1374920074 Frame 73: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 518, Ack: 1628, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
74	4.836589522	127.0.0.1	127.0.0.1	TLSv1.3	130	Change Cipher Spec, Application Data Frame 74: 130 bytes on wire (1040 bits), 130 bytes captured (1040 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 518, Ack: 1628, Len: 64 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
75	4.836605822	127.0.0.1	127.0.0.1	TCP	66	12345 → 59366 [ACK] Seq=1628 Ack=582 Win=65536 Len=0 TSval=1374920076 TSecr=1374920076 Frame 75: 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 1628, Ack: 582, Len: 0
No.	Time	Source	Destination	Protocol	Length	Info
76	4.836705124	127.0.0.1	127.0.0.1	TLSv1.3	426	Application Data Frame 76: 426 bytes on wire (3408 bits), 426 bytes captured (3408 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: 127.0.0.1, Dst: 127.0.0.1 Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 582, Ack: 1628, Len: 360 Transport Layer Security
No.	Time	Source	Destination	Protocol	Length	Info
77	4.836707824	127.0.0.1	127.0.0.1	TCP	66	12345 → 59366 [ACK] Seq=1628 Ack=942 Win=65280 Len=0 TSval=1374920076 TSecr=1374920076

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Frame 77: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 1628, Ack: 942, Len: 0
No.      Time      Source      Destination      Protocol Length Info
   78 4.836714324    127.0.0.1    127.0.0.1        TLSv1.3   289    Application Data
Frame 78: 289 bytes on wire (2312 bits), 289 bytes captured (2312 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 1628, Ack: 942, Len: 223
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
   79 4.836718024    127.0.0.1    127.0.0.1        TCP        66      59366 → 12345 [ACK]
Seq=942 Ack=1851 Win=65408 Len=0 TSval=1374920076 TSecr=1374920076
Frame 79: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 942, Ack: 1851, Len: 0
No.      Time      Source      Destination      Protocol Length Info
   80 4.836752025    127.0.0.1    127.0.0.1        TLSv1.3   289    Application Data
Frame 80: 289 bytes on wire (2312 bits), 289 bytes captured (2312 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 1851, Ack: 942, Len: 223
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
   81 4.836754225    127.0.0.1    127.0.0.1        TCP        66      59366 → 12345 [ACK]
Seq=942 Ack=2074 Win=65280 Len=0 TSval=1374920076 TSecr=1374920076
Frame 81: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 942, Ack: 2074, Len: 0
No.      Time      Source      Destination      Protocol Length Info
   82 4.836806226    127.0.0.1    127.0.0.1        TLSv1.3   429    Application Data
Frame 82: 429 bytes on wire (3432 bits), 429 bytes captured (3432 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 2074, Ack: 942, Len: 363
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
   83 4.836840927    127.0.0.1    127.0.0.1        TCP        66      59366 → 12345 [ACK]
Seq=942 Ack=2437 Win=65024 Len=0 TSval=1374920076 TSecr=1374920076
Frame 83: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 942, Ack: 2437, Len: 0
No.      Time      Source      Destination      Protocol Length Info
   84 4.836852027    127.0.0.1    127.0.0.1        TLSv1.3   90     Application Data
Frame 84: 90 bytes on wire (720 bits), 90 bytes captured (720 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 2437, Ack: 942, Len: 24
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info
   85 4.836853927    127.0.0.1    127.0.0.1        TCP        66      59366 → 12345 [ACK]
Seq=942 Ack=2461 Win=65024 Len=0 TSval=1374920076 TSecr=1374920076
Frame 85: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 942, Ack: 2461, Len: 0
No.      Time      Source      Destination      Protocol Length Info
   86 4.836867827    127.0.0.1    127.0.0.1        TCP        66      12345 → 59366 [FIN,
ACK] Seq=2461 Ack=942 Win=65536 Len=0 TSval=1374920076 TSecr=1374920076
Frame 86: 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 2461, Ack: 942, Len: 0
No.      Time      Source      Destination      Protocol Length Info
   87 4.836969429    127.0.0.1    127.0.0.1        TLSv1.3   90     Application Data
Frame 87: 90 bytes on wire (720 bits), 90 bytes captured (720 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: 127.0.0.1, Dst: 127.0.0.1
Transmission Control Protocol, Src Port: 59366, Dst Port: 12345, Seq: 942, Ack: 2462, Len: 24
Transport Layer Security
No.      Time      Source      Destination      Protocol Length Info

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88	4.836979929	127.0.0.1	127.0.0.1	TCP	54	12345 → 59366 [RST]
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Seq=2462 Win=0 Len=0

Frame 88: 54 bytes on wire (432 bits), 54 bytes captured (432 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: 127.0.0.1, Dst: 127.0.0.1

Transmission Control Protocol, Src Port: 12345, Dst Port: 59366, Seq: 2462, Len: 0

Google-Client Capture

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	172.24.207.147	172.24.192.1	DNS	70	Standard query 0xfedc A google.com
Frame 1: 70 bytes on wire (560 bits), 70 bytes captured (560 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)						
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.24.192.1						
User Datagram Protocol, Src Port: 46781, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
2	0.000062902	172.24.207.147	172.24.192.1	DNS	70	Standard query 0xa78a AAAA google.com
Frame 2: 70 bytes on wire (560 bits), 70 bytes captured (560 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)						
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.24.192.1						
User Datagram Protocol, Src Port: 46552, Dst Port: 53						
Domain Name System (query)						
No.	Time	Source	Destination	Protocol	Length	Info
3	0.044858062	172.24.192.1	172.24.207.147	DNS	108	Standard query response 0xa78a AAAA google.com AAAA 2607:f8b0:4009:803::200e
Frame 3: 108 bytes on wire (864 bits), 108 bytes captured (864 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)						
Internet Protocol Version 4, Src: 172.24.192.1, Dst: 172.24.207.147						
User Datagram Protocol, Src Port: 53, Dst Port: 46552						
Domain Name System (response)						
No.	Time	Source	Destination	Protocol	Length	Info
4	0.087691071	172.24.192.1	172.24.207.147	DNS	96	Standard query response 0xfedc A google.com A 172.217.4.78
Frame 4: 96 bytes on wire (768 bits), 96 bytes captured (768 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)						
Internet Protocol Version 4, Src: 172.24.192.1, Dst: 172.24.207.147						
User Datagram Protocol, Src Port: 53, Dst Port: 46781						
Domain Name System (response)						
No.	Time	Source	Destination	Protocol	Length	Info
5	0.088216184	172.24.207.147	172.217.4.78	TCP	74	52880 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=1505342382 TSecr=0 WS=128
Frame 5: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)						
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78						
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 0, Len: 0						
No.	Time	Source	Destination	Protocol	Length	Info
6	0.111052876	172.217.4.78	172.24.207.147	TCP	74	443 → 52880 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1430 SACK_PERM=1 TSval=3362252319 TSecr=1505342382 WS=256
Frame 6: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)						
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147						
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 0, Ack: 1, Len: 0						
No.	Time	Source	Destination	Protocol	Length	Info
7	0.111080876	172.24.207.147	172.217.4.78	TCP	66	52880 → 443 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=1505342405 TSecr=3362252319
Frame 7: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)						
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78						
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 1, Ack: 1, Len: 0						
No.	Time	Source	Destination	Protocol	Length	Info
8	0.111975599	172.24.207.147	172.217.4.78	TLSv1.3	349	Client Hello
Frame 8: 349 bytes on wire (2792 bits), 349 bytes captured (2792 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)						
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78						
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 1, Ack: 1, Len: 283						
Transport Layer Security						
No.	Time	Source	Destination	Protocol	Length	Info
9	0.132727937	172.217.4.78	172.24.207.147	TCP	66	443 → 52880 [ACK] Seq=1 Ack=284 Win=66816 Len=0 TSval=3362252341 TSecr=1505342406
Frame 9: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)						
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147						
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 1, Ack: 284, Len: 0						
No.	Time	Source	Destination	Protocol	Length	Info
10	0.142525791	172.217.4.78	172.24.207.147	TLSv1.3	1452	Server Hello, Change Cipher Spec, Application Data
Frame 10: 1452 bytes on wire (11616 bits), 1452 bytes captured (11616 bits) on interface eth0, id 0						
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)						
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147						
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 1, Ack: 284, Len: 1386						
Transport Layer Security						
No.	Time	Source	Destination	Protocol	Length	Info

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    11 0.142539791    172.24.207.147    172.217.4.78      TCP        66      52880 → 443 [ACK]
Seq=284 Ack=1387 Win=64128 Len=0 TSval=1505342436 TSecr=3362252351
Frame 11: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 284, Ack: 1387, Len: 0
No.      Time                Source                Destination            Protocol Length Info
    12 0.142864699    172.24.207.147    172.217.4.78      TLSv1.3    146      Change Cipher Spec,
Application Data
Frame 12: 146 bytes on wire (1168 bits), 146 bytes captured (1168 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 284, Ack: 1387, Len: 80
Transport Layer Security
No.      Time                Source                Destination            Protocol Length Info
    13 0.169339385    172.217.4.78      172.24.207.147    TCP        66      443 → 52880 [ACK]
Seq=1387 Ack=364 Win=66816 Len=0 TSval=3362252378 TSecr=1505342436
Frame 13: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 1387, Ack: 364, Len: 0
No.      Time                Source                Destination            Protocol Length Info
    14 0.169356486    172.24.207.147    172.217.4.78      TLSv1.3    111      Application Data
Frame 14: 111 bytes on wire (888 bits), 111 bytes captured (888 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 364, Ack: 1387, Len: 45
Transport Layer Security
No.      Time                Source                Destination            Protocol Length Info
    15 0.188744388    172.217.4.78      172.24.207.147    TCP        66      443 → 52880 [ACK]
Seq=1387 Ack=409 Win=66816 Len=0 TSval=3362252397 TSecr=1505342463
Frame 15: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 1387, Ack: 409, Len: 0
No.      Time                Source                Destination            Protocol Length Info
    16 0.240684934    172.217.4.78      172.24.207.147    TLSv1.3    2022     Application Data,
Application Data
Frame 16: 2022 bytes on wire (16176 bits), 2022 bytes captured (16176 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 1387, Ack: 409, Len: 1956
Transport Layer Security
No.      Time                Source                Destination            Protocol Length Info
    17 0.240697934    172.24.207.147    172.217.4.78      TCP        66      52880 → 443 [ACK]
Seq=409 Ack=3343 Win=63872 Len=0 TSval=1505342534 TSecr=3362252448
Frame 17: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 409, Ack: 3343, Len: 0
No.      Time                Source                Destination            Protocol Length Info
    18 0.240685034    172.217.4.78      172.24.207.147    TLSv1.3    11410    Application Data,
Application Data, Application Data, Application Data, Application Data, Application
Data, Application Data
Frame 18: 11410 bytes on wire (91280 bits), 11410 bytes captured (91280 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 3343, Ack: 409, Len: 11344
Transport Layer Security
No.      Time                Source                Destination            Protocol Length Info
    19 0.240712934    172.24.207.147    172.217.4.78      TCP        66      52880 → 443 [ACK]
Seq=409 Ack=14687 Win=55552 Len=0 TSval=1505342534 TSecr=3362252448
Frame 19: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 409, Ack: 14687, Len: 0
No.      Time                Source                Destination            Protocol Length Info
    20 0.240984741    172.24.207.147    172.217.4.78      TCP        66      52880 → 443 [RST, ACK]
Seq=409 Ack=14687 Win=64128 Len=0 TSval=1505342535 TSecr=3362252448
Frame 20: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 409, Ack: 14687, Len: 0
No.      Time                Source                Destination            Protocol Length Info
    21 0.242128171    172.217.4.78      172.24.207.147    TLSv1.3    1484     Application Data
Frame 21: 1484 bytes on wire (11872 bits), 1484 bytes captured (11872 bits) on interface eth0, id 0

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Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 14687, Ack: 409, Len: 1418
Transport Layer Security

No.	Time	Source	Destination	Protocol	Length	Info
22	0.242143272	172.24.207.147	172.217.4.78	TCP	54	52880 → 443 [RST] Seq=409 Win=0 Len=0

Frame 22: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 409, Len: 0

No.	Time	Source	Destination	Protocol	Length	Info
23	0.281459090	172.217.4.78	172.24.207.147	TLSv1.3	1484	Application Data

Frame 23: 1484 bytes on wire (11872 bits), 1484 bytes captured (11872 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 16105, Ack: 409, Len: 1418
Transport Layer Security

No.	Time	Source	Destination	Protocol	Length	Info
24	0.281488391	172.24.207.147	172.217.4.78	TCP	54	52880 → 443 [RST] Seq=409 Win=0 Len=0

Frame 24: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 409, Len: 0

No.	Time	Source	Destination	Protocol	Length	Info
25	0.285170086	172.217.4.78	172.24.207.147	TLSv1.3	5738	Application Data, Application Data, Application Data, Application Data

Frame 25: 5738 bytes on wire (45904 bits), 5738 bytes captured (45904 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5), Dst: Microsof_78:a2:00 (00:15:5d:78:a2:00)
Internet Protocol Version 4, Src: 172.217.4.78, Dst: 172.24.207.147
Transmission Control Protocol, Src Port: 443, Dst Port: 52880, Seq: 17523, Ack: 409, Len: 5672
Transport Layer Security

No.	Time	Source	Destination	Protocol	Length	Info
26	0.285214087	172.24.207.147	172.217.4.78	TCP	54	52880 → 443 [RST] Seq=409 Win=0 Len=0

Frame 26: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface eth0, id 0
Ethernet II, Src: Microsof_78:a2:00 (00:15:5d:78:a2:00), Dst: Microsof_e0:5f:c5 (00:15:5d:e0:5f:c5)
Internet Protocol Version 4, Src: 172.24.207.147, Dst: 172.217.4.78
Transmission Control Protocol, Src Port: 52880, Dst Port: 443, Seq: 409, Len: 0