

CS 342: Computer Networks Laboratory

Assignment 1

Group 84

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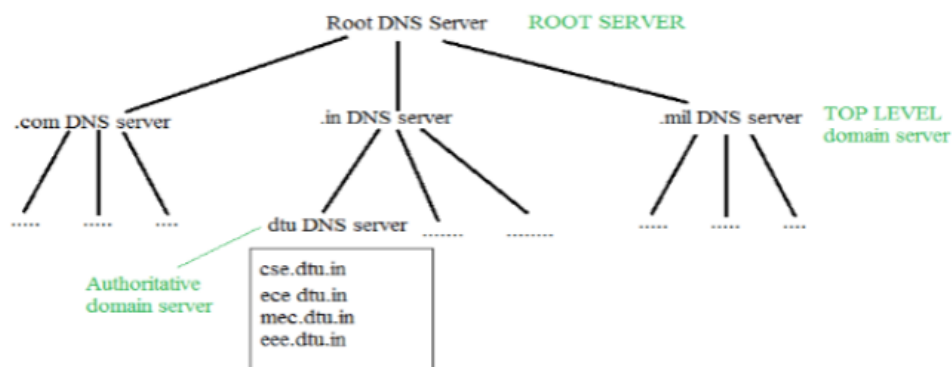
Drive link to all the traces: [Google Drive](#)

Question 1.

Application Layer:

Protocols:

1. DNS -Domain Name System is also an application layer protocol which converts domain names into IP addresses.



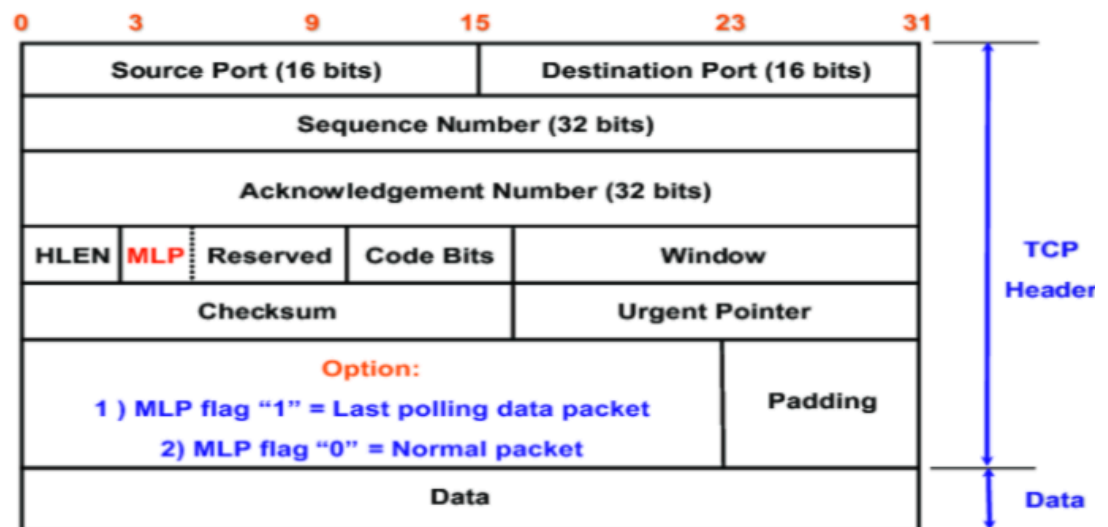
- 2.HTTP - HTTP is an application layer protocol designed to transfer information between networked devices and runs on top of other layers of the network protocol stack.

Request Method	Space	Request URI	Space	HTTP Version	Request Line
Header Field Name	Space	Value	Space		
					Request Headers
Header Field Name	Space	Value	Space		
Blank Line					Request Body
Message Body					

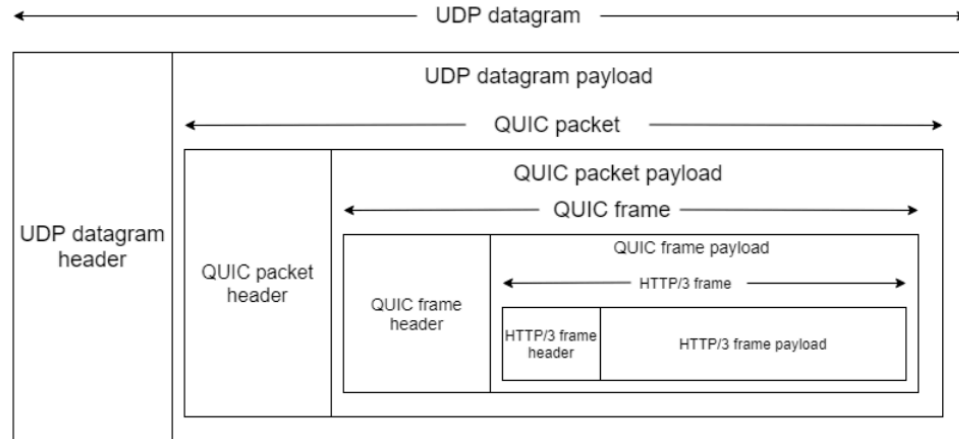
Transport Layer Protocol:

Protocols:

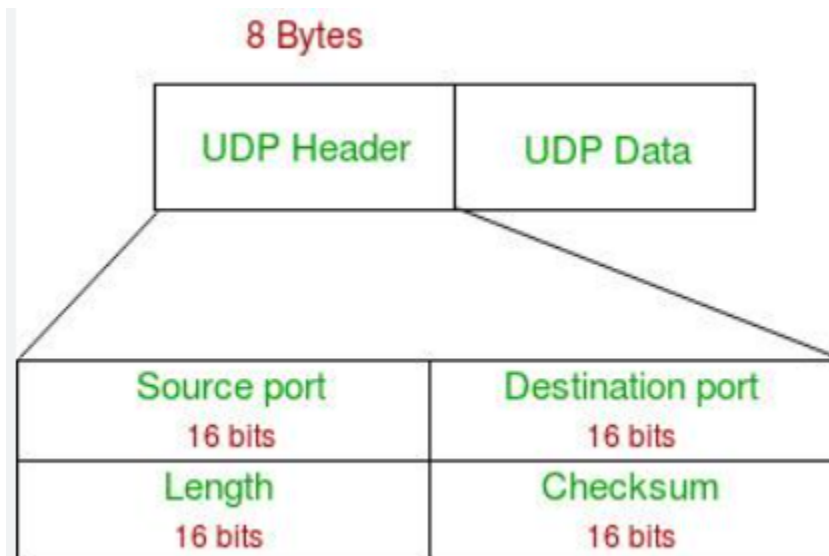
1. Transmission Control Protocol (TCP) is a communications standard that enables application programs and computing devices to exchange messages over a network. It is designed to send packets across the internet and ensure the successful delivery of data and messages over networks.



2. QUIC is a general-purpose transport layer network protocol. QUIC (Quick UDP Internet Connections, is an experimental transport layer network protocol designed by Google. The overall goal is to reduce latency compared to that of TCP. QUIC is similar to TCP+TLS+HTTP/2 implemented on UDP.



3. User Datagram Protocol (UDP) is a Transport Layer protocol. UDP is a part of the Internet Protocol suite, referred to as UDP/IP suite. Unlike TCP, it is an unreliable and connectionless protocol. So, there is no need to establish a connection before data transfer.



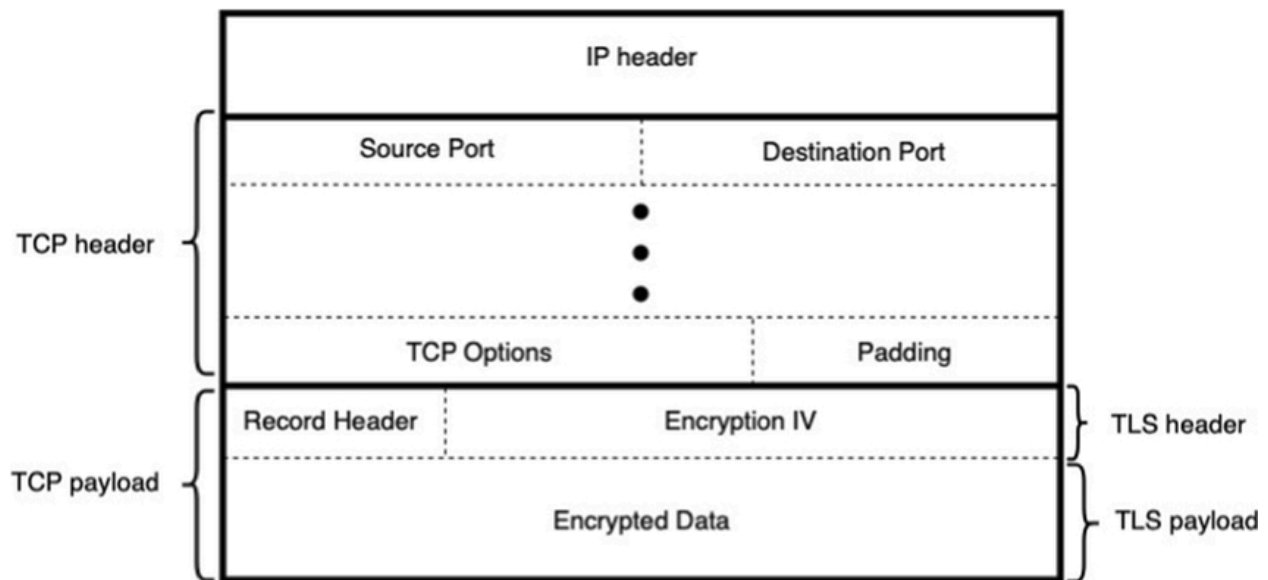
Security Layer Protocols:

Protocols:

1. SSL: Secure Socket Layer (SSL) provides security to the data that is transferred between web browser and server. SSL encrypts the link between a web server and

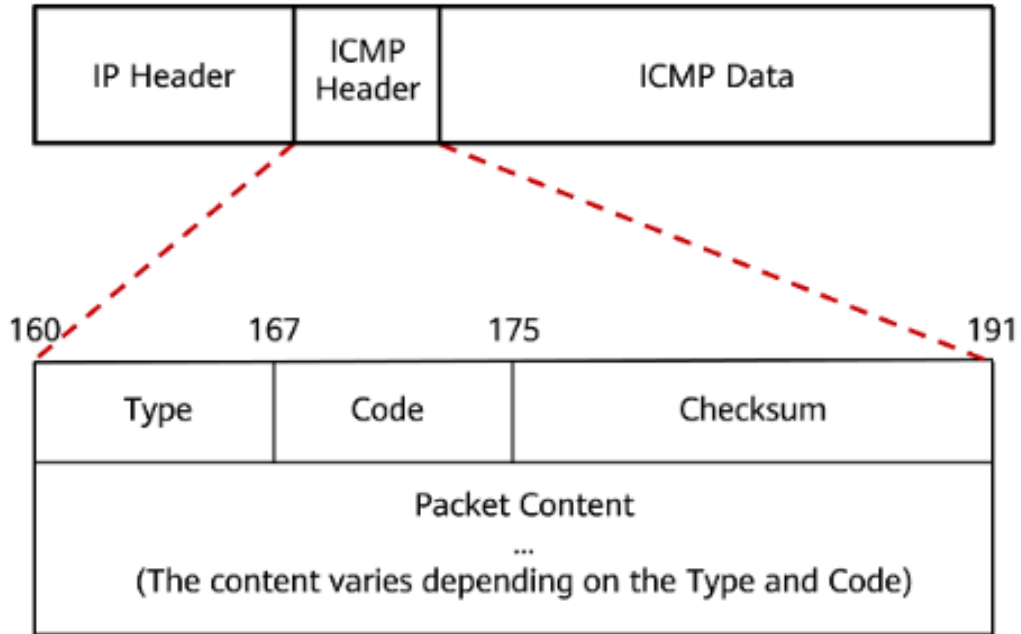
a browser, ensuring that all data passed between them remains private and free from attack.

2. TLS: Transport Layer Security, or TLS, is a widely adopted security protocol designed to facilitate privacy and data security for communications over the Internet. A primary use case of TLS is encrypting the communication between web applications and servers, such as web browsers loading a website. I captured TLSv1.2 and TLSv1.3 that is Transfer Layer Security which is the successor to Secure Socket Layer (SSL).



Network Layer Protocol:

1. The Internet Control Message Protocol (ICMP) is a network layer protocol used by network devices to diagnose network communication issues. ICMP is mainly used to determine whether or not data is reaching its intended destination in a timely manner. Commonly, the ICMP protocol is used on network devices, such as routers.



Question 2.

1. Zoom:

DNS: Src IP and Dst IP can be seen in lines 21 to 38

21	0.335635	10.0.2.15	192.168.39.23	DNS	75	Standard query 0xfca6 A explore.zoom.us
22	0.336285	10.0.2.15	192.168.39.23	DNS	79	Standard query 0xfaf9 A cdn3.optimizely.com
23	0.336486	10.0.2.15	192.168.39.23	DNS	79	Standard query 0xa679 AAAA cdn3.optimizely.com
24	0.336741	10.0.2.15	192.168.39.23	DNS	75	Standard query 0xd830 AAAA explore.zoom.us
25	0.365431	10.0.2.15	192.168.39.23	DNS	67	Standard query 0xf3fc A zoom.us
26	0.365651	10.0.2.15	192.168.39.23	DNS	67	Standard query 0x5d5c AAAA zoom.us
37	0.375028	192.168.39.23	10.0.2.15	DNS	111	Standard query response 0xfaf9 A cdn3.optimizely.com A 104.18.31.209 A 104.18.30.209
38	0.375058	192.168.39.23	10.0.2.15	DNS	139	Standard query response 0xfca6 A explore.zoom.us A 52.84.151.64 A 52.84.151.65 A 52.84.151.66
39	0.375063	192.168.39.23	10.0.2.15	DNS	299	Standard query response 0xd830 AAAA explore.zoom.us AAAA 2600:9000:2600:5800:5:1167::
40	0.375981	10.0.2.15	192.168.39.23	DNS	78	Standard query 0x169a A tag.demandbase.com

Frame 21: 75 bytes on wire (600 bits), 75 bytes captured (600 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 192.168.39.23
User Datagram Protocol, Src Port: 51805, Dst Port: 53
Domain Name System (query)

TCP: Src IP and Dst IP can be seen in lines 70 and 92

70	0.421645	10.0.2.15	170.114.52.2	TCP	74	42608 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=4007398767 TSecr=0 WS=128
88	0.463753	13.107.42.14	10.0.2.15	TLSv1.2	92	Application Data
92	0.470512	170.114.52.2	10.0.2.15	TCP	60	443 → 42608 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
93	0.470542	10.0.2.15	170.114.52.2	TCP	54	42608 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
94	0.472644	10.0.2.15	170.114.52.2	TLSv1.3	659	Client Hello (SNI=zoom.us)
95	0.472932	170.114.52.2	10.0.2.15	TCP	60	443 → 42608 [ACK] Seq=1 Ack=606 Win=65535 Len=0
101	0.510358	10.0.2.15	13.107.42.14	TCP	54	60692 → 443 [ACK] Seq=5690 Ack=5078 Win=62780 Len=0
102	0.534410	170.114.52.2	10.0.2.15	TLSv1.3	266	Server Hello, Change Cipher Spec, Application Data
103	0.534442	10.0.2.15	170.114.52.2	TCP	54	42608 → 443 [ACK] Seq=606 Ack=213 Win=64028 Len=0
104	0.535151	10.0.2.15	170.114.52.2	TLSv1.3	118	Change Cipher Spec, Application Data

Frame 70: 74 bytes on wire (592 bits), 74 bytes captured (592 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 170.114.52.2

Transmission Control Protocol, Src Port: 42608, Dst Port: 443, Seq: 0, Len: 0

Source Port: 42608

Destination Port: 443

[Stream index: 3]

[Conversation completeness: Incomplete, DATA (15)]

[TCP Segment Len: 0]

Sequence Number: 0 (relative sequence number)

Sequence Number (raw): 1899734305

[Next Sequence Number: 1 (relative sequence number)]

Acknowledgment Number: 0

Acknowledgment number (raw): 0

1010 = Header Length: 40 bytes (10)

TLS: Src IP and Dst IP can be seen in lines 94,104 and 106

94	0.472644	10.0.2.15	170.114.52.2	TLSv1.3	659	Client Hello (SNI=zoom.us)
102	0.534410	170.114.52.2	10.0.2.15	TLSv1.3	266	Server Hello, Change Cipher Spec, Application Data
104	0.535151	10.0.2.15	170.114.52.2	TLSv1.3	118	Change Cipher Spec, Application Data
106	0.535923	10.0.2.15	170.114.52.2	TLSv1.3	224	Application Data
107	0.536010	10.0.2.15	170.114.52.2	TLSv1.3	3567	Application Data
112	0.552133	142.250.183.78	10.0.2.15	TLSv1.3	2654	Server Hello, Change Cipher Spec
114	0.558334	142.250.183.78	10.0.2.15	TLSv1.3	2168	Application Data
119	0.563712	10.0.2.15	142.250.183.78	TLSv1.3	112	Application Data
121	0.564809	10.0.2.15	142.250.183.78	TLSv1.3	224	Application Data
122	0.564830	10.0.2.15	142.250.183.78	TLSv1.3	1566	Application Data

Frame 94: 659 bytes on wire (5272 bits), 659 bytes captured (5272 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 170.114.52.2

Transmission Control Protocol, Src Port: 42608, Dst Port: 443, Seq: 1, Ack: 1, Len: 605

Source Port: 42608

Destination Port: 443

[Stream index: 3]

[Conversation completeness: Incomplete, DATA (15)]

[TCP Segment Len: 605]

Sequence Number: 1 (relative sequence number)

Sequence Number (raw): 1899734306

[Next Sequence Number: 606 (relative sequence number)]

Acknowledgment Number: 1 (relative ack number)

Acknowledgment number (raw): 1046912002

0101 = Header Length: 20 bytes (5)

QUIC: Src IP and Dst IP can be observed

No.	Time	Source	Destination	Protocol	Length	Info
655	19.763535	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 0, CRYPTO
697	20.064203	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 1, CRYPTO
698	20.064689	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 2, PING, PADDING
830	20.665892	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 3, CRYPTO
831	20.665949	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 4, PING, PADDING
1147	21.869535	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 5, CRYPTO
1148	21.869610	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 6, PING, PADDING
1610	24.270606	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 7, CRYPTO
1611	24.270643	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 8, PING, PADDING
2497	29.070990	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 9, CRYPTO
2498	29.071028	10.0.2.15	170.114.52.2	QUIC	1399	Initial, DCID=35453be289baad6f148608701aa3, SCID=3a888d, PKN: 10, PING, PADDING

Frame 655: 1399 bytes on wire (11192 bits), 1399 bytes captured (11192 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 170.114.52.2

User Datagram Protocol, Src Port: 36999, Dst Port: 443

QUIC IETF

QUIC IETF

2. Live Sports

TCP: Src IP and Dest IP can be observed

1	0.000000	49.44.185.211	10.0.2.15	TLSv1.2	11734 Ignored Unknown Record
2	0.000051	10.0.2.15	49.44.185.211	TCP	54 57762 → 443 [ACK] Seq=1 Ack=11681 Win=65535 Len=0
3	0.000950	49.44.185.211	10.0.2.15	TLSv1.2	13194 Ignored Unknown Record
4	0.000982	10.0.2.15	49.44.185.211	TCP	54 57762 → 443 [ACK] Seq=1 Ack=24821 Win=65535 Len=0
5	0.001832	49.44.185.211	10.0.2.15	TLSv1.2	14654 Ignored Unknown Record
6	0.001873	10.0.2.15	49.44.185.211	TCP	54 57762 → 443 [ACK] Seq=1 Ack=39421 Win=65535 Len=0
7	0.002701	49.44.185.211	10.0.2.15	TLSv1.2	10756 Ignored Unknown Record
8	0.002724	10.0.2.15	49.44.185.211	TCP	54 57762 → 443 [ACK] Seq=1 Ack=50123 Win=65535 Len=0
9	0.016550	10.0.2.15	49.44.185.211	TLSv1.2	1804 Application Data
10	0.017673	49.44.185.211	10.0.2.15	TCP	60 443 → 36478 [ACK] Seq=1 Ack=1461 Win=65535 Len=0
11	0.017685	49.44.185.211	10.0.2.15	TCP	60 443 → 36478 [ACK] Seq=1 Ack=1751 Win=65535 Len=0
12	0.033306	10.0.2.15	49.44.185.211	TLSv1.2	1833 Application Data
13	0.034374	49.44.185.211	10.0.2.15	TCP	60 443 → 57762 [ACK] Seq=50123 Ack=1461 Win=65535 Len=0
14	0.034388	49.44.185.211	10.0.2.15	TCP	60 443 → 57762 [ACK] Seq=50123 Ack=1780 Win=65535 Len=0
15	1.039809	10.0.2.15	216.58.200.214	TLSv1.2	187 Application Data
16	1.040459	216.58.200.214	10.0.2.15	TCP	60 443 → 45810 [ACK] Seq=1 Ack=134 Win=65535 Len=0
17	1.143487	216.58.200.214	10.0.2.15	TLSv1.2	216 Application Data
18	1.154467	216.58.200.214	10.0.2.15	TLSv1.2	6554 Application Data, Application Data, Application Data, Application Data, Application Data
19	1.154532	10.0.2.15	216.58.200.214	TCP	60 443 → 443 [ACK] Seq=1 Ack=50123 Win=65535 Len=0

Frame 1: 11734 bytes on wire (93872 bits), 11734 bytes captured (93872 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: 49.44.185.211, Dst: 10.0.2.15
Transmission Control Protocol, Src Port: 443, Dst Port: 57762, Seq: 1, Ack: 1, Len: 11680

TLS: Src IP and Dest IP can be observed

9	0.016550	10.0.2.15	49.44.185.211	TLSv1.2	1804 Application Data
12	0.033306	10.0.2.15	49.44.185.211	TLSv1.2	1833 Application Data
15	1.039809	10.0.2.15	216.58.200.214	TLSv1.2	187 Application Data
17	1.143487	216.58.200.214	10.0.2.15	TLSv1.2	216 Application Data
18	1.154467	216.58.200.214	10.0.2.15	TLSv1.2	6554 Application Data, Application Data, Application Data, Application Data, Application Data
20	1.154893	216.58.200.214	10.0.2.15	TLSv1.2	5254 Application Data, Application Data, Application Data, Application Data
22	1.159158	216.58.200.214	10.0.2.15	TLSv1.2	2654 Application Data, Application Data
24	1.160091	216.58.200.214	10.0.2.15	TLSv1.2	15654 Application Data, Application Data, Application Data, Application Data, Application Data
26	1.160954	216.58.200.214	10.0.2.15	TLSv1.2	3034 Application Data, Application Data, Application Data, Application Data
28	1.161261	10.0.2.15	216.58.200.214	TLSv1.2	93 Application Data
30	1.233035	10.0.2.15	172.217.161.14	TLSv1.2	184 Application Data
31	1.233076	10.0.2.15	172.217.161.14	TLSv1.2	1315 Application Data
32	1.233233	10.0.2.15	172.217.161.14	TLSv1.2	1439 Application Data
36	1.444218	172.217.161.14	10.0.2.15	TLSv1.2	3035 Application Data, Application Data, Application Data, Application Data, Application Data
38	1.445634	10.0.2.15	172.217.161.14	TLSv1.2	93 Application Data

Frame 12: 1833 bytes on wire (14664 bits), 1833 bytes captured (14664 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 49.44.185.211
Transmission Control Protocol, Src Port: 57762, Dst Port: 443, Seq: 1, Ack: 50123, Len: 1779
Source Port: 57762
Destination Port: 443
[Stream index: 0]
[Conversation completeness: Incomplete (60)]
[TCP Segment Len: 1779]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 2197112991
[Next Sequence Number: 1780 (relative sequence number)]
Acknowledgment Number: 50123 (relative ack number)

3. YouTube Upload

DNS: Src IP and Dest IP can be seen in lines 66 to 69

```
66 9.800419 10.0.2.15 192.168.39.23 DNS 78 Standard query 0x85f8 A upload.youtube.com
67 9.800548 10.0.2.15 192.168.39.23 DNS 78 Standard query 0x352d AAAA upload.youtube.com
68 9.861083 192.168.39.23 10.0.2.15 DNS 133 Standard query response 0x85f8 A upload.youtube.com CNAME yt-video-upload.l.google.com A 142.250.194.15
69 9.864457 192.168.39.23 10.0.2.15 DNS 145 Standard query response 0x352d AAAA upload.youtube.com CNAME yt-video-upload.l.google.com AAAA 2484:6800:4002:
1966 18.441021 10.0.2.15 192.168.39.23 DNS 89 Standard query 0x6bc5 AAAA connectivity-check.ubuntu.com
1967 18.456786 10.0.2.15 192.168.39.23 DNS 88 Standard query 0xedc6 A contile.services.mozilla.com
1968 18.456879 10.0.2.15 192.168.39.23 DNS 88 Standard query 0x6165 AAAA contile.services.mozilla.com
1975 18.599184 192.168.39.23 10.0.2.15 DNS 104 Standard query response 0xedc6 A contile.services.mozilla.com A 34.117.188.166
1976 18.599219 192.168.39.23 10.0.2.15 DNS 425 Standard query response 0x6bc5 AAAA connectivity-check.ubuntu.com AAAA 2620:2d:4002:1:196 AAAA 2620:2d:4002:1:196
1977 18.599639 192.168.39.23 10.0.2.15 DNS 116 Standard query response 0x6165 AAAA contile.services.mozilla.com AAAA 64:ff9b::2275:bca6
2044 18.756268 10.0.2.15 192.168.39.23 DNS 75 Standard query 0x9584 A r10.o.lencr.org
2045 18.756453 10.0.2.15 192.168.39.23 DNS 75 Standard query 0x70b9 AAAA r10.o.lencr.org
2048 18.934410 192.168.39.23 10.0.2.15 DNS 198 Standard query response 0x70b9 AAAA r10.o.lencr.org CNAME o.lencr.edgesuite.net CNAME a1887.dscq.akamai.net A
2049 18.934432 192.168.39.23 10.0.2.15 DNS 174 Standard query response 0x9584 A r10.o.lencr.org CNAME o.lencr.edgesuite.net CNAME a1887.dscq.akamai.net A
2182 18.939051 10.0.2.15 192.168.39.23 DNS 195 Standard query response 0xf608 A r10.o.lencr.org CNAME o.lencr.edgesuite.net CNAME a1887.dscq.akamai.net A

Frame 52: 76 bytes on wire (608 bits), 76 bytes captured (608 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15 (10.0.2.15), Dst: 192.168.39.23 (192.168.39.23)
User Datagram Protocol, Src Port: 36840, Dst Port: 53
Domain Name System (query)
```

TCP: Src IP and Dest IP can be seen in lines 70 to 74

```
70 9.865173 10.0.2.15 142.250.194.15 TCP 74 55408 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=1192676970 TSecr=0 WS=128
71 9.865316 10.0.2.15 142.250.194.15 TCP 74 55416 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=1192676970 TSecr=0 WS=128
72 9.937808 142.250.194.15 10.0.2.15 TCP 60 443 → 55408 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
73 9.937846 10.0.2.15 142.250.194.15 TCP 54 55408 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
74 9.942608 142.250.194.15 10.0.2.15 TCP 60 443 → 55416 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
75 9.942645 10.0.2.15 142.250.194.15 TCP 54 55416 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
76 9.945391 10.0.2.15 142.250.194.15 TLSv1.3 571 Client Hello (SNI=upload.youtube.com)
77 9.946597 142.250.194.15 10.0.2.15 TCP 60 443 → 55408 [ACK] Seq=1 Ack=518 Win=65535 Len=0
78 9.948202 10.0.2.15 142.250.194.15 TLSv1.3 571 Client Hello (SNI=upload.youtube.com)
79 9.949447 142.250.194.15 10.0.2.15 TCP 60 443 → 55416 [ACK] Seq=1 Ack=518 Win=65535 Len=0
80 10.100023 142.250.194.15 10.0.2.15 TLSv1.3 1354 Server Hello, Change Cipher Spec
81 10.100050 10.0.2.15 142.250.194.15 TCP 54 55408 → 443 [ACK] Seq=518 Ack=1301 Win=63700 Len=0
82 10.101858 142.250.194.15 10.0.2.15 TLSv1.3 1354 Server Hello, Change Cipher Spec
83 10.101896 10.0.2.15 142.250.194.15 TCP 54 55416 → 443 [ACK] Seq=518 Ack=1301 Win=63700 Len=0
84 10.102005 142.250.194.15 10.0.2.15 TCP 2664 443 → 55408 [ACK] Seq=1301 Ack=518 Win=65535 Len=2660 (TCP segment of a reassembled packet)

Frame 51: 54 bytes on wire (432 bits), 54 bytes captured (432 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 162.125.81.18
Transmission Control Protocol, Src Port: 51804, Dst Port: 443, Seq: 22075, Ack: 685, Len: 0
Source Port: 51804
Destination Port: 443
[Stream index: 3]
[Conversation completeness: Incomplete (60)]
[TCP Segment Len: 0]
Sequence Number: 22075 (relative sequence number)
Sequence Number (raw): 1215213160
[Next Sequence Number: 22075 (relative sequence number)]
Acknowledgment Number: 685 (relative ack number)
```

TLS: Src IP and Dest IP can be seen in lines 76 onwards

```
76 9.945391 10.0.2.15 142.250.194.15 TLSv1.3 571 Client Hello (SNI=upload.youtube.com)
78 9.948202 10.0.2.15 142.250.194.15 TLSv1.3 571 Client Hello (SNI=upload.youtube.com)
80 10.100023 142.250.194.15 10.0.2.15 TLSv1.3 1354 Server Hello, Change Cipher Spec
82 10.101858 142.250.194.15 10.0.2.15 TLSv1.3 1354 Server Hello, Change Cipher Spec
86 10.104223 142.250.194.15 10.0.2.15 TLSv1.3 647 Application Data
90 10.105292 142.250.194.15 10.0.2.15 TLSv1.3 1948 Application Data
92 10.108543 10.0.2.15 142.250.194.15 TLSv1.3 118 Change Cipher Spec, Application Data
93 10.108786 10.0.2.15 142.250.194.15 TLSv1.3 118 Change Cipher Spec, Application Data
95 10.108912 10.0.2.15 142.250.194.15 TLSv1.3 224 Application Data
98 10.110268 10.0.2.15 142.250.194.15 TLSv1.3 224 Application Data
99 10.110303 10.0.2.15 142.250.194.15 TLSv1.3 479 Application Data
102 10.193734 142.250.194.15 10.0.2.15 TLSv1.3 668 Application Data, Application Data
103 10.195143 10.0.2.15 142.250.194.15 TLSv1.3 85 Application Data
104 10.195241 142.250.194.15 10.0.2.15 TLSv1.3 85 Application Data
106 10.195549 142.250.194.15 10.0.2.15 TLSv1.3 699 Application Data, Application Data, Application Data
107 10.195886 10.0.2.15 142.250.194.15 TLSv1.3 85 Application Data
110 10.275851 142.250.194.15 10.0.2.15 TLSv1.3 723 Application Data, Application Data, Application Data

Frame 76: 571 bytes on wire (4568 bits), 571 bytes captured (4568 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 142.250.194.15
Transmission Control Protocol, Src Port: 55408, Dst Port: 443, Seq: 1, Ack: 1, Len: 517
Source Port: 55408
Destination Port: 443
[Stream index: 7]
[Conversation completeness: Complete, WITH_DATA (31)]
[TCP Segment Len: 517]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 1510685915
[Next Sequence Number: 518 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
```


QUIC: Src IP and Dest IP can be seen in lines 114, 120 and 121

114	10.278254	10.0.2.15	142.250.194.15	QUIC	1399	Initial, DCID=8497644555120a58, SCID=f8d7eb, PKN: 0, CRYPTO
120	10.579435	10.0.2.15	142.250.194.15	QUIC	1399	Initial, DCID=8497644555120a58, SCID=f8d7eb, PKN: 1, CRYPTO
121	10.579562	10.0.2.15	142.250.194.15	QUIC	1399	Initial, DCID=8497644555120a58, SCID=f8d7eb, PKN: 2, PING, PADDING
269	11.180698	10.0.2.15	142.250.194.15	QUIC	1399	Initial, DCID=8497644555120a58, SCID=f8d7eb, PKN: 3, CRYPTO
270	11.180733	10.0.2.15	142.250.194.15	QUIC	1399	Initial, DCID=8497644555120a58, SCID=f8d7eb, PKN: 4, PING, PADDING
273	11.196272	10.0.2.15	172.217.166.2...	QUIC	1399	Initial, DCID=46c3655636e02043, SCID=660e04, PKN: 11, CRYPTO

▶ Frame 114: 1399 bytes on wire (11192 bits), 1399 bytes captured (11192 bits)						
▶ Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)						
▶ Internet Protocol Version 4, Src: 10.0.2.15, Dst: 142.250.194.15						
▶ User Datagram Protocol, Src Port: 51397, Dst Port: 443						
▶ QUIC IETF						
▶ QUIC IETF						

ICMP:

No.	Time	Source	Destination	Protocol	Length	Info
3	0.000333	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
4	0.000342	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
11	1.595288	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
12	1.595297	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
15	2.163517	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
16	2.163527	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
48	4.801431	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
49	4.801440	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
64	7.154734	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
65	7.154743	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
122	10.580245	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)
123	10.580254	10.0.2.2	10.0.2.15	ICMP	70	Destination unreachable (Network unreachable)

▶ Frame 65: 70 bytes on wire (560 bits), 70 bytes captured (560 bits)						
▶ Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)						
▶ Internet Protocol Version 4, Src: 10.0.2.2, Dst: 10.0.2.15						
▶ Internet Control Message Protocol						

4. YouTube Downloading and Buffering:

TCP: Src IP and Dst IP can be seen in lines 1 and 2

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.2.15	142.250.196.3	TCP	54	44212 → 80 [ACK] Seq=1 Ack=1 Win=63882 Len=0
2	0.000553	142.250.196.3	10.0.2.15	TCP	60	[TCP ACKed unseen segment] 80 → 44212 [ACK] Seq=1 Ack=2 Win=65535 Len=0
3	1.900367	10.0.2.15	180.149.55.232	UDP	1399	33706 → 443 Len=1357
4	1.900403	10.0.2.15	180.149.55.232	UDP	1399	33706 → 443 Len=1357
5	1.900416	10.0.2.15	180.149.55.232	UDP	216	33706 → 443 Len=174
6	1.918092	180.149.55.232	10.0.2.15	UDP	170	443 → 33706 Len=128
7	1.918778	10.0.2.15	180.149.55.232	UDP	73	33706 → 443 Len=31
8	1.919926	180.149.55.232	10.0.2.15	UDP	1395	443 → 33706 Len=1353
9	1.920068	10.0.2.15	180.149.55.232	UDP	75	33706 → 443 Len=33

Frame 1: 54 bytes on wire (432 bits), 54 bytes captured (432 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 142.250.196.3

Transmission Control Protocol, Src Port: 44212, Dst Port: 80, Seq: 1, Ack: 1, Len: 0

Source Port: 44212

Destination Port: 80

[Stream Index: 0]

[Conversation completeness: Incomplete (4)]

[TCP Segment Len: 0]

Sequence Number: 1 (relative sequence number)

Sequence Number (raw): 1596487230

[Next Sequence Number: 1 (relative sequence number)]

Acknowledgment Number: 1 (relative ack number)

Acknowledgment number (raw): 5760704

0101 ... = Header Length: 20 bytes (5)

Flags: 0x010 (ACK)

Window: 63882

[Calculated window size: 63882]

[Window size scaling factor: -1 (unknown)]

Checksum: 0x5f27 [unverified]

[Checksum Status: Unverified]

Urgent Pointer: 0

TLS: Src IP and Dst IP

No.	Time	Source	Destination	Protocol	Length	Info
1671	3.282243	10.0.2.15	34.117.188.166	TLSv1.2	93	Application Data
1686	3.360291	34.117.188.166	10.0.2.15	TLSv1.2	93	Application Data
1693	3.681399	10.0.2.15	34.120.208.123	TLSv1.2	228	Application Data
1694	3.681422	10.0.2.15	34.120.208.123	TLSv1.2	1579	Application Data
1699	3.682124	10.0.2.15	34.120.208.123	TLSv1.2	2707	Application Data
1714	4.060448	34.120.208.123	10.0.2.15	TLSv1.2	129	Application Data
1716	4.061211	34.120.208.123	10.0.2.15	TLSv1.2	311	Application Data, Application Data
1718	4.061327	10.0.2.15	34.120.208.123	TLSv1.2	100	Application Data
1720	4.283202	10.0.2.15	34.107.243.93	TLSv1.2	93	Application Data
1721	4.283258	10.0.2.15	34.149.100.209	TLSv1.2	93	Application Data

Frame 1671: 93 bytes on wire (744 bits), 93 bytes captured (744 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 34.117.188.166

Transmission Control Protocol, Src Port: 54838, Dst Port: 443, Seq: 1, Ack: 1, Len: 39

Source Port: 54838

Destination Port: 443

[Stream Index: 2]

[Conversation completeness: Incomplete (12)]

[TCP Segment Len: 39]

Sequence Number: 1 (relative sequence number)

Sequence Number (raw): 115363161

[Next Sequence Number: 40 (relative sequence number)]

Acknowledgment Number: 1 (relative ack number)

Acknowledgment number (raw): 324079

0101 ... = Header Length: 20 bytes (5)

Flags: 0x018 (PSH, ACK)

Window: 62780

[Calculated window size: 62780]

[Window size scaling factor: -1 (unknown)]

Checksum: 0xeb6b [unverified]

[Checksum Status: Unverified]

UDP: Src IP and Dst IP

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.2.15	142.250.196.3	TCP	54	44212 → 80 [ACK] Seq=1 Ack=1 Win=63882 Len=0
2	0.000553	142.250.196.3	10.0.2.15	TCP	60	[TCP ACKed unseen segment] 80 → 44212 [ACK] Seq=1 Ack=2 Win=65535 Len=0
3	1.900367	10.0.2.15	180.149.55.232	UDP	1399	33706 → 443 Len=1357
4	1.900403	10.0.2.15	180.149.55.232	UDP	1399	33706 → 443 Len=1357
5	1.900416	10.0.2.15	180.149.55.232	UDP	216	33706 → 443 Len=174
6	1.918092	180.149.55.232	10.0.2.15	UDP	170	443 → 33706 Len=128
7	1.918778	10.0.2.15	180.149.55.232	UDP	73	33706 → 443 Len=31
8	1.919926	180.149.55.232	10.0.2.15	UDP	1395	443 → 33706 Len=1353
9	1.920068	10.0.2.15	180.149.55.232	UDP	75	33706 → 443 Len=33
10	1.920403	180.149.55.232	10.0.2.15	UDP	1399	443 → 33706 Len=1357
11	1.920912	180.149.55.232	10.0.2.15	UDP	1399	443 → 33706 Len=1357
12	1.921009	10.0.2.15	180.149.55.232	UDP	75	33706 → 443 Len=33
13	1.921345	180.149.55.232	10.0.2.15	UDP	1399	443 → 33706 Len=1357
14	1.922200	180.149.55.232	10.0.2.15	UDP	1399	443 → 33706 Len=1357
15	1.922287	10.0.2.15	180.149.55.232	UDP	75	33706 → 443 Len=33
16	1.922582	180.149.55.232	10.0.2.15	UDP	1399	443 → 33706 Len=1357

Frame 3: 1399 bytes on wire (11192 bits), 1399 bytes captured (11192 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 180.149.55.232

User Datagram Protocol, Src Port: 33706, Dst Port: 443

Data (1357 bytes)

5. NPTEL

DNS: DNS lookup can be seen in lines 24 and 25, and response in lines 30 and 33

24	0.131383	10.0.2.15	192.168.39.23	DNS	71 Standard query 0x54e6 A npTEL.ac.in
25	0.131687	10.0.2.15	192.168.39.23	DNS	71 Standard query 0xd03e AAAA npTEL.ac.in
26	0.326467	del03s14-in-f..	10.0.2.15	TLSv1.2	311 Application Data, Application Data
27	0.327250	del03s14-in-f..	10.0.2.15	TLSv1.2	1204 Application Data, Application Data, Application Data
28	0.327425	10.0.2.15	del03s14-in-f..	TLSv1.2	93 Application Data
29	0.328099	del03s14-in-f..	10.0.2.15	TCP	60 443 → 51770 [ACK] Seq=1408 Ack=2679 Win=65535 Len=0
30	0.332659	192.168.39.23	10.0.2.15	DNS	183 Standard query response 0xd03e AAAA npTEL.ac.in AAAA 2001:4860:4802:34::15 AAAA 2001:4860:4802:38::15 AAAA 2001:4860:4802:36::15
31	0.367851	del03s14-in-f..	10.0.2.15	TLSv1.2	315 Application Data, Application Data
32	0.409720	10.0.2.15	del03s14-in-f..	TCP	54 51770 → 443 [ACK] Seq=2679 Ack=1669 Win=65535 Len=0
33	0.428439	192.168.39.23	10.0.2.15	DNS	135 Standard query response 0x54e6 A npTEL.ac.in A 216.239.34.21 A 216.239.36.21 A 216.239.32.21 A 216.239.38.21
34	0.429474	youtube-ui.l..	10.0.2.15	TLSv1.2	254 Application Data, Application Data, Application Data, Application Data
35	0.429513	del03s14-in-f..	10.0.2.15	TLSv1.2	315 Application Data, Application Data

Frame 24: 71 bytes on wire (568 bits), 71 bytes captured (568 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15 (10.0.2.15), Dst: 192.168.39.23 (192.168.39.23)
User Datagram Protocol, Src Port: 40456, Dst Port: 53
Domain Name System (query)

TLS: Src IP and Dst IP can be seen in lines 35 and 36

34	0.429474	142.250.207.2..	10.0.2.15	TLSv1.2	254 Application Data, Application Data, Application Data, Application Data
35	0.429513	172.217.166.2..	10.0.2.15	TLSv1.2	315 Application Data, Application Data
36	0.429530	10.0.2.15	172.217.166.2..	TCP	54 51770 → 443 [ACK] Seq=2679 Ack=1930 Win=65535 Len=0
37	0.430750	10.0.2.15	142.250.207.2..	TLSv1.2	93 Application Data
38	0.431110	10.0.2.15	216.239.34.21	TCP	74 50782 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=1821608963 TSecr=0 WS=128
39	0.432096	142.250.207.2..	10.0.2.15	TCP	60 443 → 51720 [ACK] Seq=201 Ack=1236 Win=65535 Len=0
40	0.531242	216.239.34.21	10.0.2.15	TCP	60 443 → 50782 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
41	0.531292	10.0.2.15	216.239.34.21	TCP	54 50782 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
42	0.534915	10.0.2.15	216.239.34.21	TLSv1.3	571 Client Hello (SNI=npTEL.ac.in)
43	0.536027	216.239.34.21	10.0.2.15	TCP	60 443 → 50782 [ACK] Seq=1 Ack=518 Win=65535 Len=0
44	0.740857	216.239.34.21	10.0.2.15	TLSv1.3	1354 Server Hello, Change Cipher Spec

Frame 34: 254 bytes on wire (2032 bits), 254 bytes captured (2032 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: 142.250.207.206, Dst: 10.0.2.15
Transmission Control Protocol, Src Port: 443, Dst Port: 51720, Seq: 1, Ack: 1197, Len: 200
Source Port: 443
Destination Port: 51720
[Stream index: 1]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 200]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 1390550670
[Next Sequence Number: 201 (relative sequence number)]
Acknowledgment Number: 1197 (relative ack number)
Acknowledgment number (raw): 115251511
0101 = Header Length: 20 bytes (5)

TCP: Src IP and Dst IP can be seen in lines 38 and 40

38	0.431110	10.0.2.15	216.239.34.21	TCP	74 50782 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=1821608963 TSecr=0 WS=128
39	0.432096	142.250.207.2..	10.0.2.15	TCP	60 443 → 51720 [ACK] Seq=201 Ack=1236 Win=65535 Len=0
40	0.531242	216.239.34.21	10.0.2.15	TCP	60 443 → 50782 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
41	0.531292	10.0.2.15	216.239.34.21	TCP	54 50782 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
42	0.534915	10.0.2.15	216.239.34.21	TLSv1.3	571 Client Hello (SNI=npTEL.ac.in)
43	0.536027	216.239.34.21	10.0.2.15	TCP	60 443 → 50782 [ACK] Seq=1 Ack=518 Win=65535 Len=0
44	0.740857	216.239.34.21	10.0.2.15	TLSv1.3	1354 Server Hello, Change Cipher Spec
45	0.740902	10.0.2.15	216.239.34.21	TCP	54 50782 → 443 [ACK] Seq=518 Ack=1301 Win=63700 Len=0
46	0.742598	216.239.34.21	10.0.2.15	TLSv1.3	3241 Application Data
47	0.742630	10.0.2.15	216.239.34.21	TCP	54 50782 → 443 [ACK] Seq=518 Ack=4488 Win=61320 Len=0
48	0.749026	10.0.2.15	192.168.39.23	DNS	70 Standard query 0x3538 A o.pki.goog
49	0.840816	192.168.39.23	10.0.2.15	DNS	121 Standard query response 0x3538 A o.pki.goog CNAME pki-goog.l.google.com A 142.250.207.195
50	0.841573	10.0.2.15	192.168.39.23	DNS	81 Standard query 0x7ddd AAAA pki-goog.l.google.com

Frame 38: 74 bytes on wire (592 bits), 74 bytes captured (592 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 216.239.34.21
Transmission Control Protocol, Src Port: 50782, Dst Port: 443, Seq: 0, Len: 0
Source Port: 50782
Destination Port: 443
[Stream index: 2]
[Conversation completeness: Incomplete, DATA (15)]
[TCP Segment Len: 0]
Sequence Number: 0 (relative sequence number)
Sequence Number (raw): 3233530340
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 0
Acknowledgment number (raw): 0

QUIC: Src IP and Dst IP can be observed

255	4.978239	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 0, CRYPTO
319	5.281024	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 1, CRYPTO
320	5.281116	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 2, PING, PADDING
587	5.883975	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 3, CRYPTO
588	5.884055	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 4, PING, PADDING
1116	7.085000	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 5, CRYPTO
1117	7.085051	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 6, PING, PADDING
2021	9.486131	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 7, CRYPTO
2022	9.486189	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 8, PING, PADDING
3944	14.286875	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 9, CRYPTO
3945	14.286977	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 10, PING, PADDING
5535	23.888524	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 11, CRYPTO
5536	23.888580	10.0.2.15	104.17.25.14	QUIC	1399	Initial, DCID=6acd186299398ecea395693cea, SCID=ddb6a9, PKN: 12, PING, PADDING
6527	31.767811	10.0.2.15	49.44.76.47	QUIC	1399	Initial, DCID=8f81284a062fbb2eef98347969, SCID=1654bc, PKN: 0, CRYPTO
6629	32.067544	10.0.2.15	49.44.76.47	QUIC	1399	Initial, DCID=8f81284a062fbb2eef98347969, SCID=1654bc, PKN: 1, CRYPTO
6630	32.067584	10.0.2.15	49.44.76.47	QUIC	1399	Initial, DCID=8f81284a062fbb2eef98347969, SCID=1654bc, PKN: 2, PING, PADDING

6. TWITCH

DNS : Src IP and Dst IP can be seen on line 64

64	0.815460	192.168.39.23	10.0.2.15	DNS	187 Standard query response 0x7ac4 AAAA usher.ttvnw.net AAAA 64:ff9b::3a4:2436 AAAA 64:ff9b::3a4:242b AAAA 64:ff9b::
65	0.815544	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=25739 Win=65535 Len=0
66	0.829266	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
67	0.829510	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=26763 Win=65535 Len=0
68	0.837777	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
69	0.837899	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=27787 Win=65535 Len=0
70	0.847170	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
71	0.847285	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=28811 Win=65535 Len=0
72	0.860016	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record

.....

Frame 64: 187 bytes on wire (1496 bits), 187 bytes captured (1496 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: 192.168.39.23, Dst: 10.0.2.15
User Datagram Protocol, Src Port: 53, Dst Port: 54754
Domain Name System (response)

TLS: Src IP and Dst IP can be seen in lines 15, 19 and 21

14	0.122254	3.164.36.27	10.0.2.15	TCP	60 [TCP ACKed unseen segment] 443 → 51208 [ACK] Seq=1 Ack=2 Win=65535 Len=0
15	0.561010	18.164.144.7	10.0.2.15	TLSv1.2	1216 Ignored Unknown Record
16	0.561055	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=1163 Win=65535 Len=0
17	0.572636	18.164.144.7	10.0.2.15	TCP	1078 443 → 34058 [PSH, ACK] Seq=1163 Ack=1 Win=65535 Len=1024
18	0.572665	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=2187 Win=65535 Len=0
19	0.583609	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
20	0.583681	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=3211 Win=65535 Len=0
21	0.595531	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
22	0.595562	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=4235 Win=65535 Len=0
23	0.608276	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
24	0.608306	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=5259 Win=65535 Len=0
25	0.618794	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
26	0.618899	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=6283 Win=65535 Len=0
27	0.626233	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
28	0.626255	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=7307 Win=65535 Len=0
29	0.638223	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record

.....

Frame 15: 1216 bytes on wire (9728 bits), 1216 bytes captured (9728 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: 18.164.144.7, Dst: 10.0.2.15
Transmission Control Protocol, Src Port: 443, Dst Port: 34058, Seq: 1, Ack: 1, Len: 1162
Source Port: 443
Destination Port: 34058
[Stream index: 3]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 1162]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 1413528672
[Next Sequence Number: 1163 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
Acknowledgment number (raw): 3752459693

TCP: src IP and dest IP can be seen in lines 16, 17 and 18

15	0.561010	18.164.144.7	10.0.2.15	TLSv1.2	1216 Ignored Unknown Record
16	0.561055	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=1163 Win=65535 Len=0
17	0.572636	18.164.144.7	10.0.2.15	TCP	1078 443 → 34058 [PSH, ACK] Seq=1163 Ack=1 Win=65535 Len=1024
18	0.572665	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=2187 Win=65535 Len=0
19	0.583609	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
20	0.583681	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=3211 Win=65535 Len=0
21	0.595531	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
22	0.595562	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=4235 Win=65535 Len=0
23	0.608276	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
24	0.608306	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=5259 Win=65535 Len=0
25	0.618794	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
26	0.618899	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=6283 Win=65535 Len=0
27	0.626233	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record
28	0.626255	10.0.2.15	18.164.144.7	TCP	54 34058 → 443 [ACK] Seq=1 Ack=7307 Win=65535 Len=0
29	0.638223	18.164.144.7	10.0.2.15	TLSv1.2	1078 Ignored Unknown Record

.....

Frame 16: 54 bytes on wire (432 bits), 54 bytes captured (432 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 18.164.144.7
Transmission Control Protocol, Src Port: 34058, Dst Port: 443, Seq: 1, Ack: 1163, Len: 0
Source Port: 34058
Destination Port: 443
[Stream index: 3]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 0]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 3752459693
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 1163 (relative ack number)
Acknowledgment number (raw): 1413529834

7. MS TEAMS

DNS: Src IP and Dest IP can be seen in light blue

108	10.311874	10.0.2.15	192.168.39.23	DNS	79 Standard query 0x0342 A teams.microsoft.com
109	10.312052	10.0.2.15	192.168.39.23	DNS	79 Standard query 0xa2bd AAAA teams.microsoft.com
110	10.495008	192.168.39.23	10.0.2.15	DNS	257 Standard query response 0xa2bd AAAA teams.microsoft.com CNAME teams.office.com CNAME tmc-g2.tm-4.office.com CNAME
111	10.495051	192.168.39.23	10.0.2.15	DNS	233 Standard query response 0x0342 A teams.microsoft.com CNAME teams.office.com CNAME tmc-g2.tm-4.office.com CNAME te
112	10.680827	10.0.2.15	52.123.129.14	TLSv1.2	324 Application Data
113	10.681753	52.123.129.14	10.0.2.15	TCP	60 443 → 38708 [ACK] Seq=1 Ack=271 Win=65535 Len=0
114	10.684928	10.0.2.15	192.168.39.23	DNS	88 Standard query 0xecfe A statics.teams.cdn.office.net
115	10.685213	10.0.2.15	192.168.39.23	DNS	80 Standard query 0xfad A res-1.cdn.office.net
116	10.685472	10.0.2.15	192.168.39.23	DNS	80 Standard query 0x53bc AAAA res-1.cdn.office.net
117	10.685671	10.0.2.15	192.168.39.23	DNS	88 Standard query 0x8fb5 AAAA statics.teams.cdn.office.net
118	10.805912	192.168.39.23	10.0.2.15	DNS	370 Standard query response 0x53bc AAAA res-1.cdn.office.net CNAME res-1.cdn.office.net-c.edgekey.net CNAME res-1.cdn
119	10.805957	192.168.39.23	10.0.2.15	DNS	262 Standard query response 0xfad A res-1.cdn.office.net CNAME res-1.cdn.office.net-c.edgekey.net CNAME res-1.cdn.of
120	10.805964	192.168.39.23	10.0.2.15	DNS	331 Standard query response 0xecfe A statics.teams.cdn.office.net CNAME teams-staticscdn.trafficmanager.net CNAME sta

Frame 108: 79 bytes on wire (632 bits), 79 bytes captured (632 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 192.168.39.23
User Datagram Protocol, Src Port: 51542, Dst Port: 53
Domain Name System (query)

TCP: Src IP and Dest IP can be seen in line 122 to 125

122	10.815264	52.123.129.14	10.0.2.15	TCP	2654 443 → 38708 [PSH, ACK] Seq=1 Ack=271 Win=65535 Len=2600 [TCP segment of a reassembled PDU]
123	10.815304	10.0.2.15	52.123.129.14	TCP	54 38708 → 443 [ACK] Seq=271 Ack=2601 Win=65535 Len=0
124	10.815801	52.123.129.14	10.0.2.15	TCP	1354 443 → 38708 [PSH, ACK] Seq=2601 Ack=271 Win=65535 Len=1300 [TCP segment of a reassembled PDU]
125	10.815826	10.0.2.15	52.123.129.14	TCP	54 38708 → 443 [ACK] Seq=271 Ack=3901 Win=65535 Len=0
126	10.825561	52.123.129.14	10.0.2.15	TLSv1.2	1718 Application Data
127	10.825595	10.0.2.15	52.123.129.14	TCP	54 38708 → 443 [ACK] Seq=271 Ack=5565 Win=65535 Len=0
128	10.845546	10.0.2.15	34.120.208.123	TLSv1.2	211 Application Data
129	10.845624	10.0.2.15	34.120.208.123	TLSv1.2	620 Application Data
130	10.845827	10.0.2.15	34.120.208.123	TLSv1.2	187 Application Data
131	10.845860	10.0.2.15	34.120.208.123	TLSv1.2	406 Application Data
132	10.846446	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=158 Win=65535 Len=0
133	10.846464	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=724 Win=65535 Len=0
134	10.846564	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=857 Win=65535 Len=0
135	10.846573	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=1209 Win=65535 Len=0

Frame 122: 2654 bytes on wire (21232 bits), 2654 bytes captured (21232 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: 52.123.129.14, Dst: 10.0.2.15
Transmission Control Protocol, Src Port: 443, Dst Port: 38708, Seq: 1, Ack: 271, Len: 2600
Source Port: 443
Destination Port: 38708
[Stream index: 15]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 2600]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 1467854849
[Next Sequence Number: 2601 (relative sequence number)]
Acknowledgment Number: 271 (relative ack number)
Acknowledgment number (raw): 4141314967

TLS: Src IP and Dest IP can be seen in line 128 to 131

126	10.825561	52.123.129.14	10.0.2.15	TLSv1.2	1718 Application Data
127	10.825595	10.0.2.15	52.123.129.14	TCP	54 38708 → 443 [ACK] Seq=271 Ack=5565 Win=65535 Len=0
128	10.845546	10.0.2.15	34.120.208.123	TLSv1.2	211 Application Data
129	10.845624	10.0.2.15	34.120.208.123	TLSv1.2	620 Application Data
130	10.845827	10.0.2.15	34.120.208.123	TLSv1.2	187 Application Data
131	10.845860	10.0.2.15	34.120.208.123	TLSv1.2	406 Application Data
132	10.846446	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=158 Win=65535 Len=0
133	10.846464	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=724 Win=65535 Len=0
134	10.846564	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=857 Win=65535 Len=0
135	10.846573	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=1209 Win=65535 Len=0
136	10.848469	10.0.2.15	34.120.208.123	TLSv1.2	182 Application Data
137	10.848543	10.0.2.15	34.120.208.123	TLSv1.2	517 Application Data
138	10.849089	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=1337 Win=65535 Len=0
139	10.849370	34.120.208.123	10.0.2.15	TCP	60 443 → 55968 [ACK] Seq=1 Ack=1800 Win=65535 Len=0
140	10.858648	10.0.2.15	34.120.208.123	TLSv1.2	269 Application Data
141	10.858918	10.0.2.15	34.120.208.123	TLSv1.2	858 Application Data

Frame 128: 211 bytes on wire (1688 bits), 211 bytes captured (1688 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 34.120.208.123
Transmission Control Protocol, Src Port: 55968, Dst Port: 443, Seq: 1, Ack: 1, Len: 157
Source Port: 55968
Destination Port: 443
[Stream index: 16]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 157]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 2144465412
[Next Sequence Number: 158 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
Acknowledgment number (raw): 1478084632

8. P2P Connectivity(Team Viewer)

DNS: Src IP and Dest IP can be seen in lines 10, 11, and 25

No.	Time	Source	Destination	Protocol	Length	Info
7	1.642955	10.0.2.15	192.168.39.23	DNS	80	Standard query 0xa4dd A fonts.googleapis.com
10	1.708062	10.0.2.15	192.168.39.23	DNS	83	Standard query 0x6a72 A router16.teamviewer.com
11	1.708333	10.0.2.15	192.168.39.23	DNS	83	Standard query 0xbf78 AAAA router16.teamviewer.com
12	1.719517	192.168.39.23	10.0.2.15	DNS	96	Standard query response 0xa4dd A fonts.googleapis.com A 142.250.66.10
25	1.912926	192.168.39.23	10.0.2.15	DNS	194	Standard query response 0x6a72 A router16.teamviewer.com CNAME routerpool16.rlb.teamviewer.com A 188.172.203.36
28	2.157112	192.168.39.23	10.0.2.15	DNS	254	Standard query response 0xbf78 AAAA router16.teamviewer.com CNAME routerpool16.rlb.teamviewer.com AAAA 2600:1900
121	10.439355	10.0.2.15	192.168.39.23	DNS	78	Standard query 0x9193 A web.teamviewer.com
140	10.554574	192.168.39.23	10.0.2.15	DNS	235	Standard query response 0x9193 A web.teamviewer.com CNAME tvweb-production-geodistribution.trafficmanager.net CN
141	10.555534	10.0.2.15	192.168.39.23	DNS	125	Standard query 0x5810 AAAA teamviewer-web-productionwe-ingress.westeurope.cloudapp.azure.com
142	10.560078	10.0.2.15	192.168.39.23	DNS	89	Standard query 0x27b7 AAAA connectivity-check.ubuntu.com
143	10.564825	192.168.39.23	10.0.2.15	DNS	425	Standard query response 0x27b7 AAAA connectivity-check.ubuntu.com AAAA 2620:2d:4002:1:198 AAAA 2620:2d:4002:1:
144	10.619157	192.168.39.23	10.0.2.15	DNS	153	Standard query response 0x5810 AAAA teamviewer-web-productionwe-ingress.westeurope.cloudapp.azure.com AAAA 64:ff
528	17.968878	10.0.2.15	192.168.39.23	DNS	77	Standard query 0x10fe AAAA fonts.gstatic.com
530	17.981867	192.168.39.23	10.0.2.15	DNS	105	Standard query response 0x10fe AAAA fonts.gstatic.com AAAA 2404:6800:4002:817::2003

Frame 10: 83 bytes on wire (664 bits), 83 bytes captured (664 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15 (10.0.2.15), Dst: 192.168.39.23 (192.168.39.23)
User Datagram Protocol, Src Port: 49072, Dst Port: 53
Domain Name System (query)

TCP: Src IP and Dest IP can be seen in lines 5 and 6

5	1.642542	217.146.12.133	10.0.2.15	TCP	60	443 → 34278 [ACK] Seq=1 Ack=31 Win=65535 Len=0
6	1.642558	52.233.254.206	10.0.2.15	TCP	60	443 → 52040 [ACK] Seq=1 Ack=43 Win=65535 Len=0
8	1.661583	10.0.2.15	52.233.254.206	TLSv1.2	280	Application Data
9	1.662783	52.233.254.206	10.0.2.15	TCP	60	443 → 52040 [ACK] Seq=1 Ack=269 Win=65535 Len=0
13	1.720115	217.146.12.133	10.0.2.15	TLSv1.2	104	Application Data, Application Data
14	1.720195	10.0.2.15	217.146.12.133	TCP	54	34278 → 443 [ACK] Seq=31 Ack=51 Win=65535 Len=0
15	1.720661	10.0.2.15	217.146.12.133	TLSv1.2	78	Application Data
16	1.720695	10.0.2.15	217.146.12.133	TCP	54	34278 → 443 [FIN, ACK] Seq=55 Ack=51 Win=65535 Len=0
17	1.721507	217.146.12.133	10.0.2.15	TCP	60	443 → 34278 [ACK] Seq=51 Ack=55 Win=65535 Len=0
18	1.721520	217.146.12.133	10.0.2.15	TCP	60	443 → 34278 [ACK] Seq=51 Ack=56 Win=65535 Len=0
19	1.855978	217.146.12.133	10.0.2.15	TCP	60	443 → 34278 [FIN, ACK] Seq=51 Ack=56 Win=65535 Len=0
20	1.856013	10.0.2.15	217.146.12.133	TCP	54	34278 → 443 [ACK] Seq=56 Ack=52 Win=17848 Len=0

Frame 5: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: 217.146.12.133, Dst: 10.0.2.15
Transmission Control Protocol, Src Port: 443, Dst Port: 34278, Seq: 1, Ack: 31, Len: 0
Source Port: 443
Destination Port: 34278
[Stream index: 0]
[Conversation completeness: Incomplete (28)]
[TCP Segment Len: 0]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 1531868169
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 31 (relative ack number)
Acknowledgment number (raw): 2815858861
0101 = Header Length: 20 bytes (5)

TLS: Src IP and Dest IP can be seen in lines 4, 8, 23 and 26

No.	Time	Source	Destination	Protocol	Length	Info
3	1.641985	10.0.2.15	217.146.12.133	TLSv1.2	84	Application Data
4	1.642104	10.0.2.15	52.233.254.206	TLSv1.2	96	Application Data
8	1.661583	10.0.2.15	52.233.254.206	TLSv1.2	280	Application Data
13	1.720115	217.146.12.133	10.0.2.15	TLSv1.2	104	Application Data, Application Data
15	1.720661	10.0.2.15	217.146.12.133	TLSv1.2	78	Application Data
21	1.883726	52.233.254.206	10.0.2.15	TLSv1.2	1530	Application Data
23	1.901330	10.0.2.15	52.233.254.206	TLSv1.2	342	Application Data
26	1.917932	10.0.2.15	52.233.254.206	TLSv1.2	96	Application Data
29	5.701593	195.201.58.253	10.0.2.15	TLSv1.2	211	Application Data
30	5.709737	10.0.2.15	195.201.58.253	TLSv1.2	242	Application Data
31	5.709875	10.0.2.15	195.201.58.253	TLSv1.2	1260	Application Data, Application Data
34	7.691027	10.0.2.15	52.233.254.206	TLSv1.2	1162	Application Data
36	7.708292	10.0.2.15	52.233.254.206	TLSv1.2	173	Application Data
38	7.709645	10.0.2.15	52.233.254.206	TLSv1.2	177	Application Data

Frame 4: 96 bytes on wire (768 bits), 96 bytes captured (768 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 52.233.254.206
Transmission Control Protocol, Src Port: 52040, Dst Port: 443, Seq: 1, Ack: 1, Len: 42
Source Port: 52040
Destination Port: 443
[Stream index: 1]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 42]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 3298389849
[Next Sequence Number: 43 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
Acknowledgment number (raw): 1553754503
0101 = Header Length: 20 bytes (5)

9. ONLINE GAME

DNS: Src IP and Dest IP can be seen

76	4.379450	10.0.2.15	192.168.39.23	DNS	73	Standard query 0xaa76 A www.chess.com
91	5.021585	192.168.39.23	10.0.2.15	DNS	153	Standard query response 0xaa76 A www.chess.com A 104.18.139.67 A 104.18.140.67 A 104.18.137.67 A 104.18.138.67 A 104.18.139.67
111	5.312705	10.0.2.15	192.168.39.23	DNS	87	Standard query 0xd223 A client-metrics-cf.chess.com
112	5.313126	10.0.2.15	192.168.39.23	DNS	87	Standard query 0xc428 AAAA client-metrics-cf.chess.com
129	5.977364	192.168.39.23	10.0.2.15	DNS	167	Standard query response 0xd223 A client-metrics-cf.chess.com A 104.18.138.67 A 104.18.137.67 A 104.18.139.67 A 104.18.138.67
130	5.981613	192.168.39.23	10.0.2.15	DNS	227	Standard query response 0xc428 AAAA client-metrics-cf.chess.com AAAA 64:ff9b::6812:8943 AAAA 64:ff9b::6812:8a43 AAAA 64:ff9b::6812:8a43
273	11.138925	10.0.2.15	192.168.39.23	DNS	84	Standard query 0x8d8c A images.chesscomfiles.com
274	11.139269	10.0.2.15	192.168.39.23	DNS	84	Standard query 0x1066 AAAA images.chesscomfiles.com
293	11.807238	192.168.39.23	10.0.2.15	DNS	197	Standard query response 0x1066 AAAA images.chesscomfiles.com CNAME images.chesscomfiles.com.cdn.cloudflare.net AAAA images.chesscomfiles.com.cdn.cloudflare.net A 104.18.139.67
294	11.807282	192.168.39.23	10.0.2.15	DNS	173	Standard query response 0x8d8c A images.chesscomfiles.com CNAME images.chesscomfiles.com.cdn.cloudflare.net A 104.18.139.67

Frame 76: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15 (10.0.2.15), Dst: 192.168.39.23 (192.168.39.23)
User Datagram Protocol, Src Port: 49091, Dst Port: 53
Domain Name System (query)

TCP: Src IP and Dest IP can be seen

295	11.809050	10.0.2.15	104.17.126.52	TCP	74	49206 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=154691537 TSecr=0 WS=128
296	11.809306	10.0.2.15	104.17.126.52	TCP	74	49210 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=154691537 TSecr=0 WS=128
297	11.809634	10.0.2.15	104.17.126.52	TCP	74	49222 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=154691537 TSecr=0 WS=128
298	11.809729	10.0.2.15	104.17.126.52	TCP	74	49230 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=154691537 TSecr=0 WS=128
299	11.850226	104.17.126.52	10.0.2.15	TCP	60	443 → 49206 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
300	11.850273	10.0.2.15	104.17.126.52	TCP	54	49206 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
301	11.852720	104.17.126.52	10.0.2.15	TCP	60	443 → 49230 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
302	11.852745	10.0.2.15	104.17.126.52	TCP	54	49230 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
303	11.853804	10.0.2.15	104.17.126.52	TLSv1.3	571	Client Hello (SNI=images.chesscomfiles.com)
304	11.855585	104.17.126.52	10.0.2.15	TCP	60	443 → 49210 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460
305	11.855609	10.0.2.15	104.17.126.52	TCP	54	49210 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
306	11.856227	104.17.126.52	10.0.2.15	TCP	60	443 → 49206 [ACK] Seq=1 Ack=518 Win=65535 Len=0
307	11.858783	10.0.2.15	104.17.126.52	TLSv1.3	571	Client Hello (SNI=images.chesscomfiles.com)

Frame 295: 74 bytes on wire (592 bits), 74 bytes captured (592 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 104.17.126.52
Transmission Control Protocol, Src Port: 49206, Dst Port: 443, Seq: 0, Len: 0
Source Port: 49206
Destination Port: 443
[Stream index: 20]
[Conversation completeness: Incomplete, DATA (15)]
[TCP Segment Len: 0]
Sequence Number: 0 (relative sequence number)
Sequence Number (raw): 3499305236
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 0
Acknowledgment number (raw): 0

TLS: Src IP and Dest IP can be seen in lines 303, 307 and 309

303	11.853804	10.0.2.15	104.17.126.52	TLSv1.3	571	Client Hello (SNI=images.chesscomfiles.com)
307	11.858783	10.0.2.15	104.17.126.52	TLSv1.3	571	Client Hello (SNI=images.chesscomfiles.com)
309	11.862317	104.18.139.67	10.0.2.15	TLSv1.2	1745	Application Data
311	11.862755	10.0.2.15	104.17.126.52	TLSv1.3	571	Client Hello (SNI=images.chesscomfiles.com)
321	11.883496	104.18.139.67	10.0.2.15	TLSv1.2	5254	Application Data, Application Data, Application Data, Application Data
331	11.892241	10.0.2.15	104.17.126.52	TLSv1.3	571	Client Hello (SNI=images.chesscomfiles.com)
335	11.908880	104.18.139.67	10.0.2.15	TLSv1.2	2135	Application Data, Application Data, Application Data
337	12.108135	104.18.139.67	10.0.2.15	TLSv1.2	1730	Application Data
341	12.142190	104.18.139.67	10.0.2.15	TLSv1.2	15654	Application Data
345	12.212933	104.18.139.67	10.0.2.15	TLSv1.2	54074	Application Data, Application Data, Application Data, Application Data, Application Data
349	12.215236	104.18.139.67	10.0.2.15	TLSv1.2	33634	Application Data, Application Data, Application Data
351	12.215396	104.18.139.67	10.0.2.15	TLSv1.2	10274	Application Data, Application Data

Frame 303: 571 bytes on wire (4568 bits), 571 bytes captured (4568 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 104.17.126.52
Transmission Control Protocol, Src Port: 49206, Dst Port: 443, Seq: 1, Ack: 1, Len: 517
Source Port: 49206
Destination Port: 443
[Stream index: 20]
[Conversation completeness: Incomplete, DATA (15)]
[TCP Segment Len: 517]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 3499305237
[Next Sequence Number: 518 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
Acknowledgment number (raw): 1579072002
0101 ... = Header Length: 20 bytes (5)

QUIC: Src IP and Dest IP can be seen in lines 684, 865 and 866

684	13.415075	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 0, CRYPTO
865	13.715136	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 1, CRYPTO
866	13.715410	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 2, PING, PADDING
964	14.316332	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 3, CRYPTO
965	14.316397	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 4, PING, PADDING
989	15.517460	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 5, CRYPTO
990	15.517518	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 6, PING, PADDING
996	16.308407	10.0.2.15	104.18.138.67	QUIC	1399 Initial, DCID=c933db54dcb658e5b3, SCID=1f7579, PKN: 9, CRYPTO
997	16.308615	10.0.2.15	104.18.138.67	QUIC	1399 Initial, DCID=c933db54dcb658e5b3, SCID=1f7579, PKN: 10, PING, PADDING
1002	17.924278	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 7, CRYPTO
1003	17.924401	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 8, PING, PADDING
1162	22.725201	10.0.2.15	104.17.126.52	QUIC	1399 Initial, DCID=b0fdecfef8a4044b6586bcf5919c, SCID=01ec67, PKN: 9, CRYPTO

Frame 288: 1399 bytes on wire (11192 bits), 1399 bytes captured (11192 bits)

Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

Internet Protocol Version 4, Src: 10.0.2.15, Dst: 104.18.138.67

User Datagram Protocol, Src Port: 55383, Dst Port: 443

QUIC IETF

QUIC IETF

10. DROPBOX

DNS : Src IP and Dst IP can be seen

24	5.219416	10.0.2.15	192.168.248.91	DNS	81	Standard query 0x3737 A cfl.dropboxstatic.com
26	5.219564	10.0.2.15	192.168.248.91	DNS	81	Standard query 0x4f09 AAAA cfl.dropboxstatic.com
35	5.304887	192.168.248.91	10.0.2.15	DNS	167	Standard query response 0x3737 A cfl.dropboxstatic.com CNAME cfl.dropboxstatic.com.cdn.cloudflare.net A 162.125.81.18
38	5.315873	192.168.248.91	10.0.2.15	DNS	163	Standard query response 0x4f09 AAAA cfl.dropboxstatic.com CNAME cfl.dropboxstatic.com.cdn.cloudflare.net A 162.125.81.18
78	6.283086	10.0.2.15	192.168.248.91	DNS	75	Standard query 0x32a7 A www.dropbox.com
79	6.283197	10.0.2.15	192.168.248.91	DNS	75	Standard query 0x47a1 AAAA www.dropbox.com
85	6.355183	192.168.248.91	10.0.2.15	DNS	137	Standard query response 0x47a1 AAAA www.dropbox.com CNAME www-env.dropbox-dns.com AAAA 2620:100:6031:18::1
86	6.355211	192.168.248.91	10.0.2.15	DNS	125	Standard query response 0x32a7 A www.dropbox.com CNAME www-env.dropbox-dns.com A 162.125.81.18
1478	24.496067	10.0.2.15	192.168.248.91	DNS	94	Standard query response 0x4721 A bolt.v.dropbox.com A 162.125.40.1
1477	24.536237	192.168.248.91	10.0.2.15	DNS	89	Standard query 0x084a AAAA connectivity-check.ubuntu.com
1674	28.364647	10.0.2.15	192.168.248.91	DNS	425	Standard query response 0x084a AAAA connectivity-check.ubuntu.com AAAA 2620:2d:4000:1::2a AAAA 2001:67c:15::2a
1675	28.384225	192.168.248.91	10.0.2.15	DNS	76	Standard query 0x39f2 A bolt.dropbox.com
1992	33.058942	10.0.2.15	192.168.248.91	DNS	76	Standard query 0x3c92 AAAA bolt.dropbox.com
1994	33.059083	10.0.2.15	192.168.248.91	DNS	113	Standard query response 0x39f2 A bolt.dropbox.com CNAME bolt.v.dropbox.com A 162.125.40.1
1998	33.086970	192.168.248.91	10.0.2.15	DNS	125	Standard query response 0x3c92 AAAA bolt.dropbox.com CNAME bolt.v.dropbox.com AAAA 64:ff9b::a27d:2801
2001	33.131315	192.168.248.91	10.0.2.15	DNS	78	Standard query 0x6ed3 A bolt.v.dropbox.com
3692	83.785308	10.0.2.15	192.168.248.91	DNS	78	Standard query 0x6ed3 A bolt.v.dropbox.com
3704	88.788067	10.0.2.15	192.168.248.91	DNS	78	Standard query 0x6ed3 A bolt.v.dropbox.com

Frame 24: 81 bytes on wire (648 bits), 81 bytes captured (648 bits)
Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 192.168.248.91
User Datagram Protocol, Src Port: 57604, Dst Port: 53
Domain Name System (query)

TCP : Src IP and Dst IP can be seen

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.2.15	a184-84-221-7...	TCP	54	44502 → 80 [ACK] Seq=1 Ack=1 Win=63350 Len=0
2	0.000281	a184-84-221-7...	10.0.2.15	TCP	60	[TCP ACKed unseen segment] 80 → 44502 [ACK] Seq=1 Ack=2 Win=65535 Len=0
3	0.634768	bolt.v.dropbo...	10.0.2.15	TLSv1.2	168	Application Data
4	0.637833	10.0.2.15	bolt.v.dropbo...	TLSv1.2	195	Application Data
5	0.637875	10.0.2.15	bolt.v.dropbo...	TLSv1.2	946	Application Data
6	0.638118	bolt.v.dropbo...	10.0.2.15	TCP	60	443 → 53258 [ACK] Seq=115 Ack=142 Win=65535 Len=0
7	0.638125	bolt.v.dropbo...	10.0.2.15	TCP	60	443 → 53258 [ACK] Seq=115 Ack=1034 Win=65535 Len=0
8	2.371020	10.0.2.15	www-env.dropb...	TLSv1.2	2586	Application Data
9	2.371144	10.0.2.15	www-env.dropb...	TLSv1.2	561	Application Data
10	2.371521	www-env.dropb...	10.0.2.15	TCP	60	443 → 50714 [ACK] Seq=1 Ack=1461 Win=65535 Len=0
11	2.371532	www-env.dropb...	10.0.2.15	TCP	60	443 → 50714 [ACK] Seq=1 Ack=2533 Win=65535 Len=0
12	2.371986	www-env.dropb...	10.0.2.15	TCP	60	443 → 50714 [ACK] Seq=1 Ack=3040 Win=65535 Len=0
13	2.761908	www-env.dropb...	10.0.2.15	TLSv1.2	204	Application Data
14	2.761933	10.0.2.15	www-env.dropb...	TCP	54	50714 → 443 [ACK] Seq=3040 Ack=151 Win=65535 Len=0
15	3.840108	10.0.2.15	152.195.38.76	TCP	54	44270 → 80 [ACK] Seq=1 Ack=1 Win=63503 Len=0
16	3.840138	10.0.2.15	a184-84-221-7...	TCP	54	47900 → 80 [ACK] Seq=1 Ack=1 Win=64008 Len=0
17	3.840453	152.195.38.76	10.0.2.15	TCP	60	[TCP ACKed unseen segment] 80 → 44270 [ACK] Seq=1 Ack=2 Win=65535 Len=0
18	3.840464	a184-84-221-7...	10.0.2.15	TCP	60	[TCP ACKed unseen segment] 80 → 47900 [ACK] Seq=1 Ack=2 Win=65535 Len=0

Frame 23: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)
Ethernet II, Src: 52:54:00:12:35:02 (52:54:00:12:35:02), Dst: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12)
Internet Protocol Version 4, Src: www-env.dropbox-dns.com (162.125.81.18), Dst: 10.0.2.15 (10.0.2.15)
Transmission Control Protocol, Src Port: 443, Dst Port: 50714, Seq: 151, Ack: 5780, Len: 0
Source Port: 443
Destination Port: 50714
[Stream index: 2]
[Conversation completeness: Incomplete (12)]
[TCP Segment Len: 0]
Sequence Number: 151 (relative sequence number)
Sequence Number (raw): 1602390430
[Next Sequence Number: 151 (relative sequence number)]
Acknowledgment Number: 5780 (relative ack number)
Acknowledgment number (raw): 3871941525

TLS: Src IP and Dest IP can be seen

No.	Time	Source	Destination	Protocol	Length	Info
3	0.634768	162.125.40.1	10.0.2.15	TLSv1.2	168	Application Data
4	0.637833	10.0.2.15	162.125.40.1	TLSv1.2	195	Application Data
5	0.637875	10.0.2.15	162.125.40.1	TLSv1.2	946	Application Data
8	2.371020	10.0.2.15	162.125.81.18	TLSv1.2	2586	Application Data
9	2.371144	10.0.2.15	162.125.81.18	TLSv1.2	561	Application Data
13	2.761908	162.125.81.18	10.0.2.15	TLSv1.2	204	Application Data
19	5.200362	10.0.2.15	162.125.81.18	TLSv1.2	2581	Application Data
20	5.200474	10.0.2.15	162.125.81.18	TLSv1.2	267	Application Data
25	5.219497	10.0.2.15	104.16.100.29	TLSv1.2	181	Application Data
27	5.219669	10.0.2.15	104.16.100.29	TLSv1.2	193	Application Data
30	5.224476	10.0.2.15	162.125.81.18	TLSv1.2	2586	Application Data
31	5.224574	10.0.2.15	162.125.81.18	TLSv1.2	738	Application Data
36	5.315533	104.16.100.29	10.0.2.15	TLSv1.2	1500	Application Data
39	5.336238	104.16.100.29	10.0.2.15	TLSv1.2	595	Application Data
41	5.351229	104.16.100.29	10.0.2.15	TLSv1.2	1387	Application Data, Application Data
45	5.395792	104.16.100.29	10.0.2.15	TLSv1.2	1349	Application Data
47	5.420577	104.16.100.29	10.0.2.15	TLSv1.2	78	Application Data
49	5.451520	10.0.2.15	104.16.100.29	TLSv1.2	170	Application Data

▶ Frame 20: 267 bytes on wire (2136 bits), 267 bytes captured (2136 bits)

▶ Ethernet II, Src: PCSSystemtec_d9:0c:12 (08:00:27:d9:0c:12), Dst: 52:54:00:12:35:02 (52:54:00:12:35:02)

▶ Internet Protocol Version 4, Src: 10.0.2.15, Dst: 162.125.81.18

▼ Transmission Control Protocol, Src Port: 50714, Dst Port: 443, Seq: 5567, Ack: 151, Len: 213

Source Port: 50714

Destination Port: 443

[Stream index: 2]

▶ [Conversation completeness: Incomplete (12)]

[TCP Segment Len: 213]

Sequence Number: 5567 (relative sequence number)

Sequence Number (raw): 3871941312

[Next Sequence Number: 5780 (relative sequence number)]

Acknowledgment Number: 151 (relative ack number)

Acknowledgment number (raw): 1602390430

Question 3.

Handshaking: Every connection begins with a “client hello” where the client gives possible cypher suits from which the server selects one that is available to it and sends in a reply in “server hello”. After that, session keys are transferred, and data transfer starts.

Video Pause and Play:

During the play of the video, the application's data continues to flow, and handshaking packets keep coming.

Video Upload and Download:

For Upload and Download, packets per second increase as soon as video is set up for upload or download as there is a huge amount of data transfer.

Question 4.

1. DNS:

DNS (Domain Name System) is vital for almost all applications, especially in streaming services, as they need to lookup their servers to serve the content to the user:

1. Domain Resolution: Translates user-friendly domains (e.g., "zoom.us or youtube.com") to IP addresses, enabling server connections.
2. Content Delivery Optimization: Directs users to the nearest CDN nodes to reduce latency in video streaming.
3. Load Balancing: Distributes user requests across multiple servers for efficient traffic management, enhancing performance during high-load events.
4. Dynamic DNS: Facilitates connections for TeamViewer, allowing users to access devices with changing IP addresses seamlessly.

2. HTTP:

HTTP is essential for data delivery platforms like YouTube and Twitch, for video delivery and user interactions.

1. Video Streaming: Users send HTTP requests for videos, and servers respond with video data in smaller packets.
2. Metadata Transfer: HTTP transmits metadata to enhance user engagement.
3. Content Delivery: YouTube utilises a CDN, leveraging HTTP to route requests to the nearest server, reducing latency and optimising load times.
4. Real-time Interactions: User interactions during live streams are processed through HTTP requests, ensuring real-time engagement.
5. Twitch: Twitch uses HLS (HTTP Live Streaming), which segments live video into small chunks sent via HTTP, allowing adaptive streaming based on bandwidth.

3. TCP:

TCP is used in applications like Dropbox, NPTEL lectures, and YouTube for the following reasons:

1. Reliable Data Transfer: TCP ensures that all data packets are delivered accurately and in order. It is ideal for applications where data integrity is crucial, like file transfers and video streaming.

2. Error Correction: TCP provides error-checking mechanisms to detect and retransmit lost or corrupted packets, ensuring the content is delivered correctly.
3. Flow Control: TCP manages the flow of data to prevent overwhelming the network or the receiver, providing smooth and consistent data transfer rates.
4. Connection-Oriented Communication: TCP establishes a connection before data is sent, ensuring a stable and secure channel for communication, which is essential for continuous data streams like video lectures and online streaming.

4. UDP:

UDP is used in parts of YouTube downloading for the following reasons:

1. Lower Latency: UDP allows for faster data transmission by avoiding the overhead of connection setup and error correction, which is useful for streaming where real-time playback is prioritized over perfect data accuracy.
2. Efficient Bandwidth Usage: UDP is more efficient for broadcasting or multicasting, making it suitable for delivering video data to multiple users simultaneously without the need for separate connections.
3. Tolerance for Packet Loss: In streaming, occasional packet loss is acceptable as it doesn't significantly affect the user experience, making UDP a suitable choice where speed and efficiency are prioritized over perfect data delivery.
4. Adaptive Streaming: UDP can be combined with protocols like QUIC (which is built on UDP) to enable adaptive streaming, allowing YouTube to adjust video quality in real-time based on network conditions, improving the overall user experience.

5. TLS and SSL:

TLS and SSL are cryptographic protocols designed to provide secure communication over a computer network and are used by almost all applications that need to send cryptographic data rather than plain ASCII text. TLS is the successor to SSL, and they are used for the following purposes:

1. Data Encryption: TLS/SSL encrypts data to protect it from being intercepted by unauthorised parties.
2. Data Integrity: Ensures that data is not altered during transmission, safeguarding against tampering.
3. Authentication: Verifies the identity of the communicating parties using digital certificates.
4. Secure Browsing: Enables secure HTTPS connections for safe online transactions and browsing.

6. QUIC:

QUIC (Quick UDP Internet Connections) is used for:

1. **Reduced Latency:** Provides faster connection establishment than TCP through a zero-round-trip time (0-RTT) handshake.
2. **Stream Multiplexing:** Allows multiple data streams without head-of-line blocking, improving performance for applications like video streaming and gaming.
3. **Built-in Encryption:** Integrates TLS for secure connections, enhancing privacy and security.
4. **Connection Resilience:** Maintains connections even when the network changes, improving reliability in mobile environments.

7. ICMP:

ICMP (Internet Control Message Protocol) is primarily used for network diagnostics and error reporting during YouTube uploads.

1. **Error Reporting:** If there are network issues (e.g., a router on the path is down), ICMP can send error messages back to the user's device, allowing the system to respond appropriately, such as by retrying the upload.
2. **Packet Handling:** During the upload process, ICMP helps manage how data packets are handled by the network, ensuring that they reach the YouTube servers efficiently, even if there is network congestion or route changes.
3. **Connectivity Verification:** ICMP can be used to verify connectivity and determine the best routes to the YouTube servers, ensuring that the upload process is as fast and reliable as possible.

Question 5.

1. Zoom:

<u>Measurement</u>	<u>Captured</u>
Packets	10286
Time span, s	53.848
Average pps	191.0
Average packet size, B	2730
Bytes	28078472
Average bytes/s	521 k
Average bits/s	4171 k

2. Live Sports:

<u>Measurement</u>	<u>Captured</u>
Packets	554
Time span, s	16.925
Average pps	32.7
Average packet size, B	1813
Bytes	1004472
Average bytes/s	59 k
Average bits/s	474 k

3. YouTube Uploading:

<u>Measurement</u>	<u>Captured</u>
Packets	33146
Time span, s	213.912
Average pps	155.0
Average packet size, B	1230
Bytes	40757918
Average bytes/s	190 k
Average bits/s	1524 k

4. YouTube Downloading and Buffering:

<u>Measurement</u>	<u>Captured</u>
Packets	68446
Time span, s	43.247
Average pps	1582.7
Average packet size, B	948
Bytes	64889890
Average bytes/s	1500 k
Average bits/s	12 M

5. NPTEL Video Lectures:

<u>Measurement</u>	<u>Captured</u>
Packets	18357
Time span, s	76.556
Average pps	239.8
Average packet size, B	2618
Bytes	48057665
Average bytes/s	627 k
Average bits/s	5021 k

6. Twitch:

<u>Measurement</u>	<u>Captured</u>
Packets	9065
Time span, s	76.774
Average pps	118.1
Average packet size, B	997
Bytes	9035815
Average bytes/s	117 k
Average bits/s	941 k

7. MS Teams:

<u>Measurement</u>	<u>Captured</u>
Packets	3329
Time span, s	76.307
Average pps	43.6
Average packet size, B	1207
Bytes	4017753
Average bytes/s	52 k
Average bits/s	421 k

8. P2P Connectivity(Team Viewer):

<u>Measurement</u>	<u>Captured</u>
Packets	2446
Time span, s	71.678
Average pps	34.1
Average packet size, B	3377
Bytes	8260009
Average bytes/s	115 k
Average bits/s	921 k

9. Online Game:

<u>Measurement</u>	<u>Captured</u>
Packets	2469
Time span, s	71.100
Average pps	34.7
Average packet size, B	3933
Bytes	9710790
Average bytes/s	136 k
Average bits/s	1092 k

10. Dropbox:

<u>Measurement</u>	<u>Captured</u>
Packets	4300
Time span, s	114.239
Average pps	37.6
Average packet size, B	1021
Bytes	4392090
Average bytes/s	38 k
Average bits/s	307 k