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# **NETWORK SECURITY EXPERIMENT REPORT**

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## **Course Title and Number:**

**Computer Networks**

## **Project Title:**

**Packet Analysis of Facebook and YouTube Traffic**

**Virtual private network (VPN) For Remote Access**

## **Group Members:**

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## **Submission Deadline:**

**07 January 2023.**

# **WIRESHARK REPORT**

## **WIRESHARK:**

Wireshark is a network protocol analyzer that allows you to capture and inspect the data traveling back and forth on a computer network in real-time. It is an open-source tool commonly used for network troubleshooting, analysis, software development, and education. Wireshark supports a wide range of network protocols and can display the captured data in a detailed and readable format.

Usage:

1. **Network Troubleshooting:** Wireshark is often used to identify and troubleshoot network issues by analyzing the packets exchanged between devices.
2. **Security Analysis:** Security professionals use Wireshark to detect and analyze malicious activities on a network, such as unauthorized access or suspicious traffic patterns.
3. **Protocol Development:** Developers use Wireshark to understand and debug the communication between different devices or software components by examining the protocol messages.
4. **Educational Purposes:** Wireshark is commonly used in networking courses and training programs to teach students about network protocols, packet analysis, and network security.

**5. Performance Optimization:** It helps in optimizing network performance by identifying bottlenecks, latency issues, or inefficient data transfers.

## Experiment Location:

Conducted at: Home

Type of Computer:

Hardware: AMD A8-4500M APU with Radeon(tm) HD Graphics (with SSE4.2)

OS: 64-bit Windows 10 (22H2), build 19045

Application: Dump cap (Wireshark) 4.2.0 (v4.2.0-0-g54eedfc63953)

## CAPTURE FILE PROPERTIES:

Name: C:\Users\MFC~1\AppData\Local\Temp\wireshark\_Wi-FiT67TG2.pcapng

Length: 18 MB

Hash cace611c5799d14cbb473a84647362a02a8dfe4a4ee6027510acc3d2  
(SHA256): 54daa2b1

Hash 34e16cabb90969af3a98f59b12efacb05e926c04  
(SHA1):

Format: Wireshark/... - pcapng

Encapsulation: Ethernet

## Time

First packet: 2024-01-07 15:49:33

Last packet: 2024-01-07 16:23:33

Elapsed: 00:34:00

Capture

Hardware: AMD A8-4500M APU with Radeon(tm) HD Graphics (with SSE4.2)

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Interfaces

<u>Interface</u>	<u>Dropped packets</u>	<u>Capture filter</u>	<u>Link type</u>	<u>Packet size limit (snaplen)</u>
Wi-Fi	0 (0.0%)	none	Ethernet	262144 bytes

Statistics

<u>Measurement</u>	<u>Captured</u>	<u>Displayed</u>	<u>Marked</u>
Packets	28321	28321 (100.0%)	—
Time span, s	2040.020	2040.020	—
Average pps	13.9	13.9	—
Average packet size, B	634	634	—
Bytes	17946836	17946836 (100.0%)	0

Average bytes/s	8797	8797	—
Average bits/s	70 k	70 k	—

Conversation:

The overall packet send and receive across the networks:

Ethernet · 17   IPv4 · 75   IPv6 · 7   TCP · 151   UDP · 390													
Address A	Port A	Address B	Port B	Packets	Bytes	Stream ID	Packets A → B	Bytes A → B	Packets B → A	Bytes B → A	Rel Start	Duration	Bits/s
192.168.181.113	51724	157.240.227.21	443	608	270 kB	1	298	249 kB	310	21 kB	0.088081	97.3997	20
192.168.181.113	51732	157.240.227.56	443	111	100 kB	2	36	2 kB	75	98 kB	0.252091	65.1703	251
192.168.181.113	51735	157.240.227.1	443	408	204 kB	3	159	15 kB	249	188 kB	1.020435	99.5675	1230
192.168.181.113	51697	51.89.98.179	443	40	2 kB	4	22	1 kB	18	1 kB	1.219286	98.0634	97
192.168.181.113	51722	157.240.227.1	443	31	2 kB	5	18	1 kB	13	898 bytes	5.283998	95.6346	111
192.168.181.113	51723	157.240.227.1	443	42	4 kB	6	23	2 kB	19	2 kB	5.790833	94.1339	134
192.168.181.113	51728	157.240.227.21	443	47	7 kB	7	25	5 kB	22	1 kB	8.255262	91.9214	445
20.192.44.78	443	192.168.181.113	50608	1	290 bytes	8	1	290 bytes	0	0 bytes	13.034955	0.0000	
192.168.181.113	51731	20.192.44.78	443	32	2 kB	9	19	2 kB	13	872 bytes	13.498653	84.8142	146
192.168.181.113	51707	173.194.76.188	5228	7	404 bytes	10	4	218 bytes	3	186 bytes	18.909408	60.3714	28
192.168.181.113	51713	157.240.227.1	443	5	271 bytes	11	3	163 bytes	2	108 bytes	21.111483	15.2103	85
192.168.181.113	51716	34.159.167.110	443	10	640 bytes	12	5	295 bytes	5	345 bytes	27.784035	30.1728	78
20.198.118.190	443	192.168.181.113	51700	3	673 bytes	13	2	486 bytes	1	187 bytes	28.075202	0.1437	27
192.168.181.113	51718	111.119.184.209	443	7	380 bytes	14	4	218 bytes	3	162 bytes	28.304989	48.7395	35
192.168.181.113	51736	157.240.227.61	443	61	12 kB	15	27	2 kB	34	10 kB	28.423005	4.0036	4485
192.168.181.113	51719	121.91.41.83	443	7	380 bytes	16	4	218 bytes	3	162 bytes	28.888005	48.1572	36
192.168.181.113	51720	121.91.40.83	443	7	380 bytes	17	4	218 bytes	3	162 bytes	29.157989	47.8872	36
192.168.181.113	51740	157.240.227.60	443	131	71 kB	18	69	5 kB	62	66 kB	33.524863	1028.9215	36
192.168.181.113	51739	163.70.137.60	443	32	6 kB	19	20	2 kB	12	4 kB	33.524863	1042.8886	13
192.168.181.113	51741	157.240.227.60	443	30	6 kB	20	18	2 kB	12	4 kB	33.525438	1037.2727	12
192.168.181.113	51742	163.70.132.60	443	32	6 kB	21	20	2 kB	12	4 kB	33.525548	1046.4446	13
192.168.181.113	51743	121.91.41.99	443	28	6 kB	22	18	1 kB	10	4 kB	33.526014	1029.7010	11
192.168.181.113	51744	111.119.184.224	443	47	8 kB	23	26	2 kB	21	5 kB	33.526182	1029.9067	17
192.168.181.113	51745	157.240.227.60	443	28	5 kB	24	19	2 kB	9	4 kB	33.526353	1034.9097	11
192.168.181.113	51746	121.91.41.99	443	47	8 kB	25	26	2 kB	21	5 kB	33.526607	1029.8896	17
192.168.181.113	51747	121.91.40.99	443	29	6 kB	26	19	2 kB	10	4 kB	33.526853	1029.4525	11
192.168.181.113	51748	111.119.184.224	443	28	6 kB	27	18	1 kB	10	4 kB	33.527173	1029.7172	11
192.168.181.113	51749	121.91.41.99	443	29	6 kB	28	19	2 kB	10	4 kB	33.527535	1029.7169	11
192.168.181.113	51750	121.91.40.99	443	42	7 kB	29	23	2 kB	19	5 kB	33.527989	1024.6408	16
192.168.181.113	51751	111.119.184.224	443	29	6 kB	30	19	2 kB	10	4 kB	33.528381	1029.8877	11
192.168.181.113	51752	121.91.41.99	443	30	6 kB	31	19	2 kB	11	4 kB	33.528715	1024.6402	11
192.168.181.113	51753	121.91.40.99	443	30	6 kB	32	19	2 kB	11	4 kB	33.529749	1031.7567	11
192.168.181.113	51754	111.119.184.224	443	30	6 kB	33	20	2 kB	10	4 kB	33.529934	1029.4495	12
192.168.181.113	51755	121.91.40.99	443	28	6 kB	34	18	1 kB	10	4 kB	33.530101	1028.3380	11
192.168.181.113	51756	157.240.227.61	5222	30	3 kB	35	13	1 kB	17	2 kB	33.597778	15.0434	608
192.168.181.113	51717	157.240.227.13	443	9	526 bytes	36	5	271 bytes	4	255 bytes	37.536979	21.3089	101
192.168.181.113	51726	20.212.88.117	443	12	855 bytes	37	10	723 bytes	2	132 bytes	40.740910	92.1950	62

WIRESHARK FILTERS:

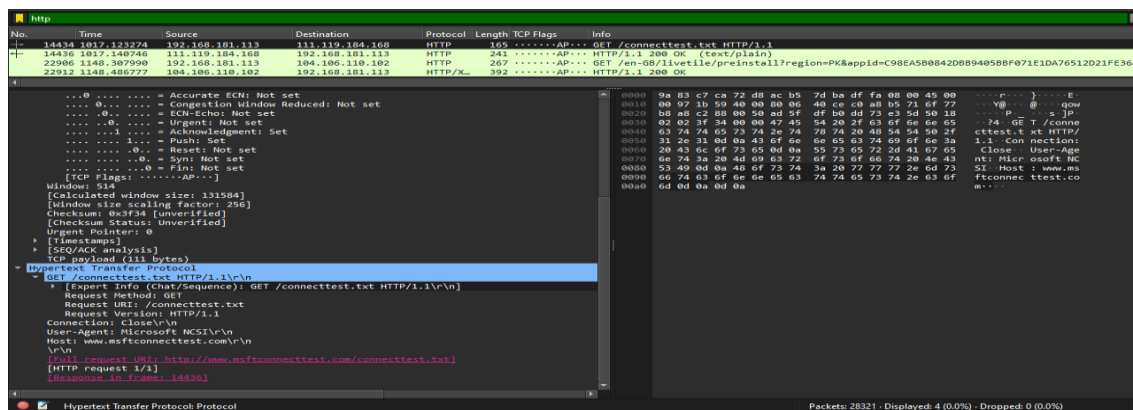
FACEBOOK:

HTTP PACKETS:

Total displayed = 4 Packets

Filter: http

The filter **http** is applied to display HTTP packets, revealing a total of 4 packets in the captured network traffic



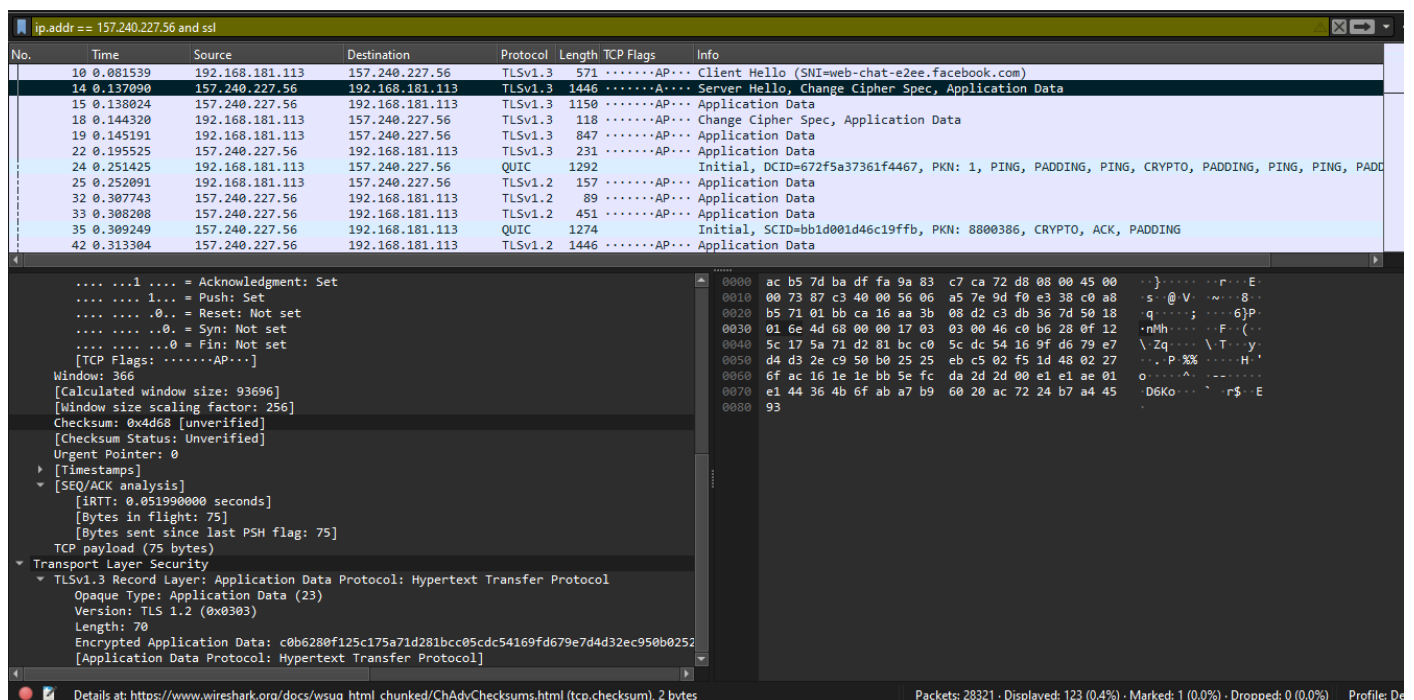
## SSL PACKETS:

The filter **ip.addr == 157.240.227.56 and ssl** is used to capture SSL packets associated with the IP address **157.240.227.56**. In the captured data, 123 bytes are displayed, constituting **0.4%** of the total traffic.

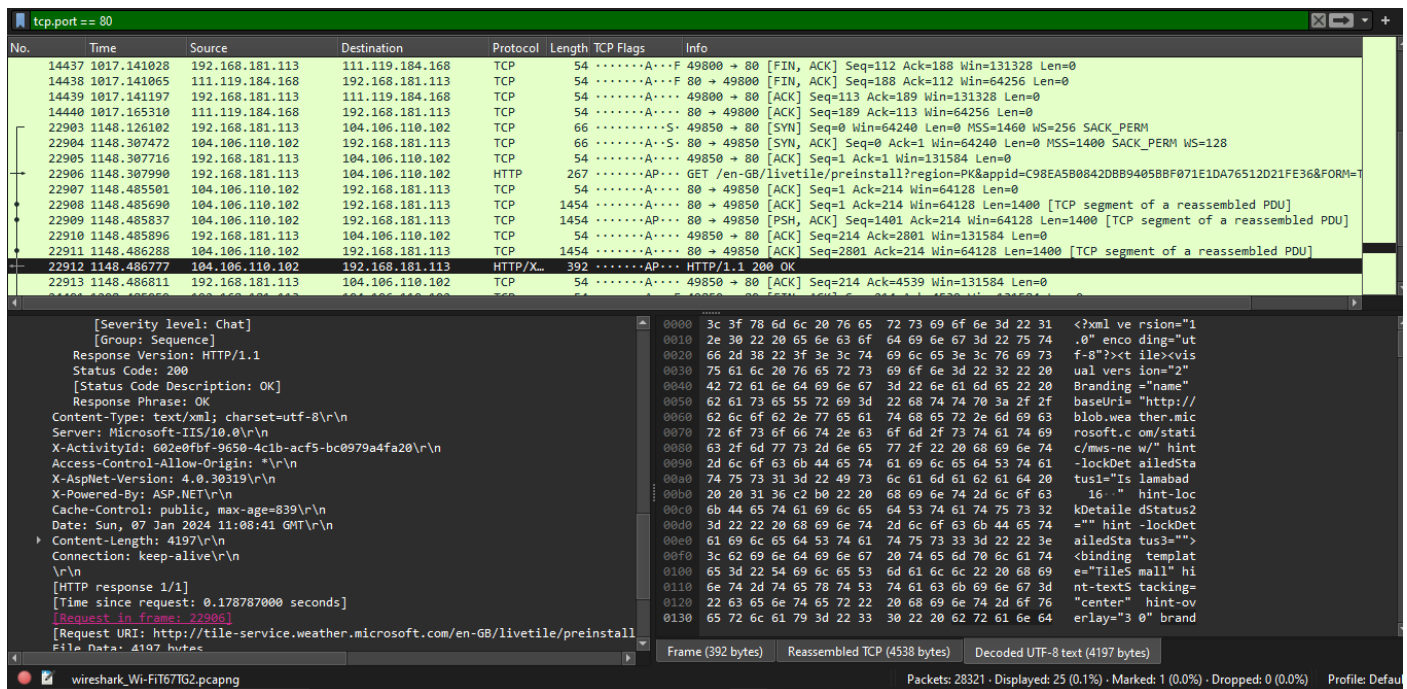
ip.addr == 157.240.227.56 and ssl

Displayed: 123 bytes

Fraction: 0.4%



Then use display filters to separate the subset of TCP packets that are also HTTP packets.

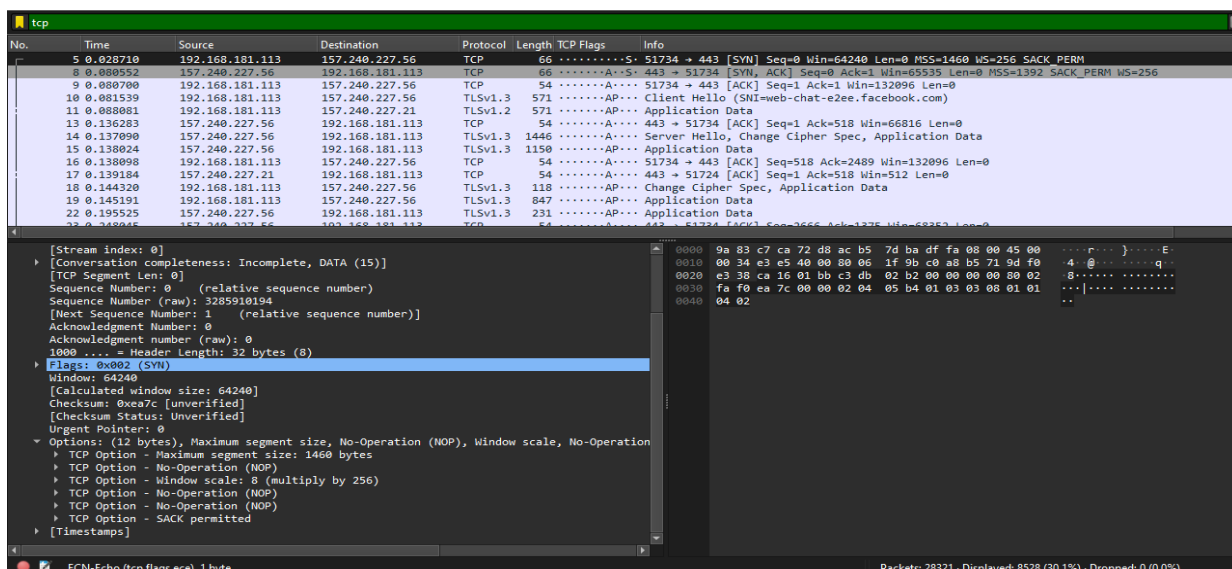


Displayed: 25 bytes

Fraction: 0.1%

## TCP to/from Facebook:

The filter `tcp` is applied to capture TCP packets to and from the IP address 157.240.227.56. In total, 8528 packets matching this filter are displayed in the captured network traffic.



## Filter from src to destination:

### FROM MY PC TO FACEBOOK:

The filter `tcp and ip.src == 192.168.181.113 && ip.dst == 157.240.227.56` is applied to capture TCP packets sent from your computer (source IP: 192.168.181.113) to Facebook (destination IP: 157.240.227.56). A total of 148 packets matching this filter are displayed, constituting 0.5% of the total traffic.

**tcp and ip.src == 192.168.181.113 && ip.dst == 157.240.227.56**

Total displayed: 148

Fraction: 0.5%

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
5	0.028710	192.168.181.113	157.240.227.56	TCP	66	.....S.	51734 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
9	0.080700	192.168.181.113	157.240.227.56	TCP	54	.....A....	51734 → 443 [ACK] Seq=1 Ack=1 Win=132096 Len=0
10	0.081539	192.168.181.113	157.240.227.56	TLSv1.3	571	.....AP...	Client Hello (SNI=web-chat-e2ee.facebook.com)
16	0.138098	192.168.181.113	157.240.227.56	TCP	54	.....A....	51734 → 443 [ACK] Seq=518 Ack=2489 Win=132096 Len=0
18	0.144320	192.168.181.113	157.240.227.56	TLSv1.3	118	.....AP...	Change Cipher Spec, Application Data
19	0.145191	192.168.181.113	157.240.227.56	TLSv1.3	847	.....AP...	Application Data
25	0.252091	192.168.181.113	157.240.227.56	TLSv1.2	157	.....AP...	Application Data
29	0.298261	192.168.181.113	157.240.227.56	TCP	54	.....A....	51734 → 443 [ACK] Seq=1375 Ack=2606 Win=131840 Len=0
34	0.308250	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=433 Win=514 Len=0
43	0.313478	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=3217 Win=516 Len=0
52	0.328578	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=11569 Win=516 Len=0
58	0.340314	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=17137 Win=516 Len=0
62	0.346354	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=19921 Win=516 Len=0
66	0.359048	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=24097 Win=516 Len=0
69	0.362379	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=26881 Win=516 Len=0
71	0.365585	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=28273 Win=516 Len=0
74	0.369367	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=31057 Win=516 Len=0
82	0.375434	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=33841 Win=516 Len=0
85	0.463556	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=36625 Win=516 Len=0
88	0.463877	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=39409 Win=516 Len=0
91	0.464232	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=42193 Win=516 Len=0
94	0.464600	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=44977 Win=516 Len=0
97	0.464896	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=47761 Win=516 Len=0
100	0.465273	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=50545 Win=516 Len=0
103	0.465635	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=53329 Win=516 Len=0
106	0.466014	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=56113 Win=516 Len=0
109	0.466399	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=58897 Win=516 Len=0
112	0.466748	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=61681 Win=516 Len=0
115	0.467112	192.168.181.113	157.240.227.56	TCP	54	.....A....	51732 → 443 [ACK] Seq=104 Ack=64465 Win=516 Len=0

Handshake Type: Client Hello (1)

Length: 508

Version: TLS 1.2 (0x0303)

Random: 04bf18131d0d3a70ac6361a6b354ed7c6ec99aaef3cd776e1b89c61022808be

Session ID Length: 32

Session ID: f487d4d274cbc5456cfc447518edae4ae370c75274735669f71bcc23c95c57396

Cipher Suites Length: 32

Cipher Suites (16 suites)

0010 02 2d e3 e7 40 00 00 06 1d a0 c0 a8 b5 71 9d f0 @ . . . . . q . . . . .

0020 e3 38 ca 16 01 bb c3 db 02 b3 a4 3a fc 35 50 18 8 . . . . . : 5P . . . . .

0030 02 04 f9 27 00 00 16 03 01 02 00 01 00 01 fc 03 . . . . . 6 k5N . . . . .

0040 03 04 bf a1 81 31 d0 d3 a7 0a c6 36 1a 6b 35 4e . . . . . ' L TV - GQ . . . . .

0050 d7 c6 ec 99 aa ef 3c d7 76 e1 b8 9c 61 02 28 08 . . . . . 7 u'G5 f q < . . . . .

0060 be 20 f4 87 d4 27 4c bc 54 56 cf c4 47 51 8e da . . . . . s . . . . . + / . . . . .

0070 e4 ae 37 0c 75 27 47 35 66 9f 71 bc c2 3c 95 c5 . . . . . , 0 . . . . .

0080 73 96 00 20 0a 0a 13 01 13 02 13 03 c0 2b c0 2f . . . . .

0090 c0 2c c0 30 cc a9 cc a8 c0 13 c0 14 00 9c 00 9d . . . . .

### From Facebook to Computer:

The filter `tcp and ip.src == 157.240.227.56 && ip.dst == 192.168.181.113` is used to capture TCP packets sent from Facebook (source IP: 157.240.227.56) to your computer (destination IP: 192.168.181.113). A total of 186 packets matching this filter are displayed, constituting 0.7% of the total traffic.

**tcp and ip.src == 157.240.227.56 && ip.dst == 192.168.181.113**



Total Displayed: 186 (0.7%)

The image shows a Wireshark packet capture. The top pane displays a list of packets with columns for No., Time, Source, Destination, Protocol, Length, TCP Flags, and Info. The bottom pane shows a detailed view of a selected packet, including the [TCP Segment Len: 0] section with fields like Sequence Number, Acknowledgment Number, Window, and various options.

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
8	0.080552	157.240.227.56	192.168.181.113	TCP	66	.....A..S.	443 → 51734 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1392 SACK_PERM WS=256
13	0.136283	157.240.227.56	192.168.181.113	TCP	54	.....A..S.	443 → 51734 [ACK] Seq=1 Ack=518 Win=66816 Len=0
14	0.137090	157.240.227.56	192.168.181.113	TLSv1.3	1446	.....A..S.	Server Hello, Change Cipher Spec, Application Data
15	0.138024	157.240.227.56	192.168.181.113	TLSv1.3	1150	.....A..S.	Application Data
22	0.195525	157.240.227.56	192.168.181.113	TLSv1.3	231	.....A..S.	Application Data
23	0.248045	157.240.227.56	192.168.181.113	TCP	54	.....A..S.	443 → 51734 [ACK] Seq=2666 Ack=1375 Win=68352 Len=0
31	0.307574	157.240.227.56	192.168.181.113	TCP	54	.....A..S.	443 → 51732 [ACK] Seq=1 Ack=104 Win=265 Len=0
32	0.307743	157.240.227.56	192.168.181.113	TLSv1.2	89	.....A..S.	Application Data
33	0.308208	157.240.227.56	192.168.181.113	TLSv1.2	451	.....A..S.	Application Data
41	0.313304	157.240.227.56	192.168.181.113	TCP	1446	.....A..S.	443 → 51732 [ACK] Seq=433 Ack=104 Win=265 Len=1392 [TCP segment of a reassembled PDU]
42	0.313304	157.240.227.56	192.168.181.113	TLSv1.2	1446	.....A..S.	Application Data
46	0.328445	157.240.227.56	192.168.181.113	TCP	1446	.....A..S.	443 → 51732 [ACK] Seq=3217 Ack=104 Win=265 Len=1392 [TCP segment of a reassembled PDU]
47	0.328445	157.240.227.56	192.168.181.113	TCP	1446	.....A..S.	443 → 51732 [PSH, ACK] Seq=4609 Ack=104 Win=265 Len=1392 [TCP segment of a reassembled PDU]
48	0.328445	157.240.227.56	192.168.181.113	TCP	1446	.....A..S.	443 → 51732 [ACK] Seq=6001 Ack=104 Win=265 Len=1392 [TCP segment of a reassembled PDU]

**[TCP Segment Len: 0]**  
Sequence Number: 0 (relative sequence number)  
Sequence Number (raw): 2855992372  
[Next Sequence Number: 1 (relative sequence number)]  
Acknowledgment Number: 1 (relative ack number)  
Acknowledgment number (raw): 3285910195  
1000 .... = Header Length: 32 bytes (8)  
Flags: 0x012 (SYN, ACK)  
Window: 65535  
[Calculated window size: 65535]  
Checksum: 0x3f31 [unverified]  
[Checksum Status: Unverified]  
Urgent Pointer: 0  
Options: (12 bytes), Maximum segment size, No-Operation (NOP), No-Operation (NOP), SACK permitted  
TCP Option - Maximum segment size: 1392 bytes  
TCP Option - No-Operation (NOP)  
TCP Option - No-Operation (NOP)  
TCP Option - SACK permitted  
TCP Option - No-Operation (NOP)  
TCP Option - Window scale: 8 (multiply by 256)  
[Timestamps]  
[SEQ/ACK analysis]

## HTTP to/from facebook:

The filter `ip.addr == 157.240.227.56 && tcp.port == 443` is applied to capture HTTP packets to and from Facebook on port 443 (HTTPS). A total of 334 packets matching this filter are displayed, constituting 1.2% of the total traffic. The source port is 51734, and the destination port is 443.

Total displayed: 334 packets (1.2%)

The image shows a Wireshark packet capture. The top pane displays a list of packets with columns for No., Time, Source, Destination, Protocol, Length, TCP Flags, and Info. The bottom pane shows a detailed view of a selected packet, including the [TCP Segment Len: 517] section with fields like Sequence Number, Acknowledgment Number, Window, and various options.

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
5	0.028710	192.168.181.113	157.240.227.56	TCP	66	.....A..S.	51734 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
8	0.080552	157.240.227.56	192.168.181.113	TCP	66	.....A..S.	443 → 51734 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1392 SACK_PERM WS=256
9	0.080700	192.168.181.113	157.240.227.56	TCP	54	.....A..S.	51734 → 443 [ACK] Seq=1 Ack=1 Win=132096 Len=0
10	0.081539	192.168.181.113	157.240.227.56	TLSv1.3	571	.....A..S.	Client Hello (SNI=web-chat-e2ee.facebook.com)
13	0.136283	157.240.227.56	192.168.181.113	TCP	54	.....A..S.	443 → 51734 [ACK] Seq=1 Ack=518 Win=66816 Len=0
14	0.137090	157.240.227.56	192.168.181.113	TLSv1.3	1446	.....A..S.	Server Hello, Change Cipher Spec, Application Data
15	0.138024	157.240.227.56	192.168.181.113	TLSv1.3	1150	.....A..S.	Application Data
16	0.138098	192.168.181.113	157.240.227.56	TCP	54	.....A..S.	51734 → 443 [ACK] Seq=518 Ack=2489 Win=132096 Len=0
18	0.144320	192.168.181.113	157.240.227.56	TLSv1.3	118	.....A..S.	Change Cipher Spec, Application Data
19	0.145191	192.168.181.113	157.240.227.56	TLSv1.3	847	.....A..S.	Application Data
22	0.195525	157.240.227.56	192.168.181.113	TLSv1.3	231	.....A..S.	Application Data
23	0.248045	157.240.227.56	192.168.181.113	TCP	54	.....A..S.	443 → 51734 [ACK] Seq=2666 Ack=1375 Win=68352 Len=0
25	0.252091	192.168.181.113	157.240.227.56	TLSv1.2	157	.....A..S.	Application Data
29	0.298261	192.168.181.113	157.240.227.56	TCP	54	.....A..S.	51734 → 443 [ACK] Seq=1375 Ack=2666 Win=131840 Len=0
31	0.307574	157.240.227.56	192.168.181.113	TCP	54	.....A..S.	443 → 51732 [ACK] Seq=1 Ack=104 Win=265 Len=0
32	0.307743	157.240.227.56	192.168.181.113	TLSv1.2	89	.....A..S.	Application Data
33	0.308208	157.240.227.56	192.168.181.113	TLSv1.2	451	.....A..S.	Application Data
34	0.308250	192.168.181.113	157.240.227.56	TCP	54	.....A..S.	51732 → 443 [ACK] Seq=104 Ack=433 Win=514 Len=0
41	0.313304	157.240.227.56	192.168.181.113	TCP	1446	.....A..S.	443 → 51732 [ACK] Seq=433 Ack=104 Win=265 Len=1392 [TCP segment of a reassembled PDU]
42	0.313304	157.240.227.56	192.168.181.113	TLSv1.2	1446	.....A..S.	Application Data
43	0.313378	192.168.181.113	157.240.227.56	TCP	54	.....A..S.	51732 → 443 [ACK] Seq=104 Ack=2317 Win=516 Len=0

**Internet Protocol Version 4, Src: 192.168.181.113, Dst: 157.240.227.56**  
Transmission Control Protocol, Src Port: 51734, Dst Port: 443, Seq: 1, Ack: 1, Len: 517  
Source Port: 51734  
Destination Port: 443  
[Stream index: 0]  
[Conversation completeness: Incomplete, DATA (15)]  
[TCP Segment Len: 517]  
Sequence Number: 1 (relative sequence number)  
Sequence Number (raw): 3285910195  
[Next Sequence Number: 518 (relative sequence number)]  
Acknowledgment Number: 1 (relative ack number)  
Acknowledgment number (raw): 2855992373  
0101 .... = Header Length: 20 bytes (5)  
Flags: 0x018 (PSH, ACK)  
Window: 516  
[Calculated window size: 132096]  
[Window size scaling factor: 256]

# Conversation filter between pc to Facebook:

ip.addr eq 192.168.181.113 and ip.addr eq 157.240.227.56

ip.addr eq 192.168.181.113 and ip.addr eq 157.240.227.56									
No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info		
5	0.028710	192.168.181.113	157.240.227.56	TCP	66	.....S.	51734 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM		
8	0.080552	157.240.227.56	192.168.181.113	TCP	66	.....A..S.	443 → 51734 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1392 SACK_PERM WS=256		
9	0.080700	192.168.181.113	157.240.227.56	TCP	54	.....A...	51734 → 443 [ACK] Seq=1 Ack=1 Win=132096 Len=0		
10	0.081539	192.168.181.113	157.240.227.56	TLSv1.3	571	.....AP...	Client Hello (SNI=web-chat-e2ee.facebook.com)		
13	0.136283	157.240.227.56	192.168.181.113	TCP	54	.....A...	443 → 51734 [ACK] Seq=1 Ack=518 Win=66816 Len=0		
14	0.137090	157.240.227.56	192.168.181.113	TLSv1.3	1446	.....A...	Server Hello, Change Cipher Spec, Application Data		
15	0.138024	157.240.227.56	192.168.181.113	TLSv1.3	1150	.....AP...	Application Data		

TLSv1.3 Record Layer: Handshake Protocol: Server Hello

Content Type: Handshake (22)

Version: TLS 1.2 (0x0303)

Length: 122

Handshake Protocol: Server Hello

Handshake Type: Server Hello (2)

Length: 118

Version: TLS 1.2 (0x0303)

Random: ddb7e4dc20817882da7672cab9beb9037a9c10b41b1cdfc9d1e0578a3c712b8

Session ID Length: 32

Session ID: f487d4274cbc5456cfc447518edae4ae370c752743566f971bcc23c95c57396

Cipher Suite: TLS\_AES\_128\_GCM\_SHA256 (0x1301)

Compression Method: null (0)

Extensions Length: 46

Extension: supported\_versions (len=2) TLS 1.3

Extension: key\_share (len=36) x25519

[JA3S Fullstring: 771,4865,43-51]

[JA3S: f4febcs5ea12b31ae17cfb7e614afda8]

TLSv1.3 Record Layer: Change Cipher Spec Protocol: Change Cipher Spec

Content Type: Change Cipher Spec (20)

Version: TLS 1.2 (0x0303)

Length: 1

Change Cipher Spec Message

TLSv1.3 Record Layer: Application Data Protocol: Hypertext Transfer Protocol

Opaque Type: Application Data (23)

Version: TLS 1.2 (0x0303)

Length: 1817

Encrypted Application Data [truncated]: 0104bdf410f4f5a3685320b8c7c41f20cf0516499b0

[Application Data Protocol: Hypertext Transfer Protocol]

TLS segment data (237 bytes)

0020 b5 71 01 bb ca 16 aa 3a fc 35 c3 db 04 b8 50 10 .....5...P  
0030 01 05 51 ed 00 00 16 03 03 00 7a 02 00 00 76 03 .....Q.....z...v  
0040 03 db b7 e4 dc 20 81 78 82 da 76 72 ca b9 be b9 .....x...v...  
0050 03 7a 79 c1 0b 41 b1 cd fc 9d 1e 05 78 a3 c7 12 .....zy...A...x...  
0060 b8 20 f4 87 d4 27 4c bc 54 56 cf c4 47 51 8e da .....L...TV...GQ...  
0070 e4 ae 37 0c 75 27 47 35 66 9f 71 bc c2 3c 95 c5 .....7...u'G5...f...q...<  
0080 73 96 13 01 00 00 2e 00 2b 00 02 03 04 00 33 00 .....s.....+.....3...  
0090 24 00 1d 00 20 9a 28 31 ed 0c 81 a4 78 a4 e4 81 .....\$.....(1...x...  
00a0 ba 39 df 3b 10 8f 28 02 e4 4d db 0b cf 48 30 f9 .....9...;...M...H0...  
00b0 30 7c be ba 51 14 03 03 00 01 01 17 03 03 03 f9 0.....Q.....  
00c0 01 04 bd f4 10 1f 4f 5a 36 85 32 0b 8c 7c 41 f2 .....0...O2...6-2...|A...  
00d0 0c fd 05 16 49 9b b1 09 8f 7a 95 ee cf bc c0 e8 .....I.....z.....v...  
00e0 d1 78 93 e0 ab a5 3e 30 b7 b1 cb 0b b8 5b d9 00 .....x.....>0...[...  
00f0 0a 8b b8 74 8c 94 70 98 41 86 31 6a 66 d3 3c 00 .....t...p...A-1jff...<  
0100 f5 38 ff 5f bc ab c0 24 ce e2 48 05 41 46 d5 1e .....#...-...\$...H-AF...  
0110 43 a5 23 2b a4 15 72 ba c3 95 e3 35 d4 50 fc c6 C-#...r...r...5-P...  
0120 f3 5d e0 1d 06 c3 6d a6 dc 9b 05 67 6f a7 6b 73 .....|.....m...go...ks...  
0130 f6 5f 9e 57 b2 91 5a 5b 2f 21 d0 c3 80 09 56 f6 .....-W...Z[.../.....V...  
0140 11 81 8d 95 5c 0b 24 e2 f9 10 55 37 d0 1c 87 4f .....3...A-F...N8...q...K...Z...  
0150 33 1b a0 6c 41 03 46 b6 4e 25 60 71 13 4b af 48 .....m...-9...q...+...Z...  
0160 b3 ee 6d ea 96 ed fe 39 85 71 f3 2b f5 20 5a 2c .....o...-p...V...1H...u...  
0170 de 6f e1 f2 60 80 a0 56 6c 48 77 da ba d4 1f 9b .....c...V0...t...t...  
0180 cd 40 71 bf 76 a7 6f 81 dd 0f b4 6c fb 14 90 57 .....@q...v...o...t...t...W...  
0190 0c 1b 63 b6 cd 56 4f 7f 90 ed 74 94 28 d3 ff 99 .....c...V0...t...t...  
01a0 98 c4 12 44 e6 23 92 8f 5c 45 11 0b 96 8d a4 92 .....B...t...s...p...E...  
01b0 42 99 e6 74 d8 e1 53 08 89 2a e0 9a 2e ff dc .....-D...-s...p...E...  
01c0 4d df 91 f8 88 1d ad 1d 55 98 c2 3e 18 b5 2c ed .....M...-...U...>...  
01d0 6c c9 83 00 d7 41 12 70 fd 96 0a ea cb 2f b9 c7 .....l...-A...p...p.../...  
01e0 7f 07 f9 aa 36 91 6e 7b 88 92 c4 ec 2e b5 c1 b0 .....6...n...  
01f0 ba 4e 55 72 96 b5 49 1d 80 ea c0 0f a4 83 bf 0d .....NUR...I...>.....

## FLAGS:

The filter **ip.addr == 157.240.227.56 and tcp.analysis.flags** in Wireshark is designed to display TCP packets to and from the IP address 157.240.227.56 while also showing additional information related to TCP flags analysis.

ip.addr == 157.240.227.56 and tcp.analysis.flags									
No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info		
6949	38.792743	157.240.227.56	192.168.181.113	TCP	125	.....AP...	[TCP Spurious Retransmission] 443 → 51734 [PSH, ACK] Seq=3600 Ack=13406 Win=93696 Len=71		
6950	38.792806	192.168.181.113	157.240.227.56	TCP	66	.....A...	[TCP Dup ACK 6948#1] 51734 → 443 [ACK] Seq=13406 Ack=3671 Win=130816 Len=0 SLE=3600 SRE=3		
7093	45.538132	192.168.181.113	157.240.227.56	TCP	55	.....A...	[TCP Keep-Alive] 51732 → 443 [ACK] Seq=103 Ack=93967 Win=516 Len=1		
7096	45.773273	157.240.227.56	192.168.181.113	TCP	54	.....A...	[TCP Keep-Alive ACK] 443 → 51732 [ACK] Seq=93967 Ack=104 Win=265 Len=0		
13375	131.768622	192.168.181.113	157.240.227.56	TCP	123	.....AP...	[TCP Retransmission] 51734 → 443 [PSH, ACK] Seq=13612 Ack=3961 Win=132096 Len=69		

Frame 6950: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface \Device\NPF...  
Ethernet II, Src: liteonTechno ba:d5:fa (ac:b5:7d:ba:d5:fa), Dst: 9a:83:c7:ca:72:d8 (9a:83:c7:ca:72:d8)  
Internet Protocol Version 4, Src: 192.168.181.113, Dst: 157.240.227.56  
Transmission Control Protocol, Src Port: 51734, Dst Port: 443, Seq: 13406, Ack: 3671, Len: 0  
Source Port: 51734  
Destination Port: 443  
[Stream index: 0]  
[Conversation completeness: Incomplete, DATA (15)]  
[TCP Segment Len: 0]  
Sequence Number: 13406 (relative sequence number)  
Sequence Number (raw): 3285923600  
[Next Sequence Number: 13406 (relative sequence number)]  
Acknowledgment Number: 3671 (relative ack number)  
Acknowledgment number (raw): 2855996043  
1000 .... = Header Length: 32 bytes (8)  
Flags: 0x010 (ACK)  
Window: 511  
[Calculated window size: 130816]  
[Window size scaling factor: 256]  
Checksum: 0x9bb0 [unverified]  
[Checksum Status: Unverified]  
Urgent Pointer: 0  
Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), SACK  
TCP Option - No-Operation (NOP)  
TCP Option - No-Operation (NOP)  
TCP Option - SACK 3600-3671  
[Timestamps]  
[SEQ/ACK analysis]

0000 9a 83 c7 ca 72 d8 ac b5 7d ba df fa 00 00 45 00 .....  
0010 00 34 e4 85 40 00 80 06 1e fb c0 a8 b5 71 9d f0 .....4...@...q...  
0020 e3 38 ca 16 01 bb c3 db 37 10 aa 3b 0a 8b 80 10 .....8...  
0030 01 ff 9b b0 00 00 01 01 05 0a aa 3b 0a 44 aa 3b .....  
0040 0a 8b .....D...;

Source Port (tcp.srcport), 2 bytes

Packets: 28321 - Displayed: 5 (0.0%) - Dropped: 0 (0.0%)

## SYN FLAG:

The filter `ip.addr == 157.240.227.56 and tcp.flags.syn == 1` is used to capture TCP packets with the SYN flag set sent to or from the IP address 157.240.227.56. A total of 4 packets matching this filter are displayed, constituting 0.0% of the total 28321 SYN-flagged packets.

`ip.addr == 157.240.227.56 and tcp.flags.syn == 1`

Displayed: 4 packets

Fraction: 0.0% because total are 28321

The image shows a Wireshark packet capture interface. The top bar displays the filter `ip.addr == 157.240.227.56 and tcp.flags.syn == 1`. The packet list shows four packets, with the third packet (No. 8) selected. The packet details pane shows the following information:

- Ethernet II, Src: 9a:83:c7:ca:72:d8 (9a:83:c7:ca:72:d8), Dst: LiteonTechno\_ba:df:fa (ac:b5:40:00:00:00)
- Internet Protocol Version 4, Src: 157.240.227.56, Dst: 192.168.181.113
- Transmission Control Protocol, Src Port: 443, Dst Port: 51734, Seq: 0, Ack: 1, Len: 0
  - Source Port: 443
  - Destination Port: 51734
  - [Stream index: 0]
  - [Conversation completeness: Incomplete, DATA (15)]
  - [TCP Segment Len: 0]
  - Sequence Number: 0 (relative sequence number)
  - Sequence Number (raw): 2855992372
  - [Next Sequence Number: 1 (relative sequence number)]
  - Acknowledgment Number: 1 (relative ack number)
  - Acknowledgment number (raw): 3285910195
  - 1000 .... = Header Length: 32 bytes (8)
  - Flags: 0x012 (SYN, ACK)
  - Window: 65535
  - [Calculated window size: 65535]
  - Checksum: 0x3f31 [unverified]
  - [Checksum Status: Unverified]
  - Urgent Pointer: 0
  - Options: (12 bytes), Maximum segment size, No-Operation (NOP), No-Operation (NOP), SACK
    - TCP Option - Maximum segment size: 1392 bytes
    - TCP Option - No-Operation (NOP)
    - TCP Option - No-Operation (NOP)
    - TCP Option - SACK permitted
    - TCP Option - No-Operation (NOP)
    - TCP Option - Window scale: 8 (multiply by 256)
  - [Timestamps]
  - [SEQ/ACK analysis]
    - [This is an ACK to the segment in frame: 5]
    - [The RTT to ACK the segment was: 0.051842000 seconds]
    - [iRTT: 0.051990000 seconds]

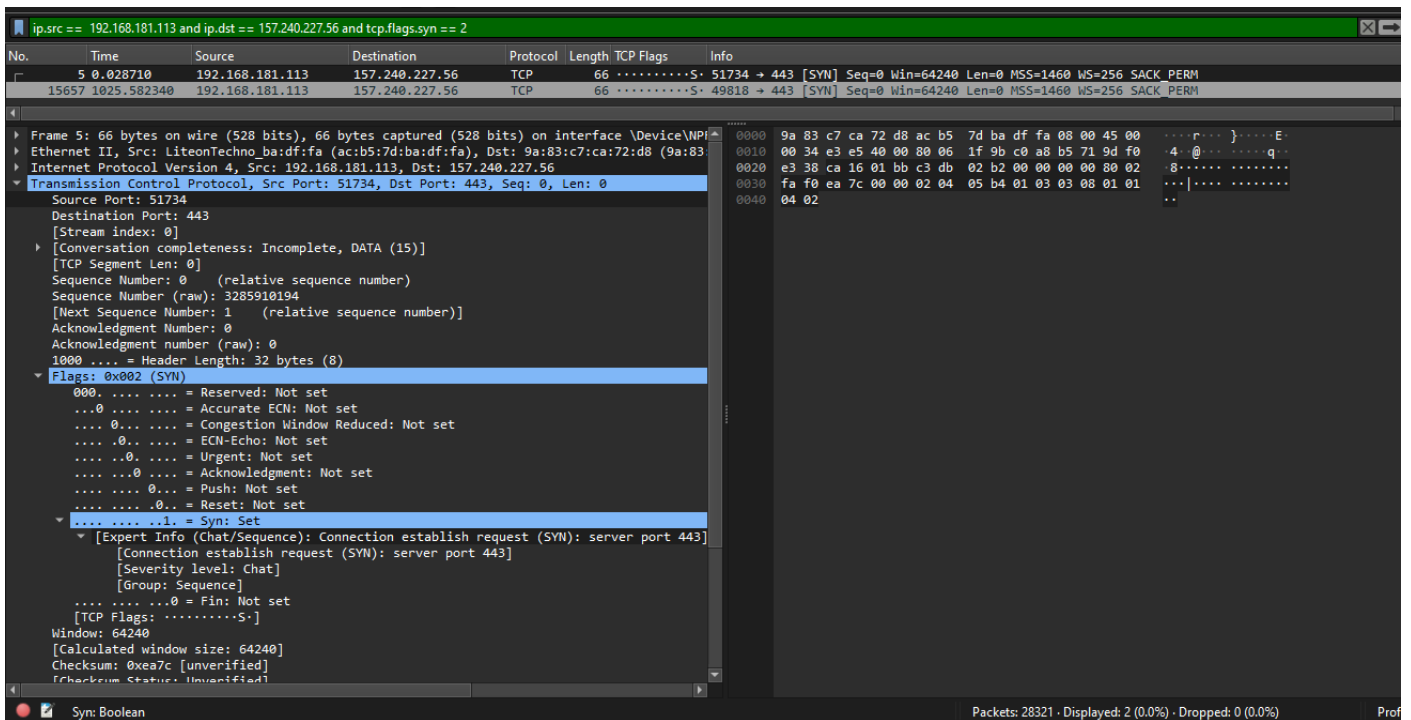
The packet bytes pane shows the raw data of the packet, including the Ethernet II header, IP header, and TCP header.

## From Pc to Facebook:

`ip.src == 192.168.181.113 and ip.dst == 157.240.227.56 and tcp.flags.syn == 2`  
`ip.src == 192.168.181.113 and ip.dst == 157.240.227.56 and tcp.flags.syn == 3`

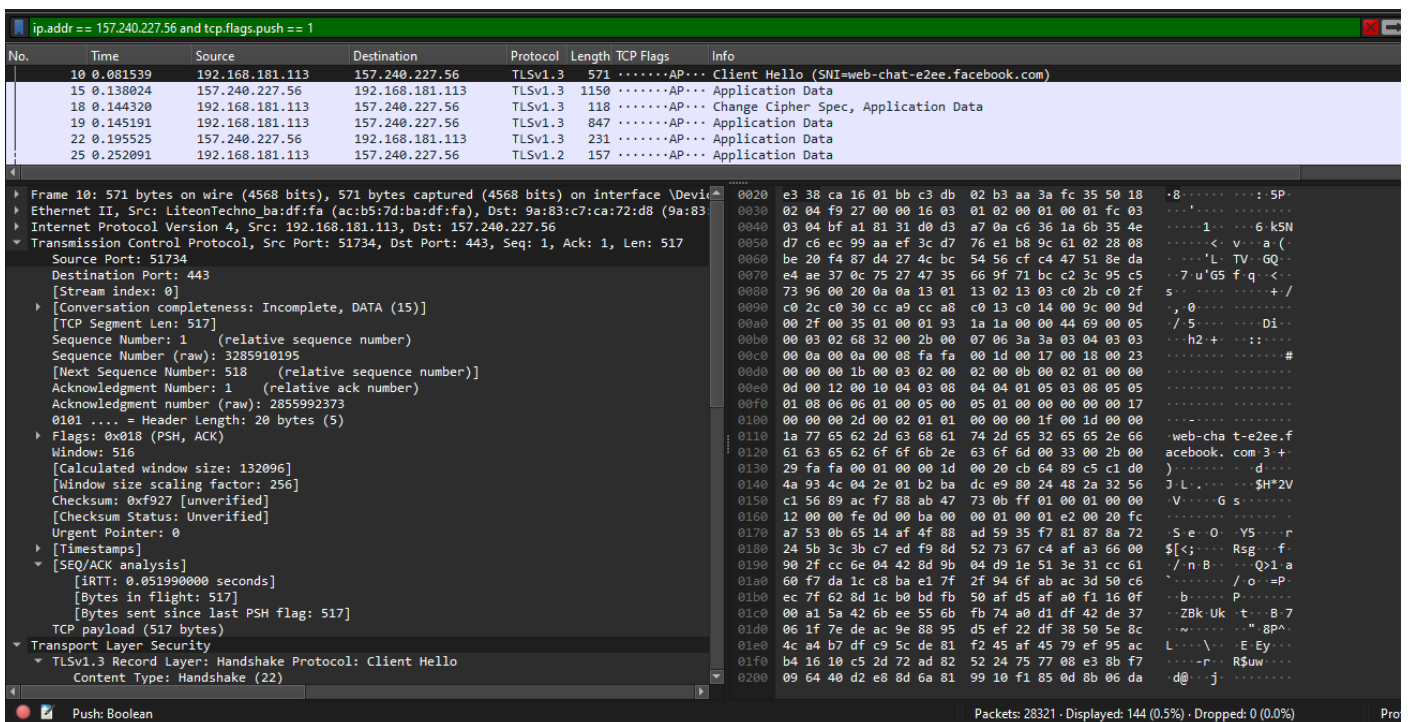
Displayed: 2

Fraction: 0.2 %



## PUSH FLAG:

The filter `ip.addr == 157.240.227.56 and tcp.flags.push == 1` is applied to capture TCP packets with the PUSH flag set sent to or from the IP address 157.240.227.56. A total of 144 packets matching this filter are displayed, constituting 0.5% of the total traffic.



**ip.addr == 157.240.227.56 and  
tcp.flags.push == 1**

Displayed packets: 144

Fraction: 0.5%

### From PC to Facebook:

**ip.src == 192.168.181.113 and ip.dst ==  
157.240.227.56 and tcp.flags.push == 3**

**ip.src == 192.168.181.113 and ip.dst ==  
157.240.227.56 and tcp.flags.push == 2**

Displayed: 53

Fraction: 0.2%

ip.src == 192.168.181.113 and ip.dst == 157.240.227.56 and tcp.flags.push == 3

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
10	0.081539	192.168.181.113	157.240.227.56	TLSv1.3	571	.....AP...	Client Hello (SNI=web-chat-e2ee.facebook.com)
18	0.144320	192.168.181.113	157.240.227.56	TLSv1.3	118	.....AP...	Change Cipher Spec, Application Data
19	0.145191	192.168.181.113	157.240.227.56	TLSv1.3	847	.....AP...	Application Data
25	0.252091	192.168.181.113	157.240.227.56	TLSv1.2	157	.....AP...	Application Data
505	1.844489	192.168.181.113	157.240.227.56	TLSv1.3	125	.....AP...	Application Data
633	2.802037	192.168.181.113	157.240.227.56	TLSv1.3	172	.....AP...	Application Data
634	2.816537	192.168.181.113	157.240.227.56	TLSv1.3	107	.....AP...	Application Data
642	2.816820	192.168.181.113	157.240.227.56	TLSv1.3	560	.....AP...	Application Data
828	3.433614	192.168.181.113	157.240.227.56	TLSv1.3	132	.....AP...	Application Data
6945	38.084544	192.168.181.113	157.240.227.56	TLSv1.3	123	.....AP...	Application Data
7126	46.784657	192.168.181.113	157.240.227.56	TLSv1.3	122	.....AP...	Application Data
8593	62.924739	192.168.181.113	157.240.227.56	TLSv1.3	123	.....AP...	Application Data
12645	89.173826	192.168.181.113	157.240.227.56	TLSv1.3	123	.....AP...	Application Data
13336	126.957529	192.168.181.113	157.240.227.56	TLSv1.3	123	.....AP...	Application Data
13375	131.768622	192.168.181.113	157.240.227.56	TCP	123	.....AP...	[TCP Retransmission] 51734 → 443 [PSH, ACK] Seq=13612 Ack=3961 Win=132096 Len=69
15784	1025.820016	192.168.181.113	157.240.227.56	TLSv1.3	750	.....AP...	Client Hello (SNI=web-chat-e2ee.facebook.com)
15876	1025.990342	192.168.181.113	157.240.227.56	TLSv1.3	118	.....AP...	Change Cipher Spec, Application Data
15921	1026.028381	192.168.181.113	157.240.227.56	TLSv1.3	935	.....AP...	Application Data
16203	1026.700641	192.168.181.113	157.240.227.56	TLSv1.3	125	.....AP...	Application Data
16262	1027.072268	192.168.181.113	157.240.227.56	TLSv1.3	172	.....AP...	Application Data

Frame 633: 172 bytes on wire (1376 bits), 172 bytes captured (1376 bits) on interface \Device\NPF...  
Ethernet II, Src: LiteonTechno\_ba:df:fa (ac:b5:7d:ba:df:fa), Dst: 9a:83:c7:ca:72:d8 (9a:83:c7:ca:72:d8)  
Internet Protocol Version 4, Src: 192.168.181.113, Dst: 157.240.227.56  
Transmission Control Protocol, Src Port: 51734, Dst Port: 443, Seq: 2838, Ack: 3230, Len: 118  
Source Port: 51734  
Destination Port: 443  
[Stream index: 0]  
[Conversation completeness: Incomplete, DATA (15)]  
[TCP Segment Len: 118]  
Sequence Number: 2838 (relative sequence number)  
Sequence Number (raw): 3285913032  
[Next Sequence Number: 2956 (relative sequence number)]  
Acknowledgment Number: 3230 (relative ack number)  
Acknowledgment number (raw): 2855995602  
0101 ... = Header Length: 20 bytes (5)  
Flags: 0x018 (PSH, ACK)  
Window: 513

Frame (172 bytes) Reassembled TCP (1510 bytes)

Packets: 28321 · Displayed: 53 (0.2%) · Dropped: 0 (0.0%) Profile: Default

## Reset:

The filter **ip.addr == 157.240.227.56 and tcp.flags.reset == 1** is used to capture TCP packets with the Reset (RST) flag set sent to or from the IP address 157.240.227.56. However, in the provided analysis, no packets matching this filter are displayed, indicating that there are no TCP packets with the RST flag set in the specified communication with Facebook.



Reset flag does not display any packets.

```
ip.addr == 157.240.227.56 and  
tcp.flags.reset == 1
```

**From Computer to the Facebook:**

```
ip.src == 192.168.181.113 and ip.dst ==  
157.240.227.56 and tcp.flags.reset == 1  
ip.src == 192.168.181.113 and ip.dst ==  
157.240.227.56 and tcp.flags.reset == 2  
ip.src == 192.168.181.113 and ip.dst ==  
157.240.227.56 and tcp.flags.reset == 3  
0 displayed
```

**Facebook Statistics for Set Flags:**

FLAGS	COUNT	FRACTION
SYN	4	0.0%
PSH	144	0.5%
RST	0	0%

**From YouTube:**

**Capture Properties:**

Name: E:\University\Smester 5\computer network\youtube.pcapng

Length: 219 MB

Hash c3970028d87fc75da568d7c704729c83462ef91bdf96daf5975a1afd  
(SHA256): 298c70a2

Hash 2aa2ce529f2f39f6be8ef4ee05cd17f083cdd56c  
(SHA1):

Format: Wireshark/... - pcapng

Encapsulation: Ethernet

Time

First packet: 2024-01-08 20:31:07

Last packet: 2024-01-08 21:02:26

Elapsed: 00:31:18

Capture

Hardware: AMD A8-4500M APU with Radeon(tm) HD Graphics (with SSE4.2)

OS: 64-bit Windows 10 (22H2), build 19045

Application: Dumpcap (Wireshark) 4.2.0 (v4.2.0-0-g54eedfc63953)

Interfaces

<u>Interface</u>	<u>Dropped packets</u>	<u>Capture filter</u>	<u>Link type</u>	<u>Packet size limit (snaplen)</u>
Wi-Fi	0 (0.0%)	none	Ethernet	262144 bytes

Statistics

<u>Measurement</u>	<u>Captured</u>	<u>Displayed</u>	<u>Marked</u>
Packets	208212	208212 (100.0%)	—
Time span, s	1878.976	1878.976	—
Average pps	110.8	110.8	—
Average packet size, B	1020	1020	—
Bytes	212411107	212411107 (100.0%)	0
Average bytes/s	113 k	113 k	—
Average bits/s	904 k	904 k	—

## HTTP Protocol Filter for YouTube:

### 1. http

You'll notice that all the packets in the list show HTTP for the protocol.

To display all the HTTP traffic you need to use the following protocol and port display filter:

```
tcp.dstport == 80
```



**http**

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
2766	38.610475	192.168.181.113	23.207.193.174	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
4605	59.928373	192.168.181.113	23.207.193.174	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
9290	81.242257	192.168.181.113	23.207.193.174	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
15129	102.939662	192.168.181.113	23.207.193.174	HTTP/X...	714	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
15159	103.112363	23.207.193.174	192.168.181.113	HTTP	350	.....AP...	[TCP Fast Retransmission] HTTP/1.1 302 Moved Temporarily
20451	127.534252	192.168.181.113	23.207.193.174	HTTP/X...	270	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
20474	127.676821	23.207.193.174	192.168.181.113	HTTP	350	.....AP...	HTTP/1.1 302 Moved Temporarily
24446	149.289431	192.168.181.113	23.207.193.174	HTTP/X...	1298	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
24460	149.439402	23.207.193.174	192.168.181.113	HTTP	350	.....AP...	HTTP/1.1 302 Moved Temporarily
36144	170.950672	192.168.181.113	23.207.193.174	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
39114	192.346551	192.168.181.113	23.207.193.174	HTTP/X...	78	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
39168	192.503548	23.207.193.174	192.168.181.113	HTTP	350	.....AP...	HTTP/1.1 302 Moved Temporarily
60461	358.230122	111.119.184.19	192.168.181.113	HTTP	220	.....AP...	HTTP/1.1 204 No Content
60462	358.230974	192.168.181.113	111.119.184.19	HTTP	78	.....AP...	Continuation
60723	359.033385	111.119.184.19	192.168.181.113	HTTP	220	.....AP...	HTTP/1.1 204 No Content
60724	359.033906	192.168.181.113	111.119.184.19	HTTP	78	.....AP...	Continuation
94918	514.489081	192.168.181.113	23.207.193.174	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
94924	514.752932	23.207.193.174	192.168.181.113	HTTP	350	.....AP...	HTTP/1.1 302 Moved Temporarily
99263	536.472770	192.168.181.113	23.207.193.174	HTTP/X...	78	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
99265	536.727854	23.207.193.174	192.168.181.113	HTTP	350	.....AP...	HTTP/1.1 302 Moved Temporarily
1041_	558.164574	192.168.181.113	23.207.193.174	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1
1083_	579.936709	192.168.181.113	104.124.110.65	HTTP/X...	326	.....AP...	POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1

Frame 2766: 326 bytes on wire (2608 bits), 326 bytes captured (2608 bits) on interface  
Ethernet II, Src: LiteonTechno\_ba:df:fa (ac:b5:7d:ba:df:fa), Dst: 9a:83:c7:ca:72:d8 (9  
Internet Protocol Version 4, Src: 192.168.181.113, Dst: 23.207.193.174  
Transmission Control Protocol, Src Port: 50452, Dst Port: 80, Seq: 1747, Ack: 1, Len  
[3 Reassembled TCP Segments (2018 bytes): #2764(346), #2765(1400), #2766(272)]  
Hypertext Transfer Protocol  
POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1\r\n  
[Expert Info (Chat/Sequence): POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1  
Request Method: POST  
Request URI: /fwlink/?LinkID=252669&clcid=0x409  
Request Version: HTTP/1.1  
Connection: Keep-Alive\r\n  
Content-Type: text/xml; charset="UTF-16LE"\r\n  
User-Agent: MICROSOFT\_DEVICE\_METADATA\_RETRIEVAL\_CLIENT\r\n  
SOAPAction: "http://schemas.microsoft.com/windowsmetadata/services/2007/09/18/dms/  
Content-Length: 1672\r\n  
Host: go.microsoft.com\r\n  
[Full request URI: http://go.microsoft.com/fwlink/?LinkID=252669&clcid=0x409]  
[HTTP request 1/1]  
File Data: 1672 bytes  
eXtensible Markup Language

Frame (326 bytes) Reassembled TCP (2018 bytes) Decoded UTF-16LE text (838 bytes)

Packets: 208212 · Displayed: 33 (0.0%)

**tcp.dstport == 80**

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
10	2.114089	192.168.181.113	138.91.171.81	TCP	66	.....S...	50428 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
825	14.950145	192.168.181.113	192.229.221.95	TCP	54	.....A...F	50389 → 80 [FIN, ACK] Seq=1 Ack=1 Win=512 Len=0
826	14.950359	192.168.181.113	23.195.61.71	TCP	54	.....A...F	50390 → 80 [FIN, ACK] Seq=1 Ack=1 Win=513 Len=0
827	14.950457	192.168.181.113	111.119.184.168	TCP	54	.....A...F	50388 → 80 [FIN, ACK] Seq=1 Ack=1 Win=513 Len=0
828	14.950556	192.168.181.113	111.119.184.168	TCP	54	.....A...F	50392 → 80 [FIN, ACK] Seq=1 Ack=1 Win=511 Len=0
829	14.950650	192.168.181.113	111.119.184.168	TCP	54	.....A...F	50398 → 80 [FIN, ACK] Seq=1 Ack=1 Win=513 Len=0
833	14.972868	192.168.181.113	111.119.184.168	TCP	54	.....A...	50398 → 80 [ACK] Seq=2 Ack=2 Win=513 Len=0
834	14.972968	192.168.181.113	111.119.184.168	TCP	54	.....A...	50392 → 80 [ACK] Seq=2 Ack=2 Win=511 Len=0
835	14.973070	192.168.181.113	111.119.184.168	TCP	54	.....A...	50388 → 80 [ACK] Seq=2 Ack=2 Win=513 Len=0
845	15.073631	192.168.181.113	192.229.221.95	TCP	54	.....A...	50389 → 80 [ACK] Seq=2 Ack=2 Win=513 Len=0
847	15.100859	192.168.181.113	23.195.61.71	TCP	54	.....A...	50390 → 80 [ACK] Seq=2 Ack=2 Win=513 Len=0
2756	38.499139	192.168.181.113	23.207.193.174	TCP	66	.....S...	50452 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2763	38.606490	192.168.181.113	23.207.193.174	TCP	54	.....A...	50452 → 80 [ACK] Seq=1 Ack=1 Win=131584 Len=0
2764	38.610186	192.168.181.113	23.207.193.174	TCP	400	.....AP...	50452 → 80 [PSH, ACK] Seq=1 Ack=1 Win=131584 Len=346 [TCP segment of s

Frame 2766: 326 bytes on wire (2608 bits), 326 bytes captured (2608 bits) on interface  
Ethernet II, Src: LiteonTechno\_ba:df:fa (ac:b5:7d:ba:df:fa), Dst: 9a:83:c7:ca:72:d8 (9  
Internet Protocol Version 4, Src: 192.168.181.113, Dst: 23.207.193.174  
Transmission Control Protocol, Src Port: 50452, Dst Port: 80, Seq: 1747, Ack: 1, Len  
[3 Reassembled TCP Segments (2018 bytes): #2764(346), #2765(1400), #2766(272)]  
Hypertext Transfer Protocol  
POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1\r\n  
[Expert Info (Chat/Sequence): POST /fwlink/?LinkID=252669&clcid=0x409 HTTP/1.1\r\n  
Request Method: POST  
Request URI: /fwlink/?LinkID=252669&clcid=0x409  
Request Version: HTTP/1.1  
Connection: Keep-Alive\r\n  
Content-Type: text/xml; charset="UTF-16LE"\r\n  
User-Agent: MICROSOFT\_DEVICE\_METADATA\_RETRIEVAL\_CLIENT\r\n  
SOAPAction: "http://schemas.microsoft.com/windowsmetadata/services/2007/09/18/dms/D  
Content-Length: 1672\r\n  
Host: go.microsoft.com\r\n  
[Full request URI: http://go.microsoft.com/fwlink/?LinkID=252669&clcid=0x409]  
[HTTP request 1/1]  
File Data: 1672 bytes  
eXtensible Markup Language

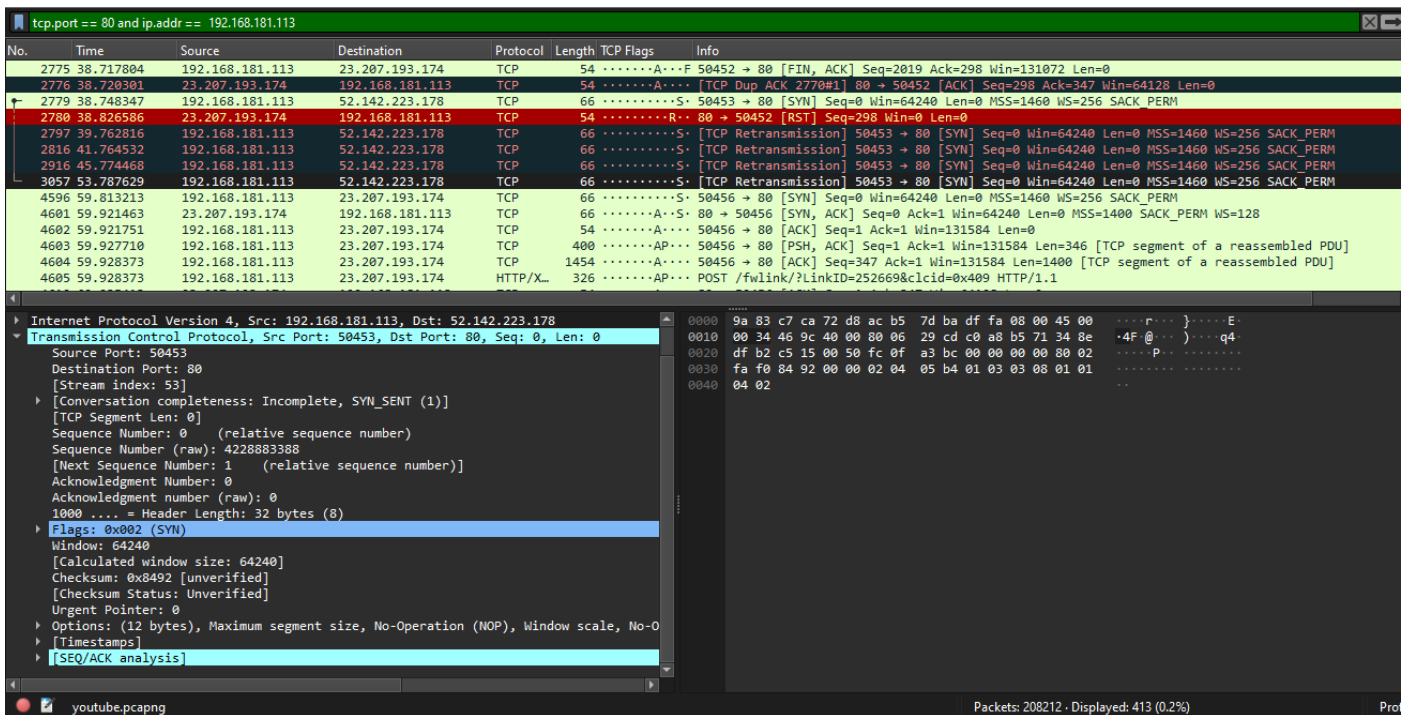
Frame (326 bytes) Reassembled TCP (2018 bytes) Decoded UTF-16LE text (838 bytes)

Packets: 208212 · Displayed: 280 (0.1%)

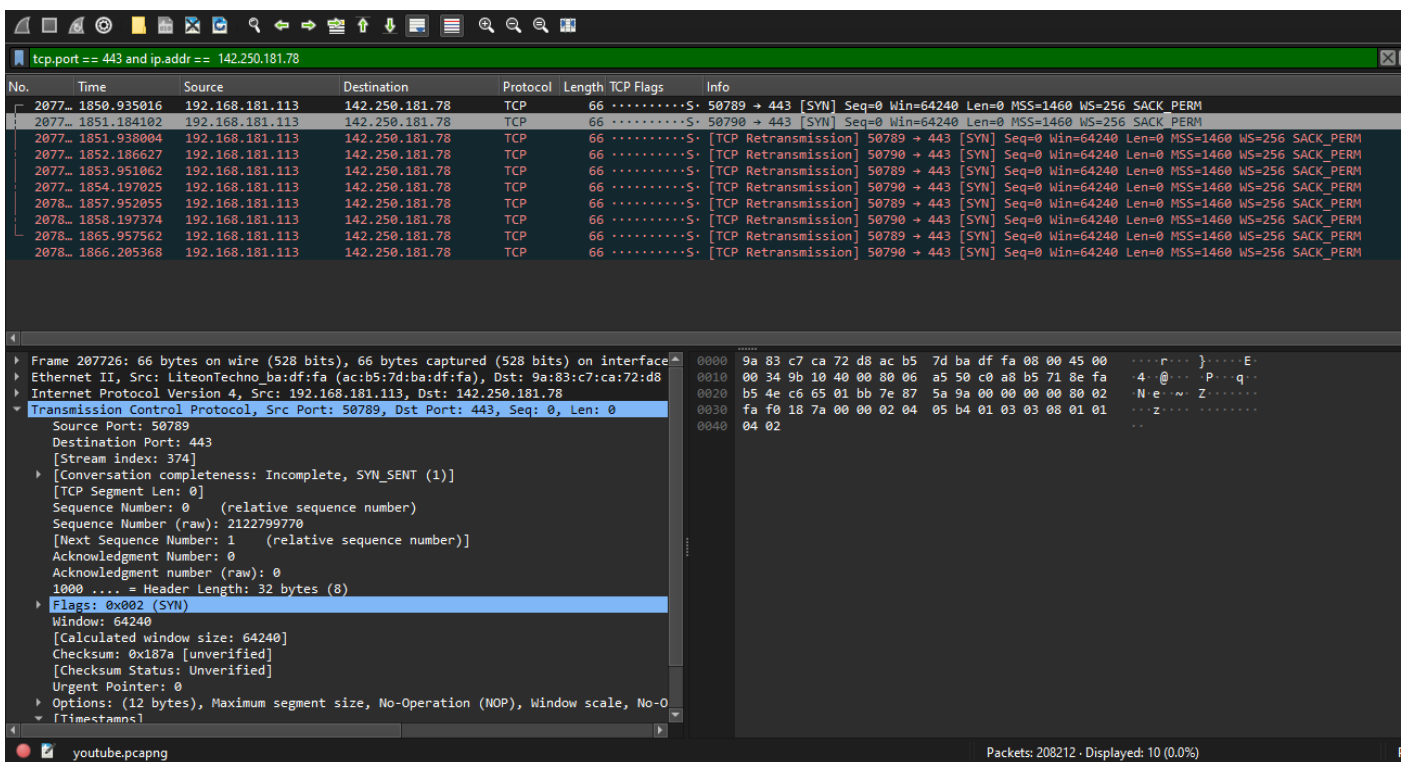
## Filtering HTTP Traffic to and from Specific IP Address in Wireshark

If you want to filter for all HTTP traffic exchanged with a specific you can use the “and” operator. If, for example, you wanted to see all HTTP traffic related to a site at you could use the following filter:

```
tcp.port == 80 and ip.addr == 192.168.181.113
```



From YouTube tcp.port == 443 and ip.addr == 142.250.181.78



## HTTP Method Filter

if you want to dig into your HTTP traffic you can filter for things like GET, PUT, POST, DELETE, HEAD, OPTIONS, CONNECT, and TRACE. To filter for these methods use the following filter syntax:

http.request.method == "GET"

http.request.method == "GET"

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
1143	699.875574	192.168.181.113	2.23.27.37	HTTP	267	.....AP...	GET /en-GB/livetile/preinstall?region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36
1846	1253.530101	192.168.181.113	178.79.238.0	HTTP	336	.....AP...	GET /msdownload/update/v3/static/trustedr/en/pinrulesstl.cab?ce09e6c88a6a5ad6 HTTP/1.1

[Window size scaling factor: 256]  
Checksum: 0xee76 [unverified]  
[Checksum Status: Unverified]  
Urgent Pointer: 0

Timestamps  
[Time since first frame in this TCP stream: 0.155120000 seconds]  
[Time since previous frame in this TCP stream: 0.000801000 seconds]

SEQ/ACK analysis  
[iRTT: 0.154319000 seconds]  
[Bytes in flight: 213]  
[Bytes sent since last PSH flag: 213]  
TCP payload (213 bytes)

Hypertext Transfer Protocol  
GET /en-GB/livetile/preinstall?region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36 HTTP/1.1  
[Expert Info (Chat/Sequence): GET /en-GB/livetile/preinstall?region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36]  
[GET /en-GB/livetile/preinstall?region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36]  
[Severity level: Chat]  
[Group: Sequence]  
Request Method: GET  
Request URI: /en-GB/livetile/preinstall?region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36  
Request URI Path: /en-GB/livetile/preinstall  
Request URI Query: region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36  
Request URI Query Parameter: region=PK  
Request URI Query Parameter: appid=C98EA580842D8B94058BF071E1DA76512D21FE36  
Request URI Query Parameter: FORM=Threshold  
Request Version: HTTP/1.1  
Connection: Keep-Alive\r\n\r\nUser-Agent: Microsoft-WNS/10.0\r\n\r\nHost: tile-service.weather.microsoft.com\r\n\r\n\r\n[Full request URI: http://tile-service.weather.microsoft.com/en-GB/livetile/preinstall?region=PK&appid=C98EA580842D8B94058BF071E1DA76512D21FE36]  
[HTTP request 1/1]  
[Response in frame: 1144141]

This packet will be responded in the packet with this number (http.response\_in)

Packets: 208212 · Displayed: 2 (0.0%)

## POST:

http.request.method == "POST"

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
9290	81.242257	192.168.181.113	23.207.193.174	HTTP/XL	326	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
15129	102.939662	192.168.181.113	23.207.193.174	HTTP/XL	714	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
20451	127.534252	192.168.181.113	23.207.193.174	HTTP/XL	270	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
24446	149.289431	192.168.181.113	23.207.193.174	HTTP/XL	1298	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
36144	170.950672	192.168.181.113	23.207.193.174	HTTP/XL	326	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
39114	192.346551	192.168.181.113	23.207.193.174	HTTP/XL	78	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
94918	514.489081	192.168.181.113	23.207.193.174	HTTP/XL	326	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
99263	536.472770	192.168.181.113	23.207.193.174	HTTP/XL	78	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
1041	558.164574	192.168.181.113	23.207.193.174	HTTP/XL	326	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
1083	579.936709	192.168.181.113	104.124.110.65	HTTP/XL	326	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
1084	589.138668	192.168.181.113	104.124.110.65	HTTP/XL	714	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
1112	631.699097	192.168.181.113	104.124.110.65	HTTP/XL	270	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
1123	653.131373	192.168.181.113	104.124.110.65	HTTP/XL	1298	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1
1133	674.575271	192.168.181.113	104.124.110.65	HTTP/XL	326	.....AP...	POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1

[Expert Info (Chat/Sequence): POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1]  
[POST /fwlink/?LinkId=252669&clid=0x409 HTTP/1.1\r\n]  
[Severity level: Chat]  
[Group: Sequence]  
Request Method: POST  
Request URI: /fwlink/?LinkId=252669&clid=0x409  
Request URI Path: /fwlink/  
Request URI Query: LinkID=252669&clid=0x409  
Request URI Query Parameter: LinkID=252669  
Request URI Query Parameter: clid=0x409  
Request Version: HTTP/1.1  
Connection: Keep-Alive\r\n\r\nContent-Type: text/xml; charset="UTF-16LE"\r\n\r\nUser-Agent: MICROSOFT\_DEVICE\_METADATA\_RETRIEVAL\_CLIENT\r\n\r\nSOAPAction: "http://schemas.microsoft.com/windowsmetadata/services/2007/09/18/dms"  
Content-Length: 2060\r\n\r\nHost: go.microsoft.com\r\n\r\n\r\n[Full request URI: http://go.microsoft.com/fwlink/?LinkId=252669&clid=0x409]  
[HTTP request 1/1]  
[Response in frame: 15159]  
File Data: 2060 bytes

Frame (714 bytes) Reassembled TCP (2406 bytes) Decoded UTF-16LE text (1032 bytes)

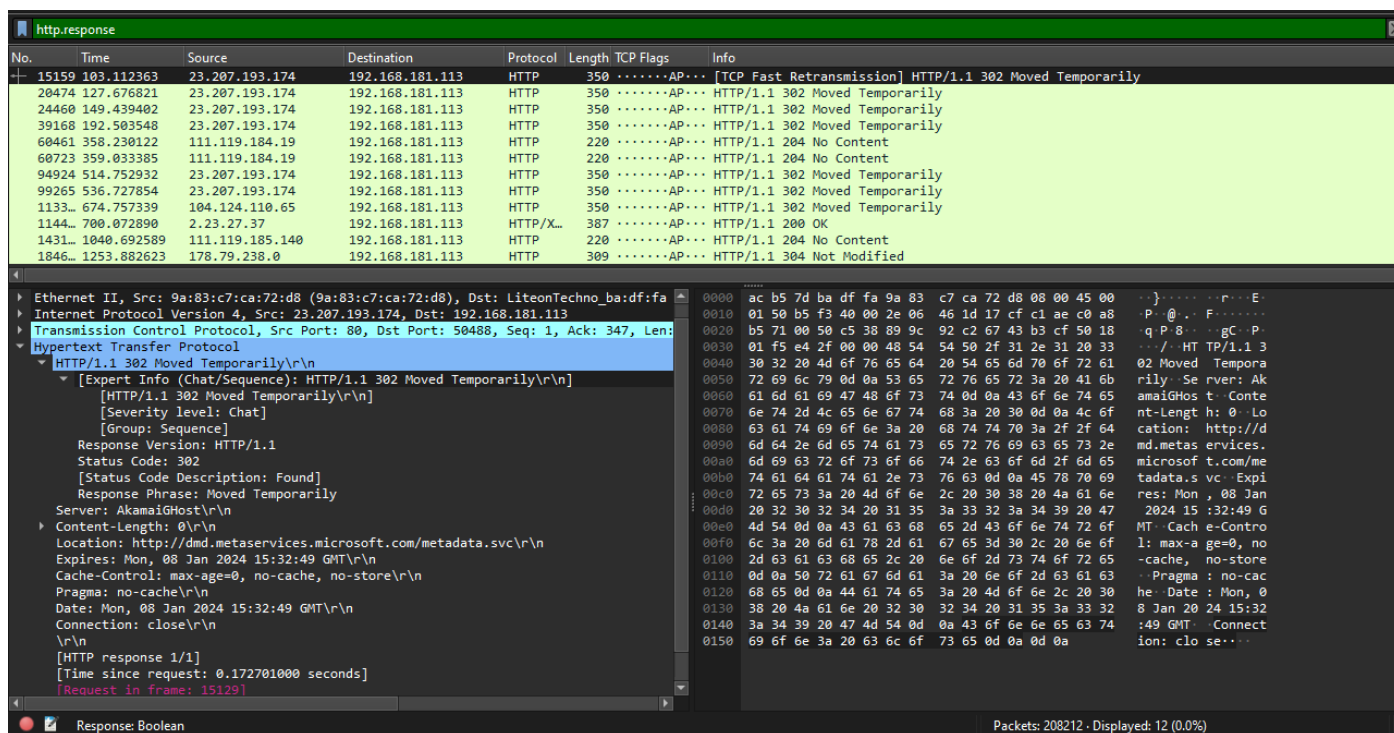
Packets: 208212 · Displayed: 16 (0.0%) Prof

## HTTP RESPONSE FILTER:

One of the many valuable bits of information in a HTTP conversation is the response. This is the code a website returns that tells the status of the asset that was requested. You've probably seen things like Error 404 (Not Found) and 403 (Forbidden). These are HTTP responses and only a couple of the many that exist.

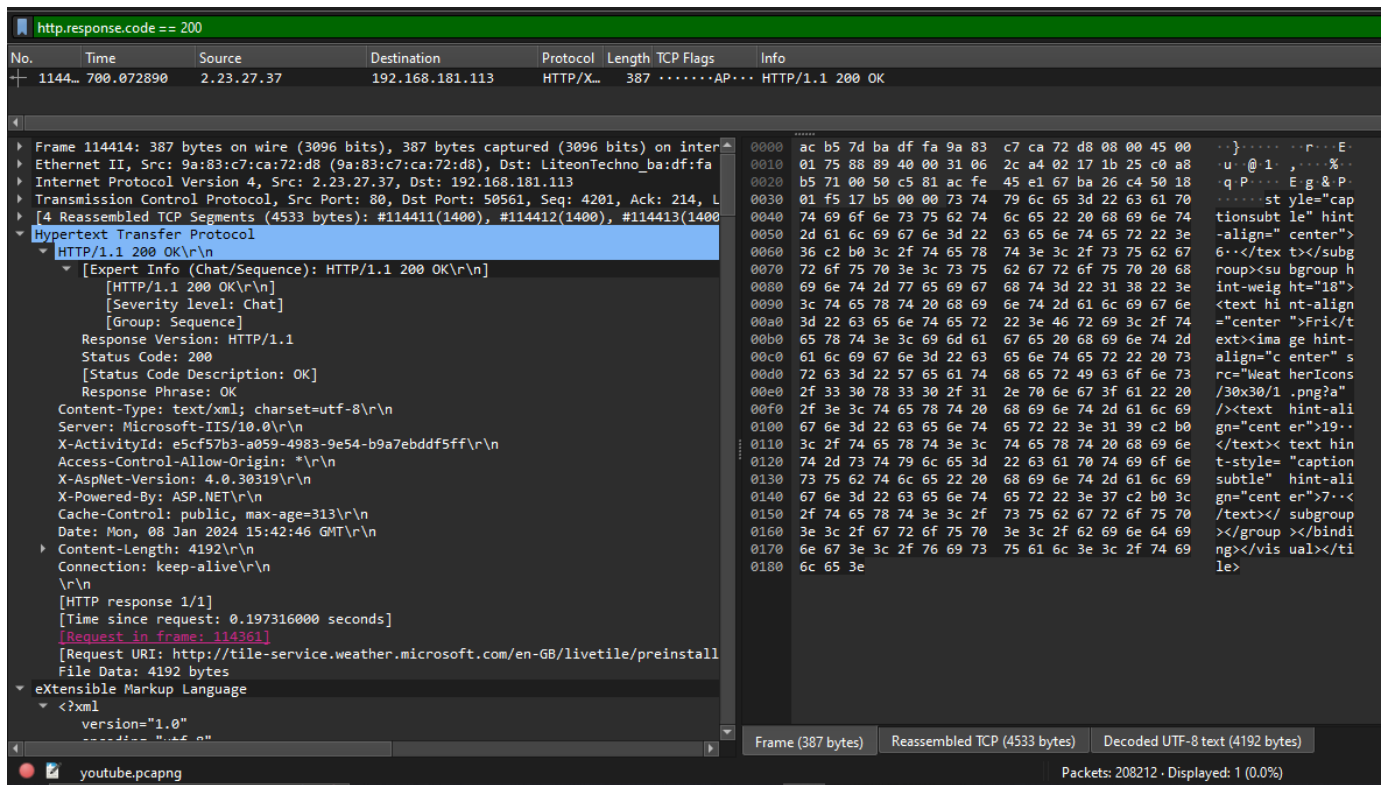
To filter for all responses enter the following display filter:

`http.response`



The Wireshark display filter `http.response.code == 200` is used to filter and display only those packets where the HTTP response code is 200. This filter is particularly useful when you want to focus on successful HTTP responses, as HTTP response code 200 indicates a successful request.

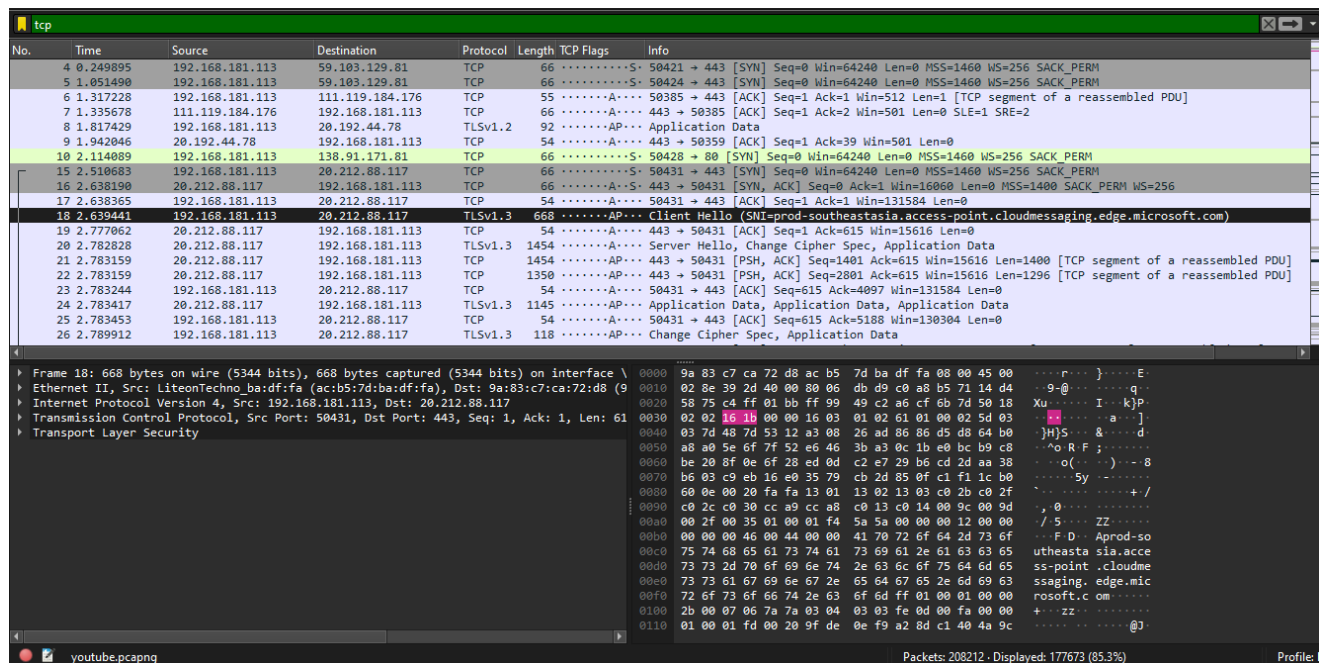




## TCP Filter for YouTube:

### 1. tcp

Captures all TCP traffic related to YouTube, providing a comprehensive overview of both incoming and outgoing connections.



Capture TCP traffic on port 443 (HTTP) to/from YouTube:

tcp.port == 443 and ip.addr == 142.250.181.78

DISPLAYED: 10 Packets  
 Filters TCP traffic on port 443 with a source or destination IP address of 142.250.181.78, displaying a total of 10 packets meeting these criteria.

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
2077	1850.935016	192.168.181.113	142.250.181.78	TCP	66	.....S.	50789 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2077	1851.184102	192.168.181.113	142.250.181.78	TCP	66	.....S.	50790 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2077	1851.938004	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50789 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2077	1852.186627	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50790 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2077	1853.951062	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50789 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2077	1854.197025	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50790 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2078	1857.952055	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50789 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2078	1858.197374	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50790 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2078	1865.957562	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50789 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
2078	1866.205368	192.168.181.113	142.250.181.78	TCP	66	.....S.	[TCP Retransmission] 50790 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM

Field	Value
[Next Sequence Number: 1 (relative sequence number)]	
Acknowledgment Number: 0	
Acknowledgment number (raw): 0	
1000 .... = Header Length: 32 bytes (8)	
Flags: 0x002 (SYN)	
Window: 64240	
[Calculated window size: 64240]	
Checksum: 0x187a [unverified]	
[Checksum Status: Unverified]	
Urgent Pointer: 0	
Options: (12 bytes), Maximum segment size, No-Operation (NOP), Window scale, No-Operation	
[Timestamps]	
[Time since first frame in this TCP stream: 1.002988000 seconds]	
[Time since previous frame in this TCP stream: 1.002988000 seconds]	
[SEQ/ACK analysis]	
[TCP Analysis Flags]	
[Expert Info (Note/Sequence): This frame is a (suspected) retransmission]	
[This frame is a (suspected) retransmission]	
[Severity level: Note]	
[Group: Sequence]	
[The RTO for this segment was: 1.002988000 seconds]	
[RTO based on delta from frame: 207726]	

## Capture TCP traffic from computer to YouTube servers:

ip.src == 192.168.181.113 and ip.dst == 142.250.181.78  
 Displayed: 1958 (0.9%)

Captures TCP traffic from the local computer (source IP 192.168.181.113) to YouTube servers (destination IP 142.250.181.78), displaying 1958 packets, and representing 0.9% of the total captured traffic.

ip.src == 192.168.181.113 and ip.dst == 142.250.181.78

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
125	6.916123	192.168.181.113	142.250.181.78	QUIC	1292		Initial, DCID=e9de82fddbf9cf6f, PKN: 1, PADDING, CRYPTO, PADDING, PING, PADDING, CRYPTO, CRYPTO
144	6.951961	192.168.181.113	142.250.181.78	QUIC	123		0-RTT, DCID=e9de82fddbf9cf6f
166	7.004007	192.168.181.113	142.250.181.78	QUIC	1288		0-RTT, DCID=e9de82fddbf9cf6f
167	7.004249	192.168.181.113	142.250.181.78	QUIC	769		0-RTT, DCID=e9de82fddbf9cf6f
179	7.087169	192.168.181.113	142.250.181.78	QUIC	121		Handshake, DCID=e9de82fddbf9cf6f
180	7.087510	192.168.181.113	142.250.181.78	QUIC	73		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
182	7.117055	192.168.181.113	142.250.181.78	QUIC	74		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
184	7.169369	192.168.181.113	142.250.181.78	QUIC	74		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
209	7.273668	192.168.181.113	142.250.181.78	QUIC	75		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
212	7.274006	192.168.181.113	142.250.181.78	QUIC	77		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
213	7.274165	192.168.181.113	142.250.181.78	QUIC	73		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
228	7.292079	192.168.181.113	142.250.181.78	QUIC	73		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
230	7.292343	192.168.181.113	142.250.181.78	QUIC	73		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
233	7.292982	192.168.181.113	142.250.181.78	QUIC	73		Protected Payload (KP0), DCID=e9de82fddbf9cf6f
238	7.295257	192.168.181.113	142.250.181.78	QUIC	73		Protected Payload (KP0), DCID=e9de82fddbf9cf6f

[Checksum Status: Unverified]  
[Stream index: 16]  
[Timestamps]  
[Time since first frame: 0.171046000 seconds]  
[Time since previous frame: 0.001070000 seconds]  
UDP payload (79 bytes)  
QUIC IEIF  
QUIC Connection Information  
[Packet Length: 79]  
1... .. = Header Form: Long Header (1)  
1... .. = Fixed Bit: True  
..10... .. = Packet Type: Handshake (2)  
Version: 1 (0x00000001)  
Destination Connection ID Length: 8  
Destination Connection ID: e9de82fddbf9cf6f  
Source Connection ID Length: 0  
Length: 62  
[Expert Info (Warning/Decryption): Failed to create decryption context: Secrets are not available]  
[Failed to create decryption context: Secrets are not available]  
[Severity level: Warning]  
[Group: Decryption]  
Remaining Payload: c885571b956278417abfecb5c9e10c57c565fb2be64689d4b0b7a9bd29ca

Packets: 208212 · Displayed: 1958 (0.9%) Profile: Def

## Capture TCP traffic from YouTube servers to your computer:

ip.src == 142.250.181.78 and ip.dst == 192.168.181.113

DISPLAYED: 5762 (2.8%)

Captures TCP traffic from YouTube servers (source IP 142.250.181.78) to your computer (destination IP 192.168.181.113), displaying 5762 packets, and constituting 2.8% of the total captured traffic.

ip.src == 142.250.181.78 and ip.dst == 192.168.181.113

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
164	6.999662	142.250.181.78	192.168.181.113	QUIC	1292		Initial, SCID=e9de82fddbf9cf6f, PKN: 1, ACK, PADDING
175	7.085798	142.250.181.78	192.168.181.113	QUIC	1292		Protected Payload (KP0)
176	7.085798	142.250.181.78	192.168.181.113	QUIC	846		Protected Payload (KP0)
177	7.085798	142.250.181.78	192.168.181.113	QUIC	204		Protected Payload (KP0)
178	7.086099	142.250.181.78	192.168.181.113	QUIC	66		Protected Payload (KP0)
183	7.138963	142.250.181.78	192.168.181.113	QUIC	166		Protected Payload (KP0)
206	7.272969	142.250.181.78	192.168.181.113	QUIC	1288		Protected Payload (KP0)
207	7.273252	142.250.181.78	192.168.181.113	QUIC	1292		Protected Payload (KP0)
208	7.273471	142.250.181.78	192.168.181.113	QUIC	1288		Protected Payload (KP0)
210	7.273730	142.250.181.78	192.168.181.113	QUIC	1292		Protected Payload (KP0)
211	7.273730	142.250.181.78	192.168.181.113	QUIC	87		Protected Payload (KP0)
224	7.291367	142.250.181.78	192.168.181.113	QUIC	1287		Protected Payload (KP0)
225	7.291683	142.250.181.78	192.168.181.113	QUIC	1292		Protected Payload (KP0)
226	7.291871	142.250.181.78	192.168.181.113	QUIC	1292		Protected Payload (KP0)
227	7.291871	142.250.181.78	192.168.181.113	QUIC	1292		Protected Payload (KP0)

Ethernet II, Src: 9a:83:c7:ca:72:d8 (9a:83:c7:ca:72:d8), Dst: LiteonTechno\_ba:df:fa  
Internet Protocol Version 4, Src: 142.250.181.78, Dst: 192.168.181.113  
User Datagram Protocol, Src Port: 443, Dst Port: 52434  
Source Port: 443  
Destination Port: 52434  
Length: 170  
Checksum: 0x6af6 [unverified]  
[Checksum Status: Unverified]  
[Stream index: 16]  
[Timestamps]  
[Time since first frame: 0.169675000 seconds]  
[Time since previous frame: 0.000000000 seconds]  
UDP payload (162 bytes)  
QUIC IEIF  
QUIC Connection information  
[Connection Number: 1]  
[Packet Length: 162]  
QUIC Short Header  
0... .. = Header Form: Short Header (0)  
1... .. = Fixed Bit: True  
..0... .. = Spin Bit: False  
Remaining Payload [truncated]: 29e5d12c544dd63894026a6d95ed10614a1e3a31c3c99c293c

Packets: 208212 · Displayed: 5762 (2.8%) Profile: Def

## Capture TCP traffic on port 19305 (commonly used for YouTube RTMFP - Real-Time Messaging Protocol):

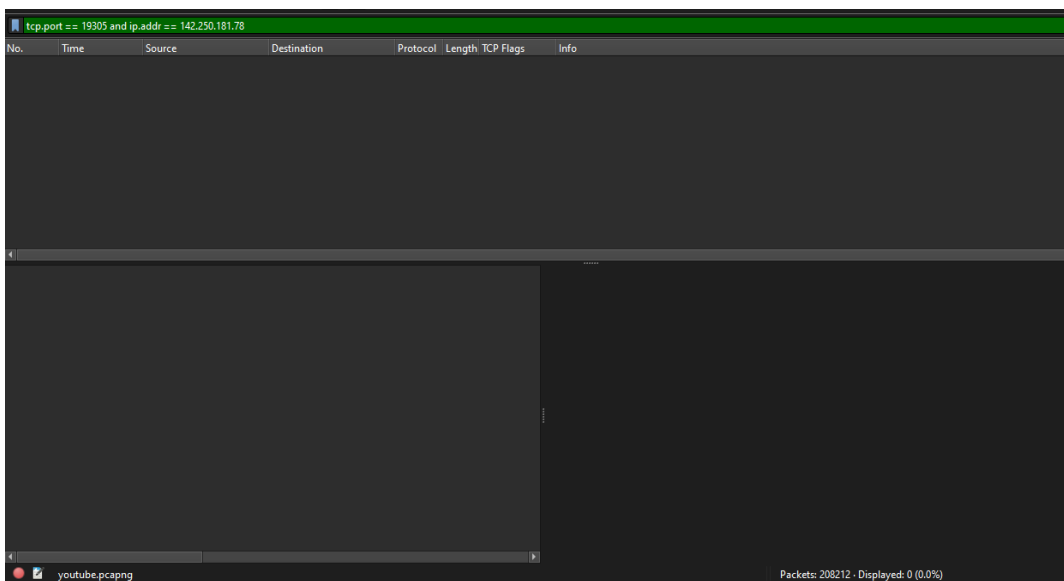
You are seeing zero displayed packets, there could be several reasons for this:

### 1. No RTMFP Traffic:

- It's possible that there is no RTMFP traffic on the network during the time of your capture. RTMFP is specific to applications that use Adobe technologies, and not all applications or websites utilize this protocol.

### 2. Encryption or Other Protocols:

- RTMFP traffic may be encrypted or encapsulated within another protocol, making it harder to capture or recognize using a simple port-based filter.



## Capture TCP traffic with a specific sequence number range:

```
tcp.seq >=1000 and tcp.seq <= 2000
```

Captures TCP traffic with sequence numbers between 1000 and 2000, focusing on a specific range of sequence numbers for analysis.



tcp.seq >= 1000 and tcp.seq <= 2000									
No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info		
21	2.783159	20.212.88.117	192.168.181.113	TCP	1454	.....AP...	443 → 50431	[PSH, ACK] Seq=1401 Ack=615 Win=15616 Len=1400	[TCP segment of a reassembled PDU]
49	3.745553	192.168.181.113	204.79.197.239	TCP	1454	.....A....	50432 → 443	[ACK] Seq=1029 Ack=155 Win=131328 Len=1400	[TCP segment of a reassembled PDU]
62	4.204803	204.79.197.239	192.168.181.113	TLSv1.2	834	.....AP...	Application Data		
87	5.087356	20.190.145.140	192.168.181.113	TCP	1454	.....A....	443 → 50433	[ACK] Seq=1401 Ack=567 Win=12582400 Len=1400	[TCP segment of a reassembled PDU]
96	5.227990	192.168.181.113	20.190.145.140	TLSv1.2	1293	.....AP...	Application Data		
133	6.947066	192.168.181.113	20.189.173.6	TCP	1454	.....A....	50405 → 443	[ACK] Seq=1401 Ack=1 Win=514 Len=1400	[TCP segment of a reassembled PDU]
195	7.234065	192.168.181.113	142.250.181.138	TLSv1.3	128	.....AP...	Change Cipher Spec		
266	7.335353	192.168.181.113	142.250.181.138	TCP	54	.....A....	50436 → 443	[ACK] Seq=1138 Ack=1350 Win=130048 Len=0	
405	9.254111	192.168.181.113	20.189.173.3	TCP	54	.....A....	50425 → 443	[ACK] Seq=1376 Ack=40 Win=511 Len=0	
422	9.591146	192.168.181.113	20.189.173.3	TLSv1.2	89	.....AP...	Application Data		
423	9.600794	192.168.181.113	20.189.173.3	TLSv1.2	138	.....AP...	Application Data		
424	9.600912	192.168.181.113	20.189.173.3	TLSv1.2	850	.....AP...	Application Data		

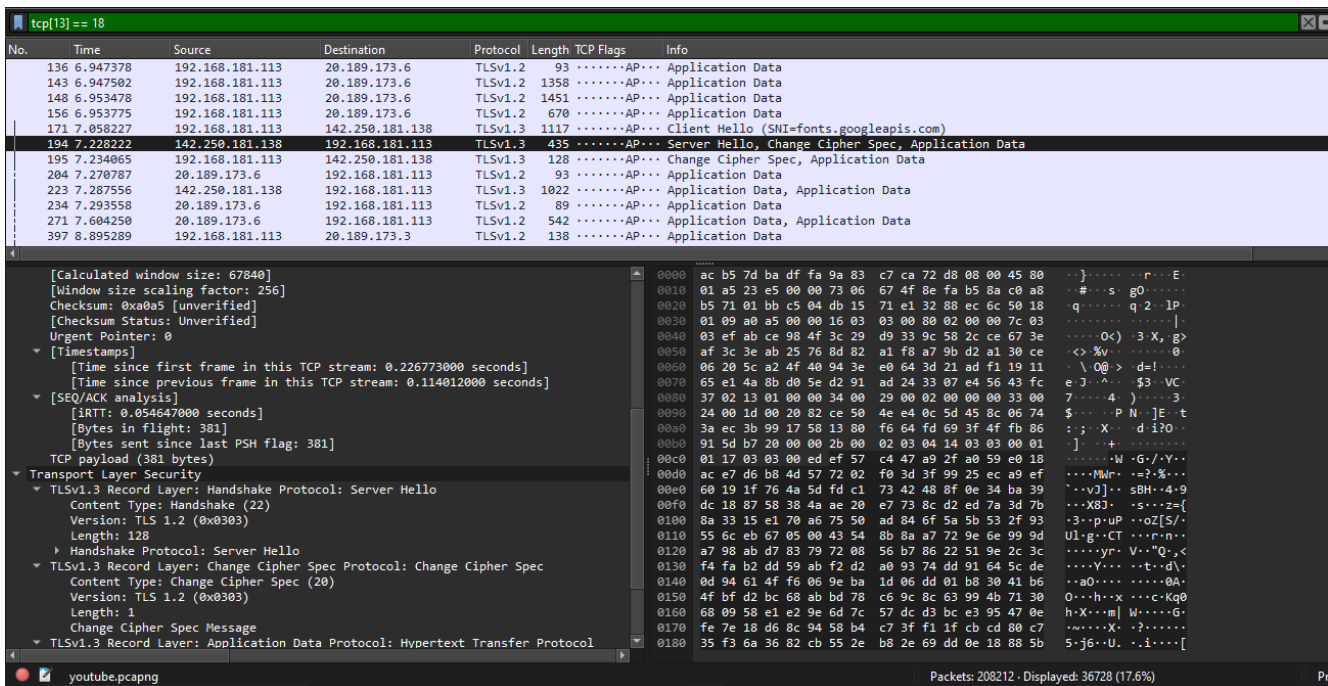
  

[Checksum Status: Unverified]	0000	9a 83 c7 ca 72 d8 ac b5 7d ba df fa 08 00 45 00	.....}	....E
Urgent Pointer: 0	0010	00 72 97 5f 40 00 00 06 a8 87 c0 a8 b5 71 8e fa	.....q	.....
[Timestamps]	0020	b5 8a c5 04 01 bb 32 88 ec 6c db 15 73 5e 50 18	.....2	....s^P
[Time since first frame in this TCP stream: 0.232616000 seconds]	0030	02 00 2a 76 00 00 14 03 03 00 01 01 17 03 03 00	.....v	.....
[Time since previous frame in this TCP stream: 0.005843000 seconds]	0040	3f f7 98 4a a1 df fd aa ff e1 36 47 e2 36 df b4	.....J	.....6G6
[SEQ/ACK analysis]	0050	a0 8a 2a 47 c1 50 1d 95 7a a1 80 9d c5 1a 2f 33	.....*G	.....Pz...../3
[This is an ACK to the segment in frame: 194]	0060	52 f7 42 7f 63 da 19 18 91 b9 23 68 1a 4a f0 b1	.....R B	.....c.....#h J
[The RTT to ACK the segment was: 0.005843000 seconds]	0070	dc c4 c5 dd 5d 17 98 a7 03 3e 73 1d 0b 79 6c 5a	.....]	.....>s...y1Z
[iRTT: 0.054647000 seconds]				
[Bytes in flight: 74]				
[Bytes sent since last PSH flag: 74]				
TCP payload (74 bytes)				
Transport Layer Security				
TLSv1.3 Record Layer: Change Cipher Spec Protocol: Change Cipher Spec				
Content Type: Change Cipher Spec (20)				
Version: TLS 1.2 (0x0303)				
Length: 1				
Change Cipher Spec Message				
TLSv1.3 Record Layer: Application Data Protocol: Hypertext Transfer Protocol				
Opaque Type: Application Data (23)				
Version: TLS 1.2 (0x0303)				
Length: 63				
Encrypted Application Data: f7984aa1dfffdaaffe13647e236dfb4a08a2a47c1501d957aa1				
[Application Data Protocol: Hypertext Transfer Protocol]				

## Capture TCP traffic with specific TCP flags set (e.g., SYN and ACK):

```
tcp[13] == 18
DISPLAYED: 36728 (17.6%)
```

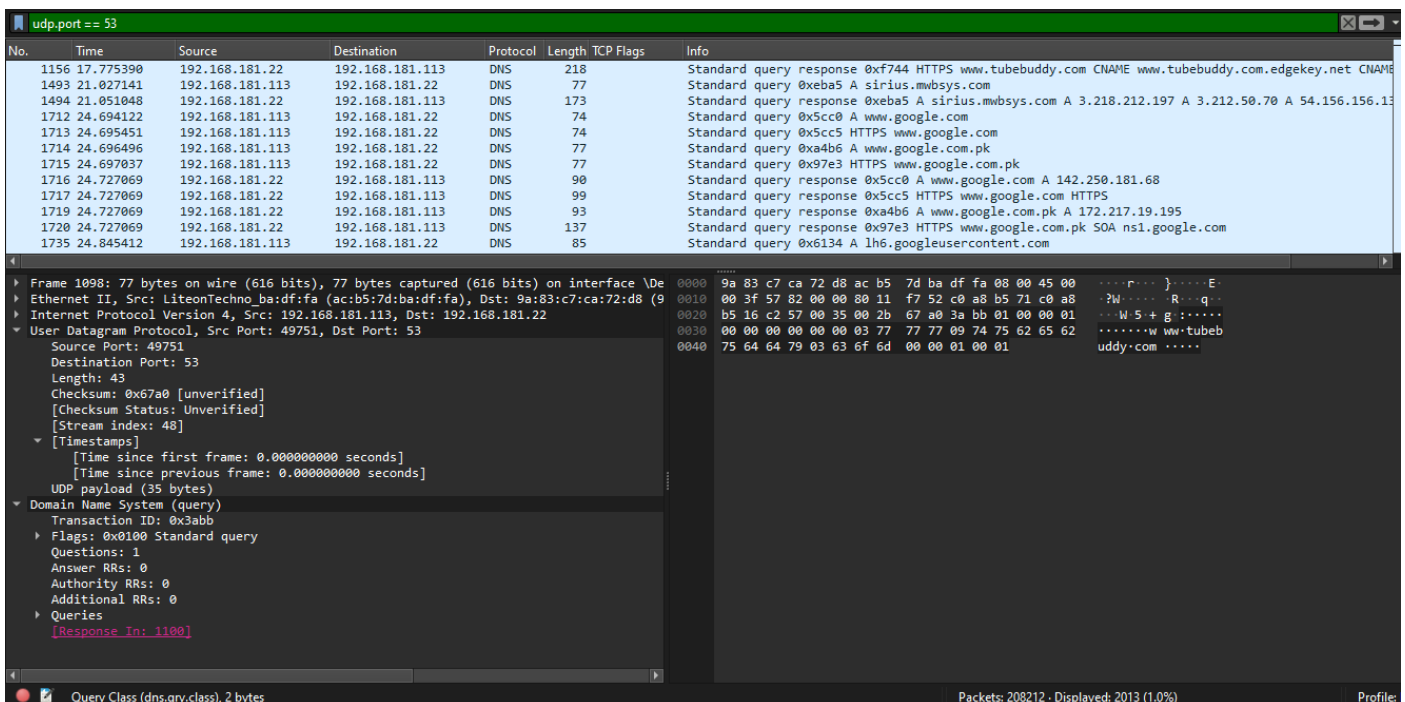
Captures TCP traffic with specific flags set (e.g., SYN and ACK) by filtering on the 13th byte of the TCP header, displaying 36,728 packets, representing 17.6% of the total captured traffic. Filters TCP traffic with specific flags set, focusing on the 13th byte of the TCP header to capture packets with intricate flag combinations (e.g., SYN and ACK). The displayed count of 36,728 packets accounts for 17.6% of the total captured traffic, providing insights into nuanced TCP communications.



## Filter for DNS queries:

udp.port == 53  
Displayed: 2013 (1%)

Filters DNS queries by capturing UDP traffic on port 53, displaying 2013 packets, constituting 1% of the total captured traffic.



udp.port == 53 and dns.qry.name contains "youtube"

Displayed: 178

Filters DNS queries related to YouTube by capturing UDP traffic on port 53 and checking if the DNS query name contains "YouTube", displaying 178 relevant packets.

Wireshark packet capture showing DNS queries to YouTube. The filter is "udp.port == 53 and dns.qry.name contains 'youtube'". The packet list shows 178 packets. The packet details pane shows a DNS query response for "www.youtube.com".

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
967	16.680022	192.168.181.113	192.168.181.22	DNS	75		Standard query 0x492f A www.youtube.com
968	16.692445	192.168.181.22	192.168.181.113	DNS	272		Standard query response 0xa529 A www.youtube.com CNAME youtube-ui.l.google.com A 172.217.19.206
970	16.708754	192.168.181.22	192.168.181.113	DNS	272		Standard query response 0x492f A www.youtube.com CNAME youtube-ui.l.google.com A 142.250.181.116
1048	17.170867	192.168.181.113	192.168.181.22	DNS	75		Standard query 0x8646 A www.youtube.com
1050	17.172553	192.168.181.113	192.168.181.22	DNS	75		Standard query 0x871e A www.youtube.com
1051	17.181129	192.168.181.22	192.168.181.113	DNS	272		Standard query response 0x8646 A www.youtube.com CNAME youtube-ui.l.google.com A 172.217.19.14
1052	17.217873	192.168.181.22	192.168.181.113	DNS	272		Standard query response 0x871e A www.youtube.com CNAME youtube-ui.l.google.com A 172.217.19.174
1909	25.960034	192.168.181.113	192.168.181.22	DNS	95		Standard query 0xcaf6 A suggestqueries-clients6.youtube.com
1990	25.962745	192.168.181.113	192.168.181.22	DNS	95		Standard query 0x8b27 HTTPS suggestqueries-clients6.youtube.com
1991	25.988668	192.168.181.22	192.168.181.113	DNS	111		Standard query response 0xcaf6 A suggestqueries-clients6.youtube.com A 142.250.181.78
1992	25.995229	192.168.181.22	192.168.181.113	DNS	152		Standard query response 0x8b27 HTTPS suggestqueries-clients6.youtube.com SOA ns1.google.com
2577	31.398544	192.168.181.113	192.168.181.22	DNS	80		Standard query 0xacb5 A accounts.youtube.com

Query Class (dns.qry.class), 2 bytes

Packets: 208212 · Displayed: 178 (0.1%)

Profile: Default

Filter for ICMP (ping) packets:

Wireshark packet capture showing ICMP (ping) packets. The filter is "icmp". The packet list shows 7 packets. The packet details pane shows an ICMP destination unreachable message.

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
2075..	1819.608099	192.168.181.22	192.168.181.113	ICMP	161	.....AP..	Destination unreachable (Network unreachable)
2075..	1819.609248	192.168.181.22	192.168.181.113	ICMP	590	.....AP..	Destination unreachable (Network unreachable)
2075..	1824.498986	192.168.181.22	192.168.181.113	ICMP	117	.....AP..	Destination unreachable (Network unreachable)
2078..	1859.865051	192.168.181.22	192.168.181.113	ICMP	94	.....S..	Destination unreachable (Network unreachable)
2078..	1862.830650	192.168.181.22	192.168.181.113	ICMP	82	.....A...F	Destination unreachable (Network unreachable)
2078..	1866.044918	192.168.181.22	192.168.181.113	ICMP	83	.....A...F	Destination unreachable (Network unreachable)
2080..	1870.606456	192.168.181.22	192.168.181.113	ICMP	94	.....S..	Destination unreachable (Network unreachable)

Sequence Number: 1561884819

[Stream index: 185]

Conversation completeness: Complete, WITH\_DATA (47)

Acknowledgment Number: 433411796 (relative ack number)

Acknowledgment number (raw): 433411796

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

Flags: 0x018 (PSH, ACK)

Window: 509

[Calculated window size: 509]

[Window size scaling factor: 256]

Checksum: 0x5b3e [unverified]

[Checksum Status: Unverified]

Urgent Pointer: 0

[Timestamps]

[Time since first frame in this TCP stream: 851.232401000 seconds]

[Time since previous frame in this TCP stream: 0.001119000 seconds]

TCP payload (79 bytes)

Transport Layer Security

TLSv1.3 Record Layer: Application Data Protocol: Hypertext Transfer Protocol

Opaque Type: Application Data (23)

Version: TLS 1.2 (0x0303)

Length: 74

Encrypted Application Data: 12b676d366f5ede93532af8d99ff030513a290d38d5774a

[Application Data Protocol: Hypertext Transfer Protocol]

youtube.pcapng

Packets: 208212 · Displayed: 7 (0.0%)

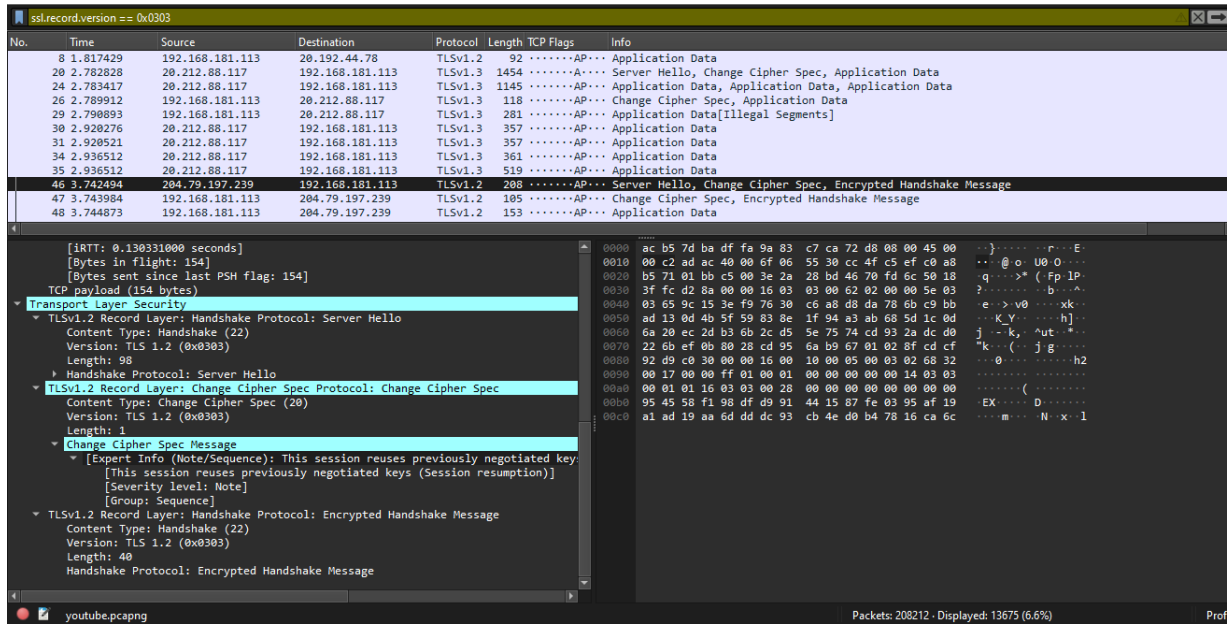
Pro

# SSL:

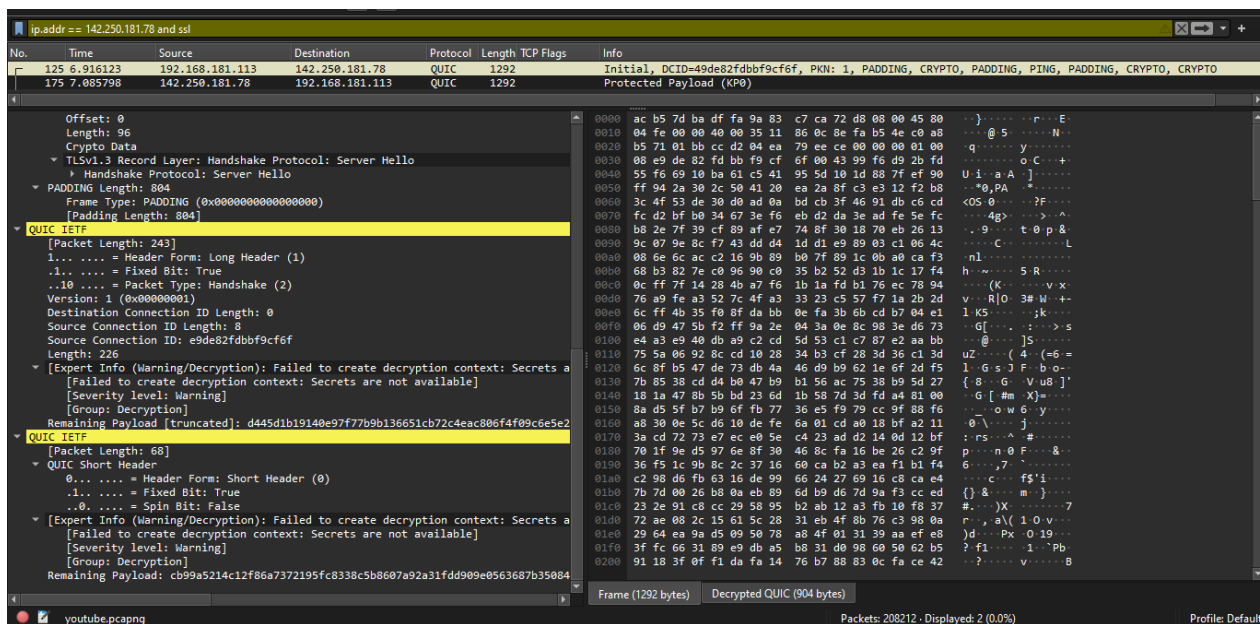
## Filter for SSL/TLS traffic with specific SSL/TLS version:

`ssl.record.version == 0x0303`

Filters SSL/TLS traffic for packets using the specific SSL/TLS version 0x0303 (TLS 1.2) in the SSL record version field.



`ip.addr == 142.250.181.78 and ssl`



Filters and displays SSL/TLS traffic associated with the IP address 142.250.181.78.

# FLAGS:

## SYN FLAG:

(captured under item #1,#2,#3)

```
tcp.flags.syn == 1
```

Displayed: 815 Fraction: 0.4%

Captures and displays TCP packets with the SYN flag set, resulting in 815 packets, constituting 0.4% of the total captured traffic (items #1, #2, #3).

The image shows a Wireshark packet capture interface. The top pane displays a list of captured packets, filtered by 'tcp.flags.syn == 1'. The middle pane shows the details of a selected packet, including the destination port (443), sequence number, and flags (SYN). The bottom pane shows the raw packet data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
1	0.000000	192.168.181.113	59.103.129.81	TCP	66	.....S.	50420 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
4	0.249895	192.168.181.113	59.103.129.81	TCP	66	.....S.	50421 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
5	1.051490	192.168.181.113	59.103.129.81	TCP	66	.....S.	50424 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
10	2.114089	192.168.181.113	138.91.171.81	TCP	66	.....S.	50428 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
15	2.510683	192.168.181.113	20.212.88.117	TCP	66	.....S.	50431 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
16	2.638190	20.212.88.117	192.168.181.113	TCP	66	.....A..S.	443 → 50431 [SYN, ACK] Seq=0 Ack=1 Win=16060 Len=0 MSS=1400 SACK_PERM WS=256
41	3.477629	192.168.181.113	204.79.197.239	TCP	66	.....S.	50432 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
42	3.607636	204.79.197.239	192.168.181.113	TCP	66	.....A..S.	443 → 50432 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1400 WS=256 SACK_PERM
77	4.805745	192.168.181.113	20.190.145.140	TCP	66	.....S.	50433 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
78	4.941732	20.190.145.140	192.168.181.113	TCP	66	.....A..S.	443 → 50433 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1400 WS=256 SACK_PERM
109	6.003405	192.168.181.113	59.103.129.75	TCP	66	.....S.	50434 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
110	6.256963	192.168.181.113	59.103.129.75	TCP	66	.....S.	50435 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
165	7.001449	192.168.181.113	142.250.181.138	TCP	66	.....S.	50436 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
168	7.018331	192.168.181.113	59.103.129.75	TCP	66	.....S.	[TCP Retransmission] 50434 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
169	7.055308	142.250.181.138	192.168.181.113	TCP	66	.....A..S.	443 → 50436 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1400 SACK_PERM WS=256
172	7.061874	192.168.181.113	59.103.129.75	TCP	66	.....S.	50437 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
203	7.269630	192.168.181.113	59.103.129.75	TCP	66	.....S.	[TCP Retransmission] 50435 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM

Destination Port: 443  
[Stream index: 3]  
[Conversation completeness: Incomplete, SYN\_SENT (1)]  
[TCP Segment Len: 0]  
Sequence Number: 0 (relative sequence number)  
Sequence Number (raw): 3027006324  
[Next Sequence Number: 1 (relative sequence number)]  
Acknowledgment Number: 0  
Acknowledgment number (raw): 0  
1000 .... = Header Length: 32 bytes (8)  
Flags: 0x002 (SYN)  
Window: 64240  
[Calculated window size: 64240]  
Checksum: 0x52b8 [unverified]  
[Checksum Status: Unverified]  
Urgent Pointer: 0  
Options: (12 bytes), Maximum segment size, No-Operation (NOP), Window scale, No-Operation  
[Timestamps]  
[Time since first frame in this TCP stream: 0.000000000 seconds]  
[Time since previous frame in this TCP stream: 0.000000000 seconds]

Syn: Boolean

Packets: 208212 · Displayed: 815 (0.4%)

From PC to YouTube:

```
tcp.flags.syn == 1
```

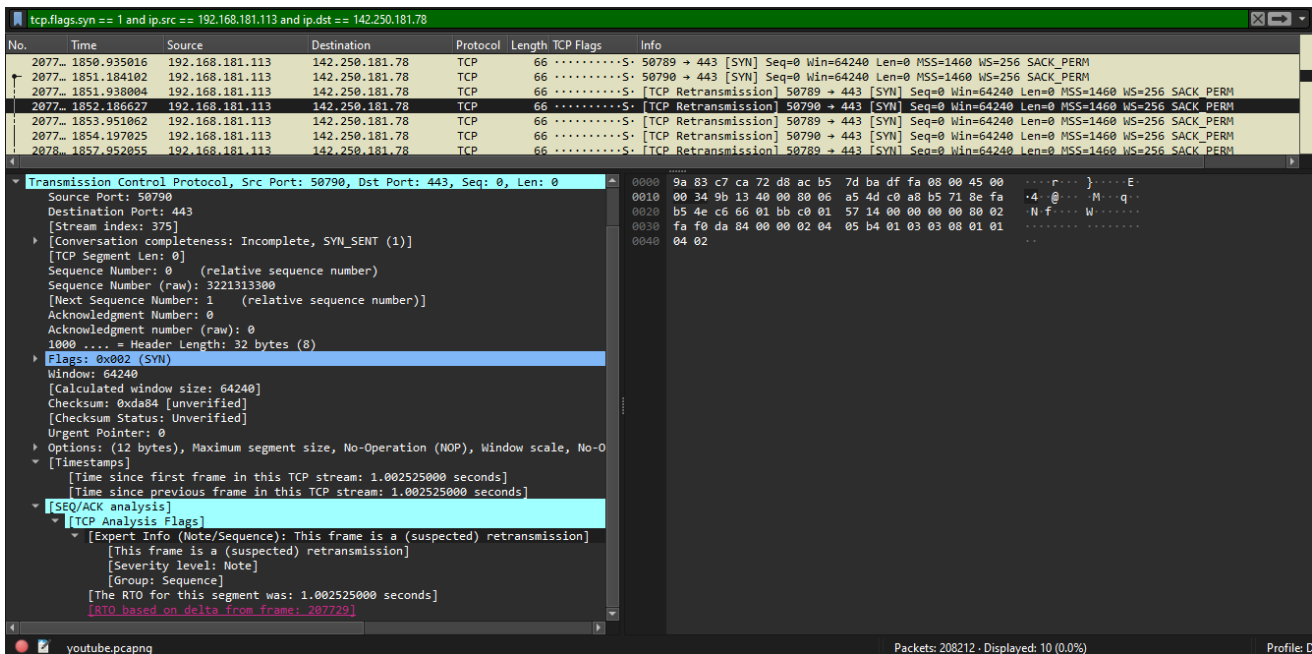
```
and ip.src == 192.168.181.113 and ip.dst == 142.250.181.78
```

Displayed: 10

Fraction: 0.0%

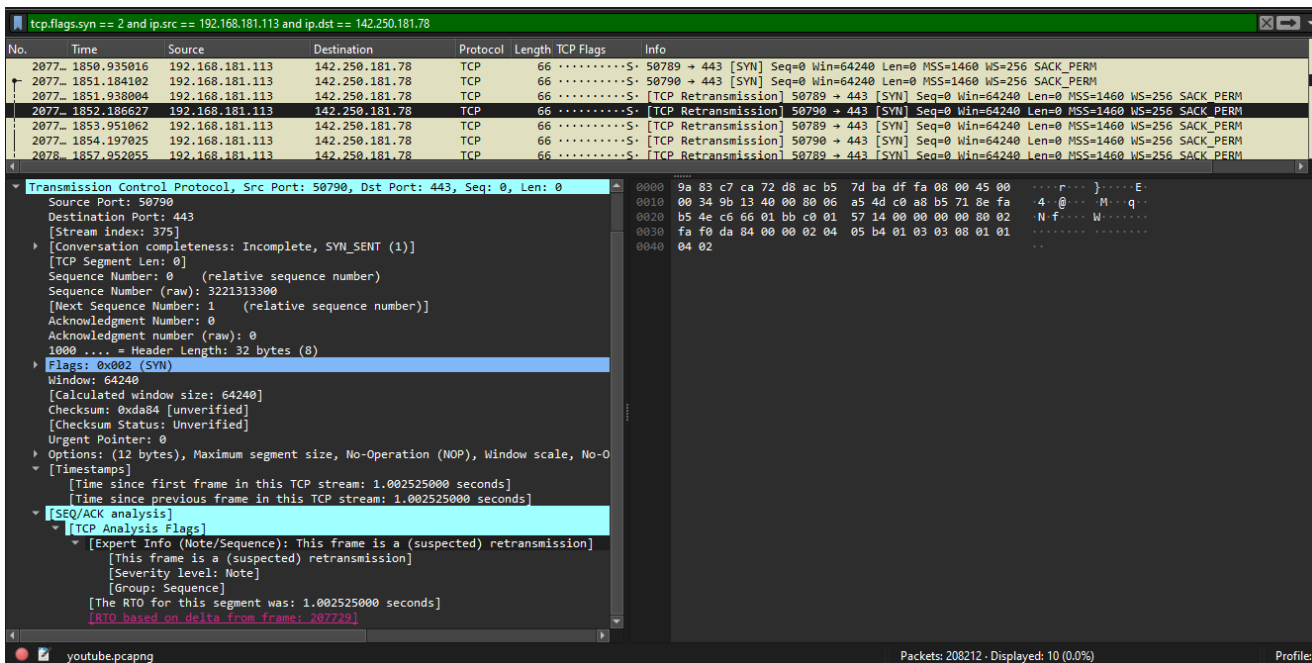
Captures TCP packets from a PC to YouTube with the SYN flag set, displaying 10 packets, representing 0.0% of the total captured traffic.





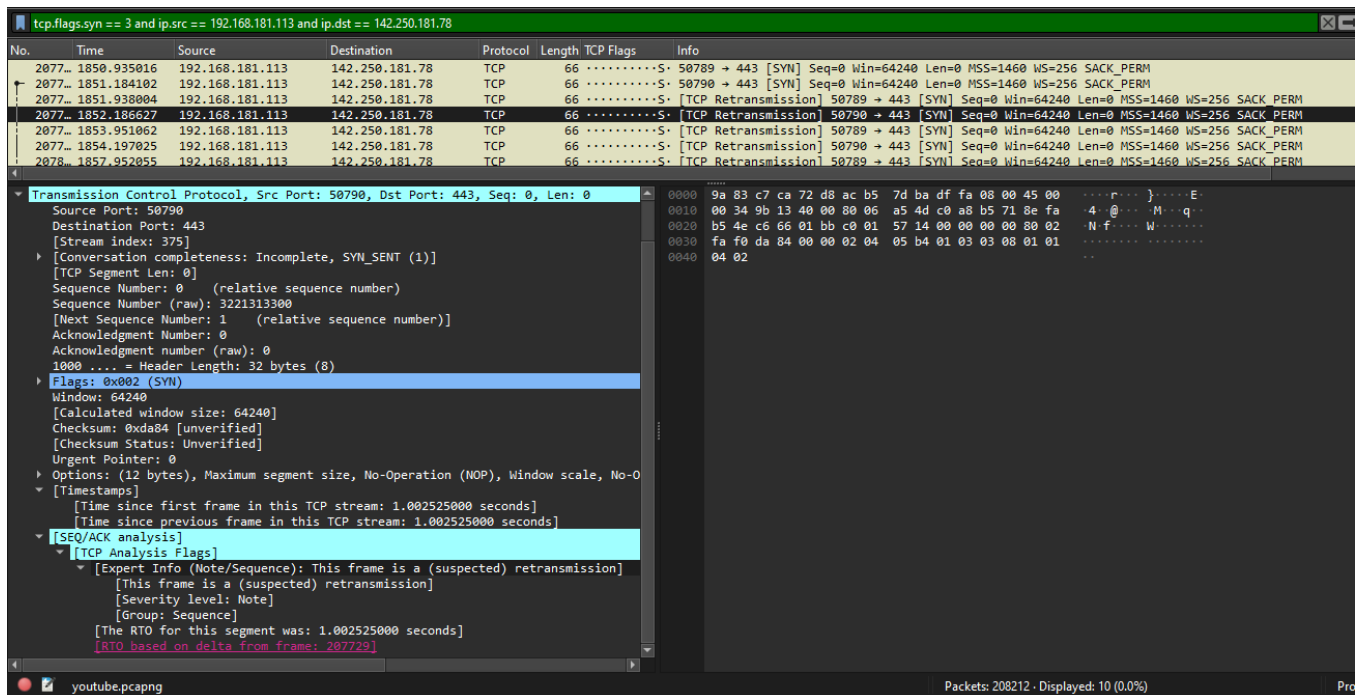
tcp.flags.syn == 2  
and ip.src == 192.168.181.113 and ip.dst == 142.250.181.78

Filters TCP packets from a PC to YouTube with the SYN flag set to 2, focusing on specific SYN values in the TCP handshake.



tcp.flags.syn == 3  
and ip.src == 192.168.181.113 and ip.dst == 142.250.181.78

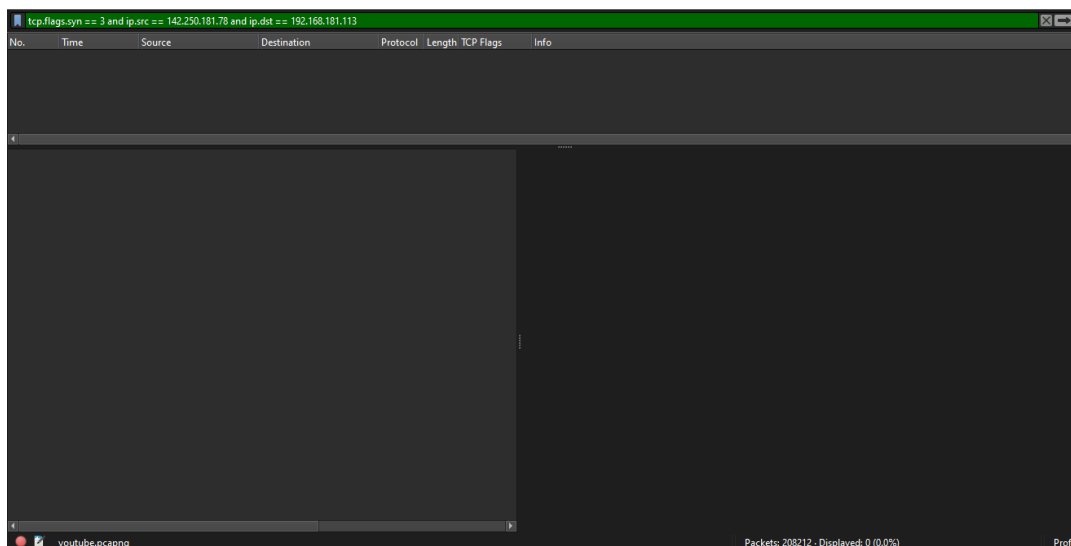
Filters TCP packets from a PC to YouTube with the SYN flag set to 3, targeting a specific condition in the TCP handshake.



FROM YouTube to PC:

0 for #3

The provided information "0 for #3" suggests that there were no TCP packets from YouTube to the PC with the specified conditions (SYN flag set to 3, source IP 192.168.181.113, and destination IP 142.250.181.78) in the captured data under item #3.



0 displayed for #2

0 displayed for #1

```
tcp.flags.syn == 1
and ip.src == 142.250.181.78 and ip.dst ==
192.168.181.113
```

Indicates that there were no displayed packets for item #2 and item #1 with the provided filters. The specific filter `tcp.flags.syn == 1 and ip.src == 142.250.181.78 and ip.dst == 192.168.181.113` focuses on capturing TCP packets with the SYN flag set from YouTube to the PC.

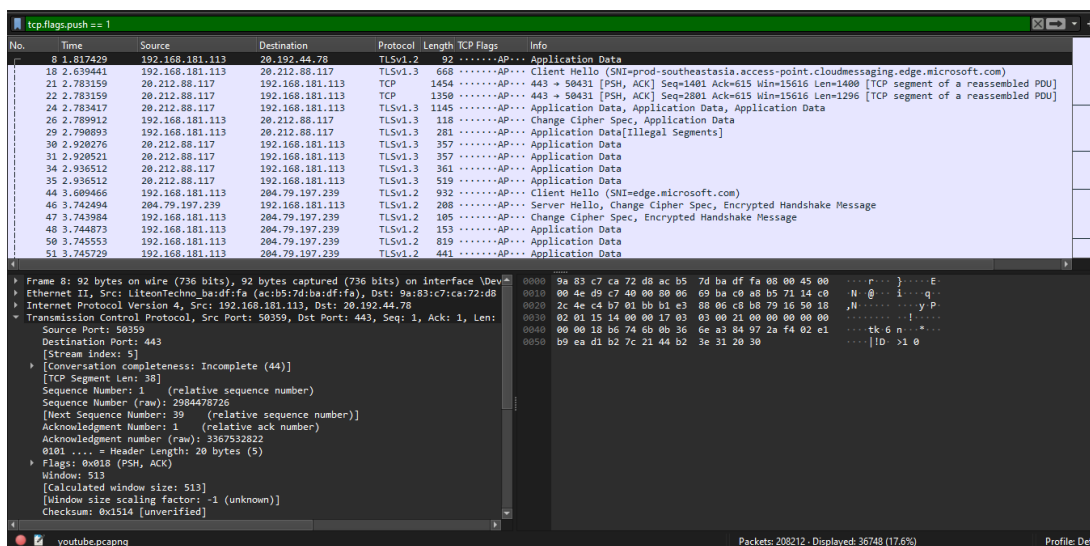
**PUSH:**

**(captured under item #1,#2,#3)**

From PC to YouTube:

```
tcp.flags.push == 1
displayed: 36748 Fraction: 17.6%
```

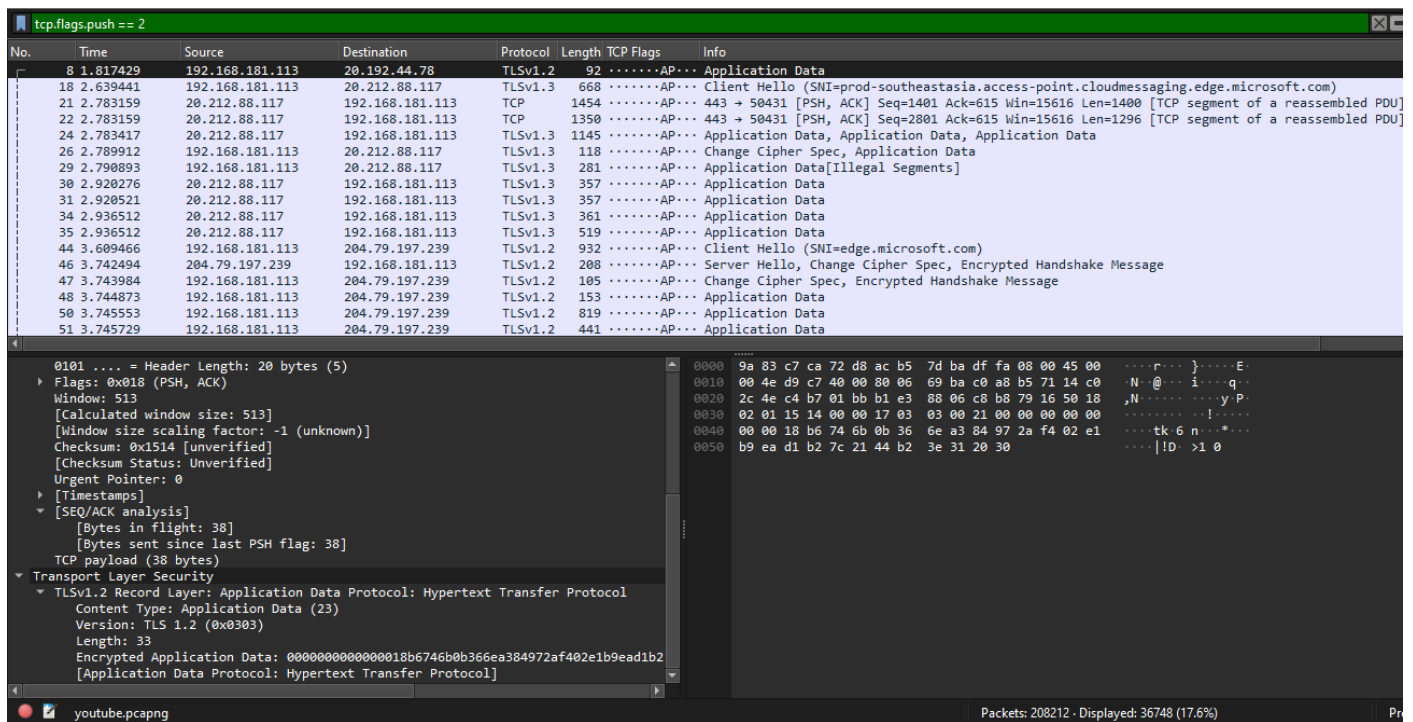
Captures and displays TCP packets with the PUSH flag set from the PC to YouTube, resulting in 36,748 packets, representing 17.6% of the total captured traffic under items #1, #2, and #3.





```
tcp.flags.push == 2
```

The filter `tcp.flags.push == 2` focuses on capturing TCP packets where the PUSH flag is set to 2, targeting a specific condition related to the PUSH flag in the TCP protocol.



No.	Time	Source	Destination	Protocol	Length	TCP Flags	Info
8	1.817429	192.168.181.113	20.192.44.78	TLSv1.2	92	.....AP...	Application Data
18	2.639441	192.168.181.113	20.212.88.117	TLSv1.3	668	.....AP...	Client Hello (SNI=prod-southeastasia.access-point.cloudmessaging.edge.microsoft.com)
21	2.783159	20.212.88.117	192.168.181.113	TCP	1454	.....AP...	443 → 50431 [PSH, ACK] Seq=1401 Ack=615 Win=15616 Len=1400 [TCP segment of a reassembled PDU]
22	2.783159	20.212.88.117	192.168.181.113	TCP	1350	.....AP...	443 → 50431 [PSH, ACK] Seq=2801 Ack=615 Win=15616 Len=1296 [TCP segment of a reassembled PDU]
24	2.783417	20.212.88.117	192.168.181.113	TLSv1.3	1145	.....AP...	Application Data, Application Data, Application Data
26	2.789912	192.168.181.113	20.212.88.117	TLSv1.3	118	.....AP...	Change Cipher Spec, Application Data
29	2.790893	192.168.181.113	20.212.88.117	TLSv1.3	281	.....AP...	Application Data[Illegal Segments]
30	2.920276	20.212.88.117	192.168.181.113	TLSv1.3	357	.....AP...	Application Data
31	2.920521	20.212.88.117	192.168.181.113	TLSv1.3	357	.....AP...	Application Data
34	2.936512	20.212.88.117	192.168.181.113	TLSv1.3	361	.....AP...	Application Data
35	2.936512	20.212.88.117	192.168.181.113	TLSv1.3	519	.....AP...	Application Data
44	3.609466	192.168.181.113	204.79.197.239	TLSv1.2	932	.....AP...	Client Hello (SNI=edge.microsoft.com)
46	3.742494	204.79.197.239	192.168.181.113	TLSv1.2	208	.....AP...	Server Hello, Change Cipher Spec, Encrypted Handshake Message
47	3.743984	192.168.181.113	204.79.197.239	TLSv1.2	105	.....AP...	Change Cipher Spec, Encrypted Handshake Message
48	3.744873	192.168.181.113	204.79.197.239	TLSv1.2	153	.....AP...	Application Data
50	3.745553	192.168.181.113	204.79.197.239	TLSv1.2	819	.....AP...	Application Data
51	3.745729	192.168.181.113	204.79.197.239	TLSv1.2	441	.....AP...	Application Data

0101 .... = Header Length: 20 bytes (5)  
Flags: 0x018 (PSH, ACK)  
Window: 513  
[Calculated window size: 513]  
[Window size scaling factor: -1 (unknown)]  
Checksum: 0x1514 [unverified]  
[Checksum Status: Unverified]  
Urgent Pointer: 0  
[Timestamps]  
[SEQ/ACK analysis]  
[Bytes in flight: 38]  
[Bytes sent since last PSH flag: 38]  
TCP payload (38 bytes)  
Transport Layer Security  
TLSv1.2 Record Layer: Application Data Protocol: Hypertext Transfer Protocol  
Content Type: Application Data (23)  
Version: TLS 1.2 (0x0303)  
Length: 33  
Encrypted Application Data: 0000000000000018b6746b0b366ea384972af402e1b9ead1b2  
[Application Data Protocol: Hypertext Transfer Protocol]

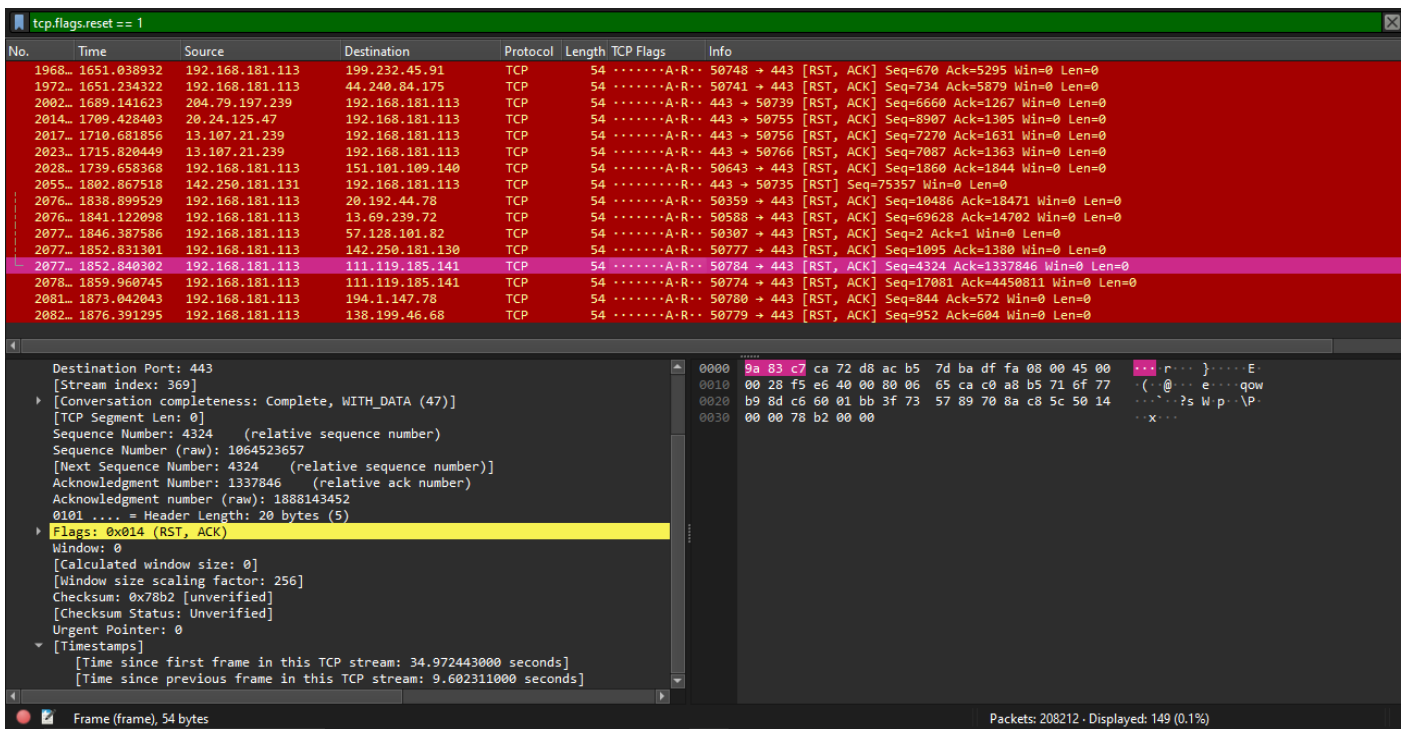
## RESET:

```
tcp.flags.reset == 1
```

Displayed: 149 Fraction:0.1%

Same display and fraction for the Capture Item #2 and #3.

Captures and displays TCP packets with the RESET (RST) flag set to 1. The displayed count is 149 packets, constituting 0.1% of the total captured traffic, and the same applies for Capture Items #2 and #3. Captures TCP packets with the RESET (RST) flag set to 1, displaying 149 packets, constituting 0.1% of the total traffic, consistent across Capture Items #2 and #3. This filter helps identify reset events in the TCP communication.



## YouTube Table for set flags for capture item #1

FLAGS	COUNT	FRACTION
SYN	10	0.0%
PSH	36748	17.6%
RST	149	0.1%

## Reference Videos:

<https://youtu.be/u4ht-E-Kihk?si=4SBxFQ9y8TPN8S9e>

<https://youtu.be/5qecyZHL-GU?si=89GhFkp3VLI0bHWZ>

# VPN PROJECT

## Introduction:

A Virtual Private Network (VPN) is a service designed to create a secure, encrypted connection to ensure privacy and anonymity while utilizing the internet. VPNs extend a private network across a public network, enabling users to securely send and receive data.

## II. Why use a VPN?

1. **Privacy and Anonymity:** VPNs hide a user's browser history, IP address, and geographical location, enhancing security and preventing unauthorized access to personal data.
2. **Bypassing Geographical Restrictions:** VPNs enable access to restricted content based on location, allowing users to visit otherwise unavailable websites.
3. **Remote Access:** VPNs provide secure remote access to a company's network, facilitating work from home or while traveling.
4. **Public WiFi Security:** VPNs protect users on public WiFi networks from hackers and cybercriminals attempting to intercept sensitive information.

## III. How VPNs Work:

1. **Tunneling Protocols:** VPNs utilize tunneling protocols like OpenVPN, SSTP, and IKEv2 for data encryption and decryption.

2. **Encryption:** VPNs use encryption to secure data transmitted over the internet, preventing unauthorized reading without the decryption key.
3. **IP Address Masking:** VPNs replace a user's IP address with that of the VPN server, maintaining anonymity and preventing tracking.

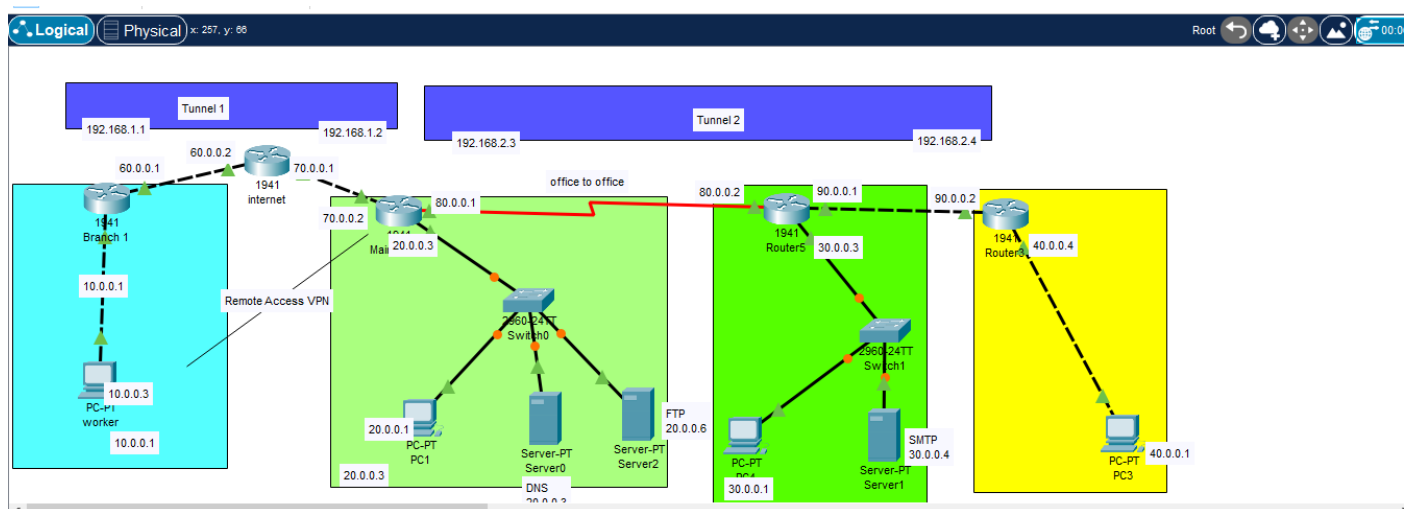
## IV. Types of VPNs:

1. **Remote Access VPNs:** Allow individual users to securely connect to a private network over the internet.
2. **Site-to-Site VPNs:** Connect entire networks in different locations, ensuring secure communication between them.
3. **Hardware VPNs:** Physical devices providing VPN functionality, commonly used for added security in enterprise environments.

## Software Used:

Cisco Packet Tracer

## Visual Representation:



## **Process:**

In this scenario, specific network devices were chosen, including Cisco 1941 routers, a 2960-24 switch with a battery backup, and a server. The reasons behind these choices are:

### **Cisco 1941 Routers:**

- *High-Performance Routing:* Known for high-performance capabilities suitable for routing tasks.
- *Scalability:* Offers scalability to accommodate growing network needs.
- *Security Features:* Advanced security features for firewall capabilities, access control, and VPN support.
- *Modular Design:* Flexibility in adding modules for specific functionalities.
- *Reliability:* Ensures uninterrupted connectivity and minimizes downtime.

### **Cisco 2960-24 Switch:**

- *Network Switching:* Used for local network switching, providing high-performance and low-latency communication.
- *Port Density:* With 24 ports, accommodates numerous devices within the local network.
- *Battery Backup:* Ensures continuous power supply, crucial for maintaining network operations during power outages.

### **Server:**

The server serves various purposes, contributing to the overall functionality, efficiency, and management of the network:

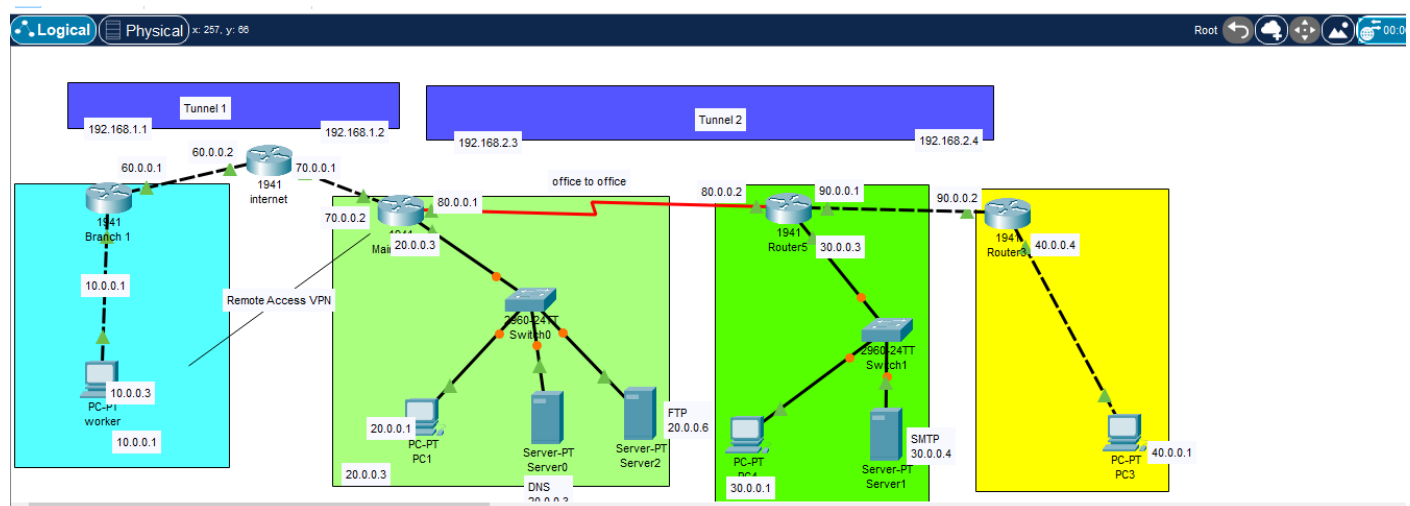
- *Centralized Resource Hosting*

- *User Authentication and Authorization*
- *Network Services*
- *Data Storage and Backup*
- *Application Hosting*
- *Security Management*
- *Power Resilience and Controlled Shutdown*
- *Centralized Updates and Patch Management*
- *Network Administration and Monitoring*

## WORKING

### Network Connectivity:

The Cisco 1941 routers are responsible for routing traffic within your network. They facilitate communication between different subnets and connect your local network to the internet.

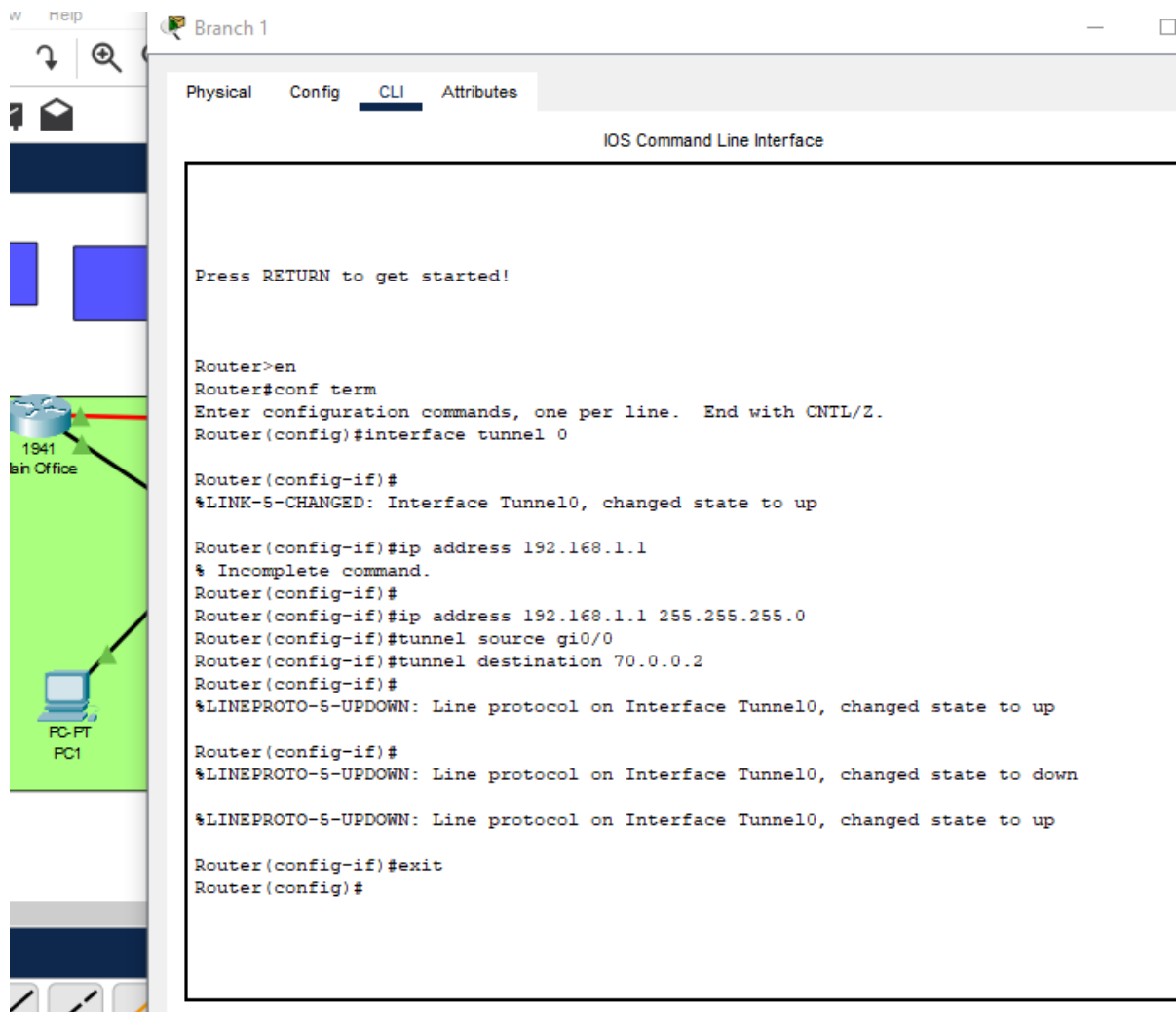


### VPN Tunnel Configuration:

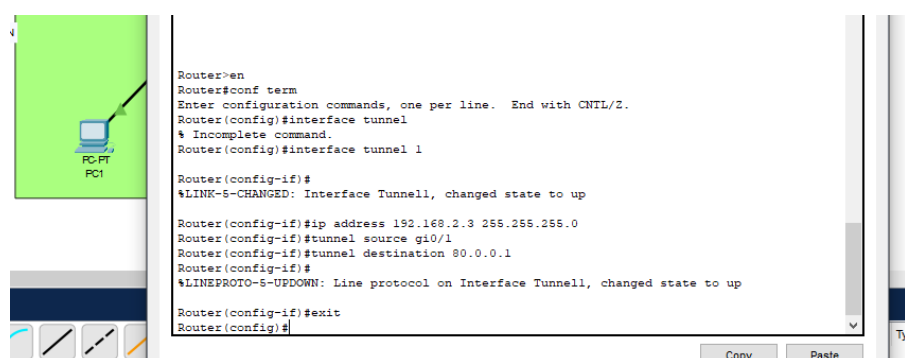
The routers are configured to establish an IPsec VPN tunnel between them. This tunnel allows secure communication between

the routers, even if they have duplicate LAN subnets. The VPN ensures that data exchanged between the routers is encrypted and secure.

## BRANCH 1:



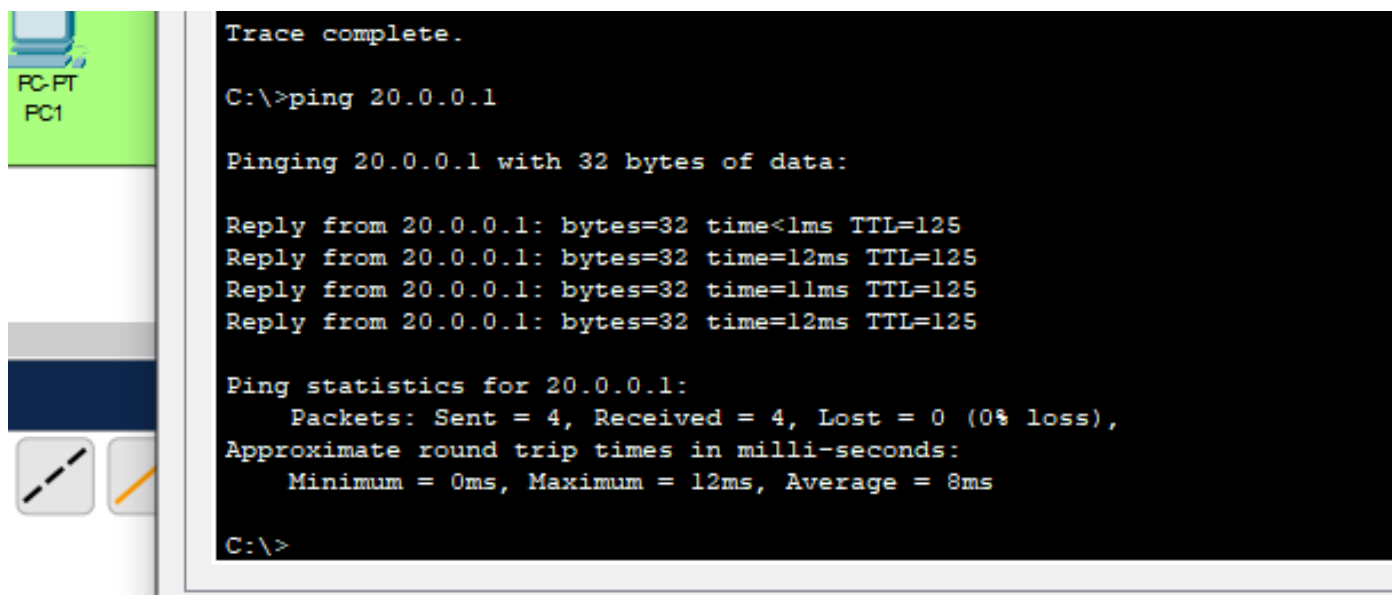
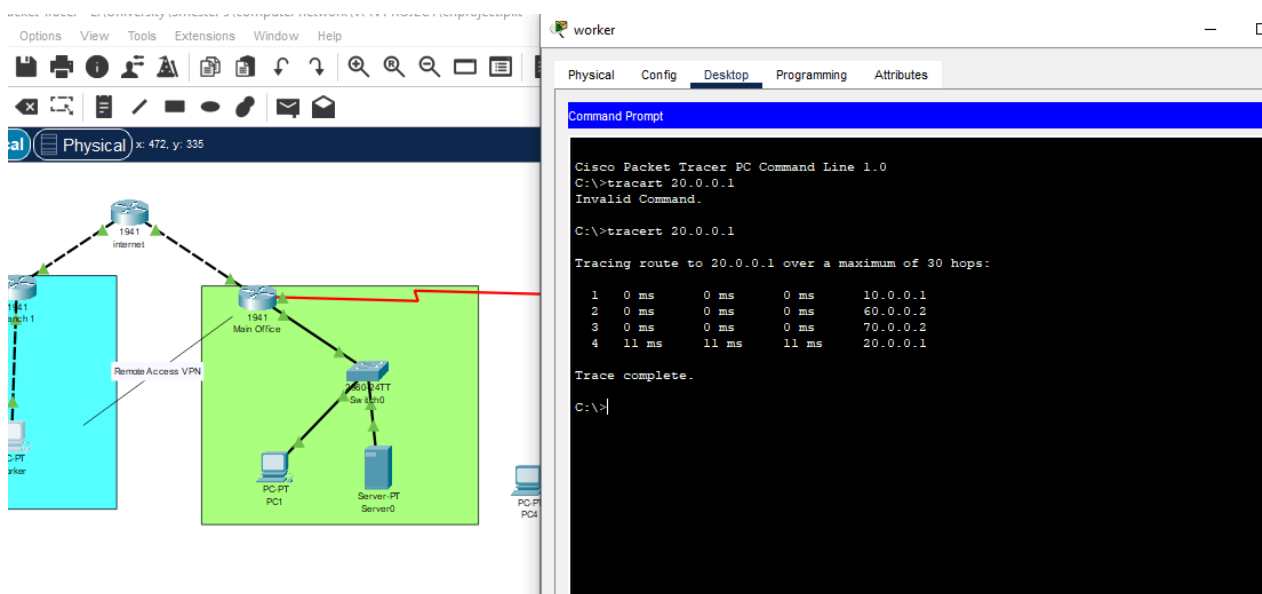
## Last Router:



## Switching and Local Network Connectivity:

The Cisco 2960-24 switch is used for local network switching. It provides efficient communication between devices within your local network, allowing devices to connect, communicate, and share resources seamlessly

### Worker 1 to Main Office:





Worker 1 is remotely accessing the main office, bypassing the router for direct connectivity. This streamlined connection enhances efficiency in accessing essential resources from the main office.

```

Pinging 20.0.0.2 with 32 bytes of data:
Reply from 20.0.0.2: bytes=32 time<1ms TTL=124
Reply from 20.0.0.2: bytes=32 time=20ms TTL=124
Reply from 20.0.0.2: bytes=32 time=10ms TTL=124
Reply from 20.0.0.2: bytes=32 time=1ms TTL=124

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 20ms, Average = 7ms

C:\>tracert 192.168.1.2

Tracing route to 192.168.1.2 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    10.0.0.3
  1  *        *        *        Request timed out.
  2  *        *        *        Request timed out.
  3  *        *        *        Request timed out.
  4  *        *        *        Request timed out.
  5  *        *        *        Request timed out.
  6  *        *        *        Request timed out.
  7  *        *        *        Request timed out.
  8  16 ms    12 ms    12 ms    192.168.1.2

Trace complete.

C:\>tracert 192.168.1.2

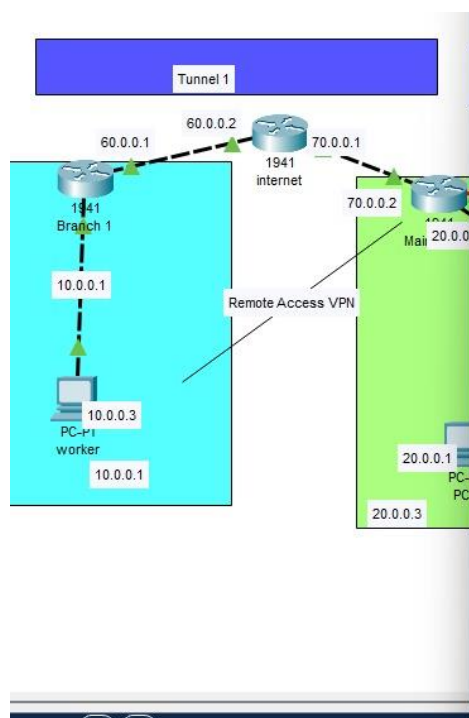
Tracing route to 192.168.1.2 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    10.0.0.3
  1  0 ms    0 ms    0 ms    192.168.1.2

Trace complete.

C:\>

```



```

  1  0 ms    0 ms    0 ms    10.0.0.1
  2  0 ms    0 ms    0 ms    60.0.0.2
  3  1 ms    0 ms    0 ms    70.0.0.2
  4  0 ms    0 ms    0 ms    20.0.0.1

Trace complete.

C:\>tracert 20.0.0.1

Tracing route to 20.0.0.1 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.0.1
  2  0 ms    1 ms    0 ms    60.0.0.2
  3  0 ms    0 ms    0 ms    70.0.0.2
  4  21 ms    0 ms    10 ms    20.0.0.1

Trace complete.

C:\>tracert 192.168.1.2

Tracing route to 192.168.1.2 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.0.1
  2  0 ms    0 ms    0 ms    192.168.1.2

Trace complete.

C:\>tracert 192.168.1.2

Tracing route to 192.168.1.2 over a maximum of 30 hops:

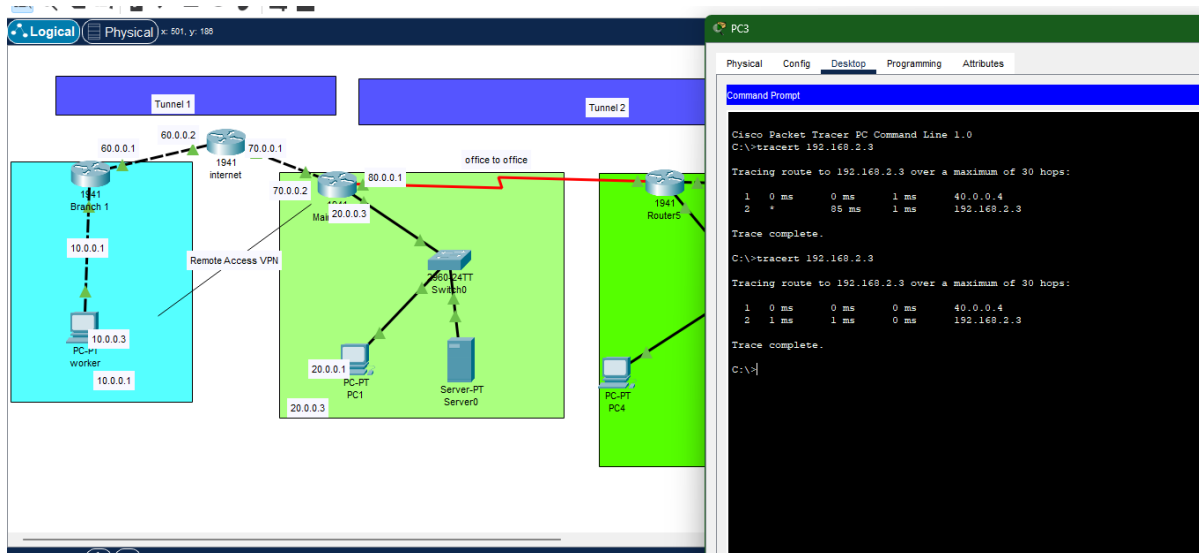
  1  0 ms    0 ms    0 ms    10.0.0.1
  2  0 ms    0 ms    0 ms    192.168.1.2

Trace complete.

C:\>

```

## TUNNEL 2 ACCESSING FROM LAST Branch/WORKER:



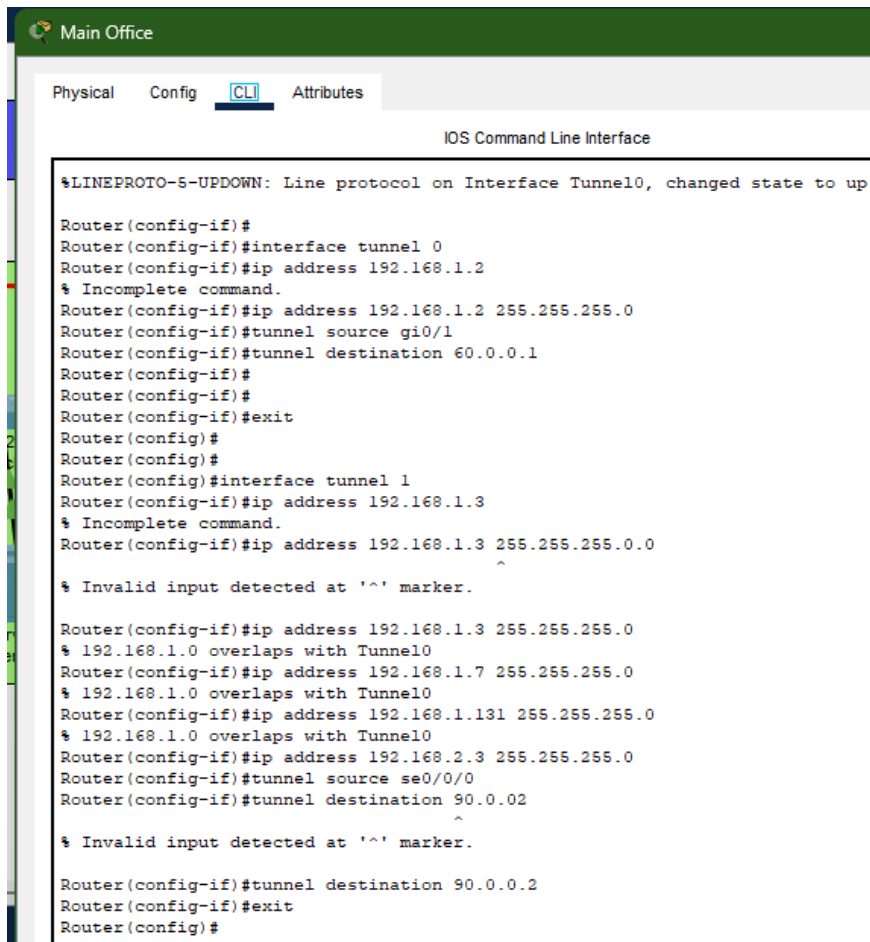
## Setting Tunnel 2 for Last worker (PC3) and Main Office:

```
Router3
Physical Config CLI Attributes
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to up

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#interface tunnel 1
Router(config-if)#ip address 192.168.2.4
% Incomplete command.
Router(config-if)#ip address 192.168.2.4 255.255.255.0
Router(config-if)#tunnel source gi0/1
Router(config-if)#tunnel destination 80.0.0.1
Router(config-if)#exit
Router(config)#
```

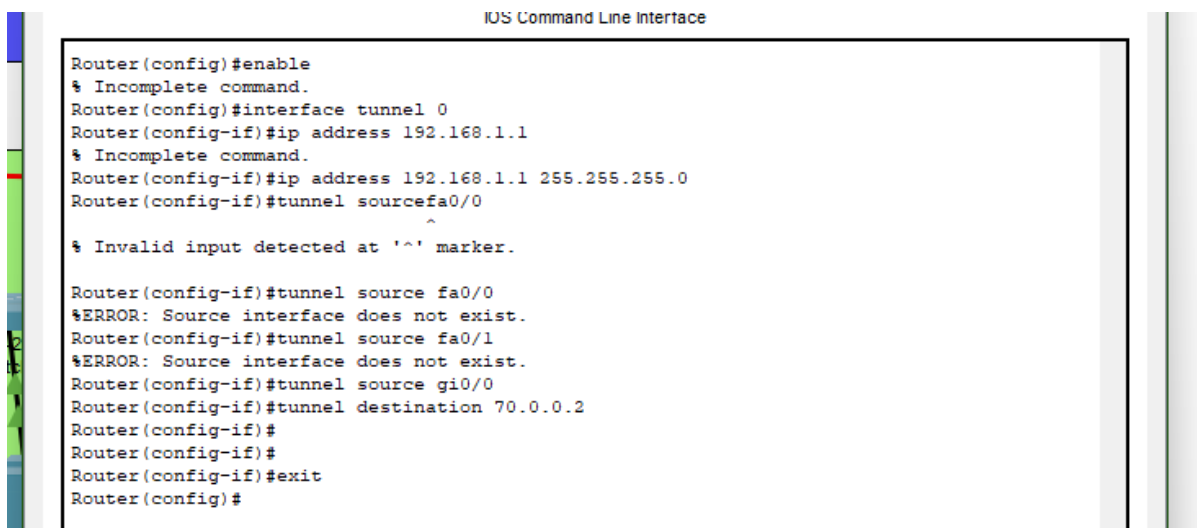
## Main Office Tunnel Configuration:



The screenshot shows the 'Main Office' application window with the 'CLI' tab selected. The title bar indicates 'IOS Command Line Interface'. The terminal output shows the following sequence of commands and responses:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to up
Router(config-if)#
Router(config-if)#interface tunnel 0
Router(config-if)#ip address 192.168.1.2
% Incomplete command.
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#tunnel source gi0/1
Router(config-if)#tunnel destination 60.0.0.1
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#interface tunnel 1
Router(config-if)#ip address 192.168.1.3
% Incomplete command.
Router(config-if)#ip address 192.168.1.3 255.255.255.0
% Invalid input detected at '^' marker.
Router(config-if)#ip address 192.168.1.3 255.255.255.0
% 192.168.1.0 overlaps with Tunnel0
Router(config-if)#ip address 192.168.1.7 255.255.255.0
% 192.168.1.0 overlaps with Tunnel0
Router(config-if)#ip address 192.168.1.131 255.255.255.0
% 192.168.1.0 overlaps with Tunnel0
Router(config-if)#ip address 192.168.2.3 255.255.255.0
Router(config-if)#tunnel source se0/0/0
Router(config-if)#tunnel destination 90.0.0.2
% Invalid input detected at '^' marker.
Router(config-if)#tunnel destination 90.0.0.2
Router(config-if)#exit
Router(config)#
```

## Setting Tunnel 0 configuration in Branch 1:



The screenshot shows the 'IOS Command Line Interface' window with the following sequence of commands and responses:

```
Router(config)#enable
% Incomplete command.
Router(config)#interface tunnel 0
Router(config-if)#ip address 192.168.1.1
% Incomplete command.
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#tunnel source fa0/0
% Invalid input detected at '^' marker.
Router(config-if)#tunnel source fa0/0
%ERROR: Source interface does not exist.
Router(config-if)#tunnel source fa0/1
%ERROR: Source interface does not exist.
Router(config-if)#tunnel source gi0/0
Router(config-if)#tunnel destination 70.0.0.2
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#
```

## Server Functionality:

The server serves as a centralized hub for hosting various resources, including applications, databases, and shared files. It

provides a platform for user authentication and authorization,  
ensuring secure access to network resources.

## ACCESSING SERVER FROM WORKER 1:

The image displays two screenshots of a network simulation environment, likely Packet Tracer, showing a network topology and a web browser interface.

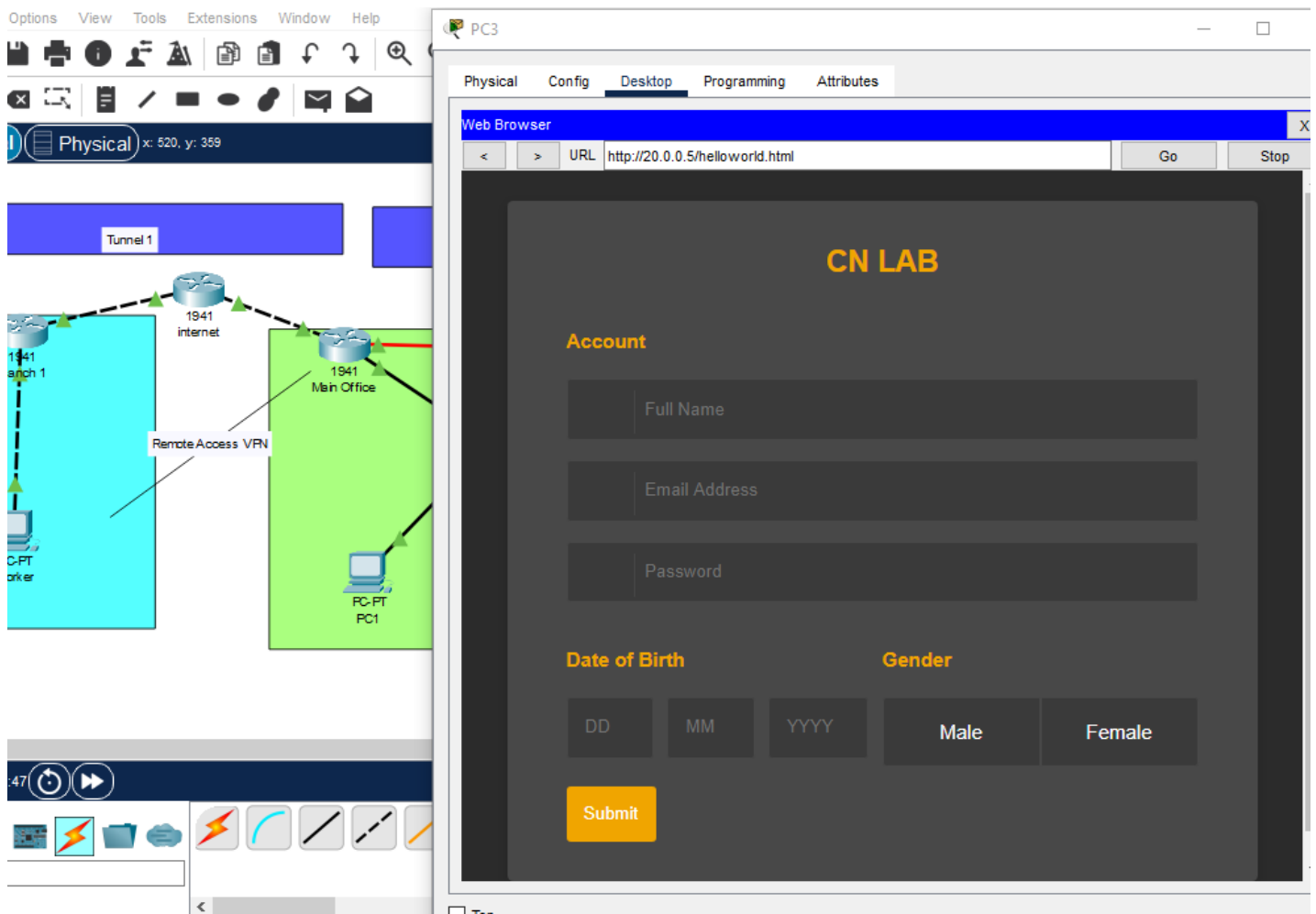
**Top Screenshot:**

- Network Diagram:** Shows a network topology with a central "1941 Internet" cloud. On the left, "Branch 1" (1941) is connected to the Internet. On the right, "Main Office" (1941) is connected to the Internet. A "Remote Access VPN" is established between Branch 1 and Main Office. A "PC-PT worker" is connected to Branch 1, and a "PC-PT PC1" is connected to Main Office. A "Tunnel 1" is shown at the top.
- Web Browser:** The browser window shows the URL `http://www.login1.com/helloworld.html`. The page displays the "CN LAB" logo and a login form with fields for "Full Name", "Email Address", and "Password". Below these are fields for "Date of Birth" (DD, MM, YYYY) and "Gender" (Male, Female), followed by a "Submit" button.

**Bottom Screenshot:**

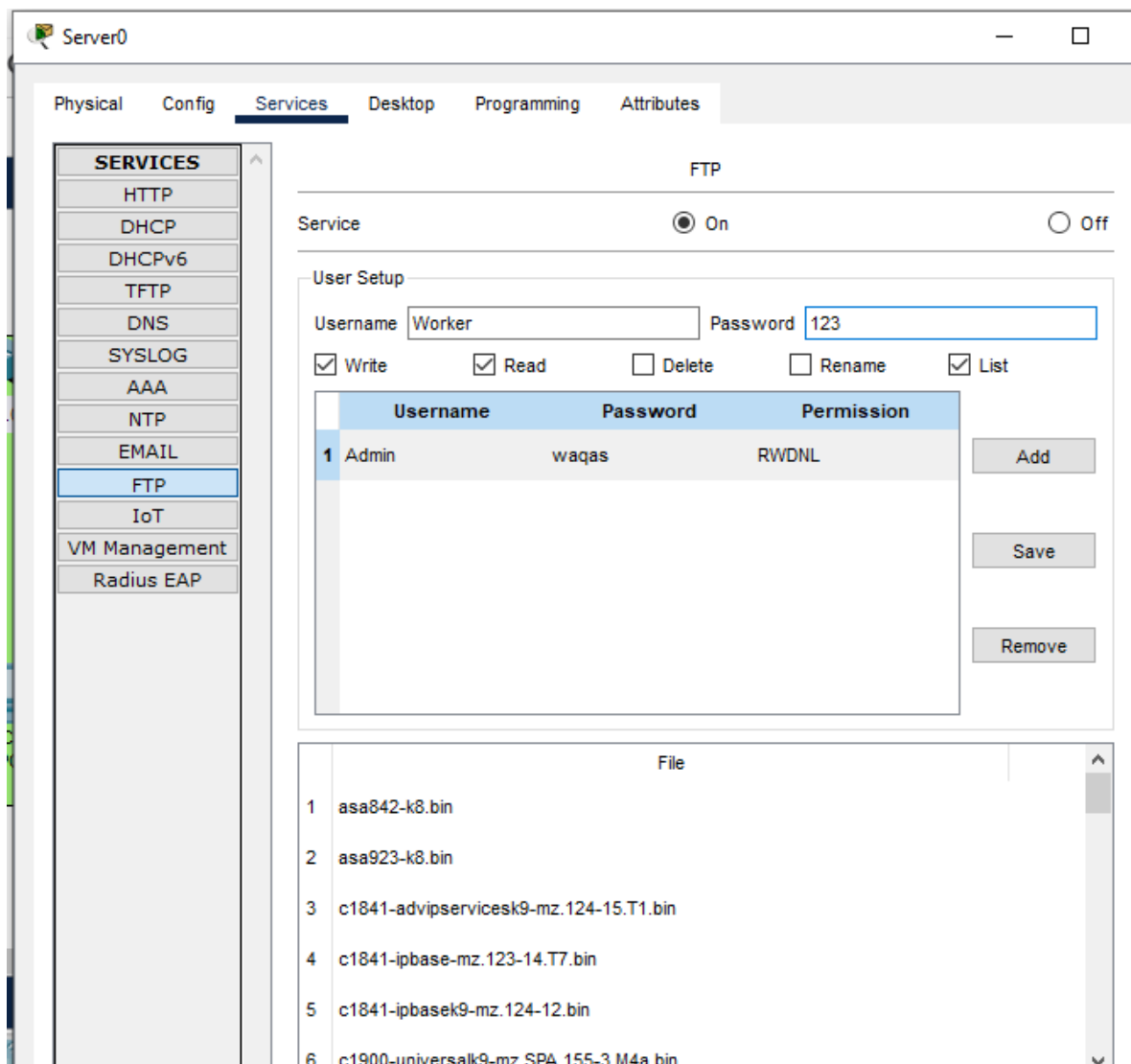
- Network Diagram:** Similar to the top screenshot, but the "PC-PT worker" is now connected to the "Main Office" (1941) via the "Remote Access VPN".
- Web Browser:** The browser window shows the URL `http://20.0.0.5/helloworld.html`. The page displays the "CN LAB" logo and a login form with fields for "Full Name", "Email Address", and "Password". Below these are fields for "Date of Birth" (DD, MM, YYYY) and "Gender" (Male, Female), followed by a "Submit" button.

## Worker 3 to Main Office:

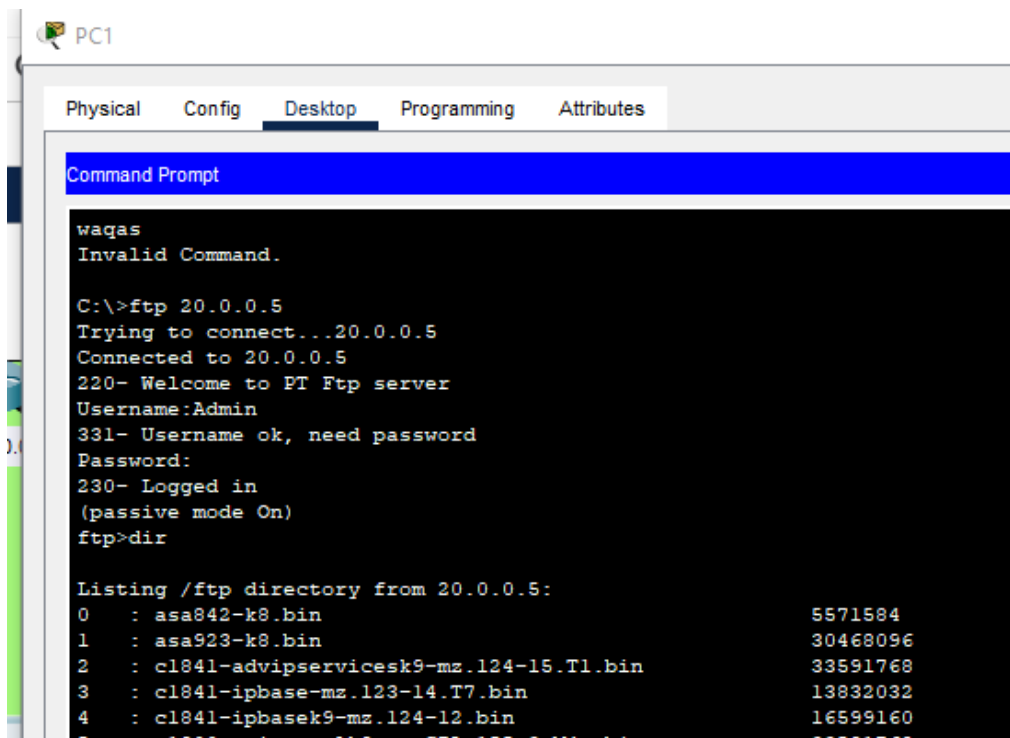


## Setting Up the FTP (File Transfer Protocol):

FTP (File Transfer Protocol) is a standard network protocol used for the seamless transfer of files between a client and a server on a computer network. It provides a reliable method for sharing files over the internet or an intranet, allowing users to upload, download, and manage files efficiently. FTP is commonly employed in scenarios where large files or numerous files need to be transferred between devices or servers.



## Accessing Directory through Admin PC:



## File Uploading & Downloading from through admin pc:

```
30 : ir800_yocto-1.7.2_python-2.7.3.tar 69120
31 : pt1000-i-mz.122-28.bin 55718
32 : pt3000-i6q412-mz.121-22.EA4.bin 31173
ftp>put ADMIN.txt

Writing file ADMIN.txt to 20.0.0.5:
File transfer in progress...

[Transfer complete - 425 bytes]

425 bytes copied in 0.026 secs (16346 bytes/sec)
ftp>
```

```
31 : ir800_yocto-1.7.2_python-2.7.3.tar
32 : pt1000-i-mz.122-28.bin
33 : pt3000-i6q412-mz.121-22.EA4.bin
ftp>get ADMIN.txt

Reading file ADMIN.txt from 20.0.0.5:
File transfer in progress...

[Transfer complete - 425 bytes]

425 bytes copied in 0.003 secs (141666 bytes/sec)
ftp>
```

## Setting up the email (SMTP) on Server 2:

SMTP stands for Simple Mail Transfer Protocol. It is a protocol used for sending and receiving email messages over a network. SMTP is essential for the delivery of emails from the sender's email client to the recipient's email server. To set up SMTP on Server 2, you'll need the following information:

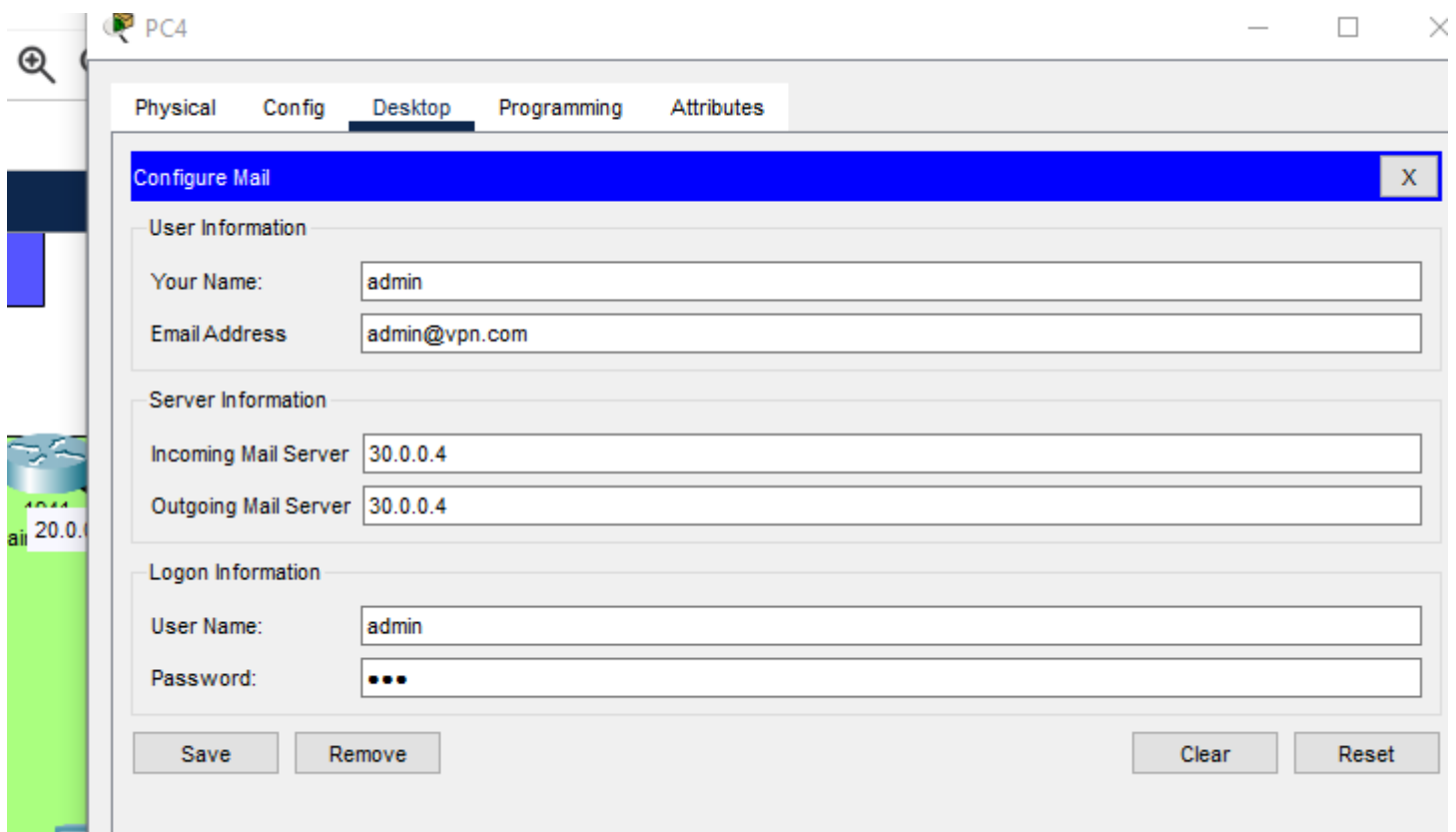
- 1. SMTP Server Address:** The address of the server that will handle outgoing emails.
- 2. SMTP Port:** The port number used for SMTP communication. Common ports are 25, 587, and 465.
- 3. Username and Password:** Credentials required for authentication with the SMTP server.



**4. Encryption Method:** Whether the communication with the SMTP server is encrypted, often specified as SSL/TLS.

## ADMIN:

Admin initiates email communication between Worker 1 and Worker 2, leveraging the SMTP setup on Server 2. Admin coordinates email transmission from Worker 1 to Worker 2, utilizing the configured SMTP settings on Server 2 for seamless communication within the network.



The image shows a screenshot of a network device configuration interface, specifically the 'Configure Mail' window. The window is titled 'Configure Mail' and has a blue header bar with a close button (X). Below the header, there are four tabs: 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes'. The 'Config' tab is selected. The configuration is organized into three sections: 'User Information', 'Server Information', and 'Logon Information'. Each section contains input fields for various parameters. At the bottom, there are four buttons: 'Save', 'Remove', 'Clear', and 'Reset'.

Section	Field	Value
User Information	Your Name:	admin
	Email Address	admin@vpn.com
Server Information	Incoming Mail Server	30.0.0.4
	Outgoing Mail Server	30.0.0.4
Logon Information	User Name:	admin
	Password:	•••

## Worker1:

PC3

Physical Config **Desktop** Programming Attributes

**Configure Mail** X

User Information

Your Name: FUZAIL

Email Address: fuzail@vpn.com

Server Information

Incoming Mail Server: 30.0.0.4

Outgoing Mail Server: 30.0.0.4

Logon Information

User Name: worker2

Password: .....

Save Remove Clear Reset

## Worker2:

worker

Physical Config **Desktop** Programming Attributes

**Configure Mail** X

User Information

Your Name: WAQAS

Email Address: waqas@vpn.com

Server Information

Incoming Mail Server: 30.0.0.4

Outgoing Mail Server: 30.0.0.4

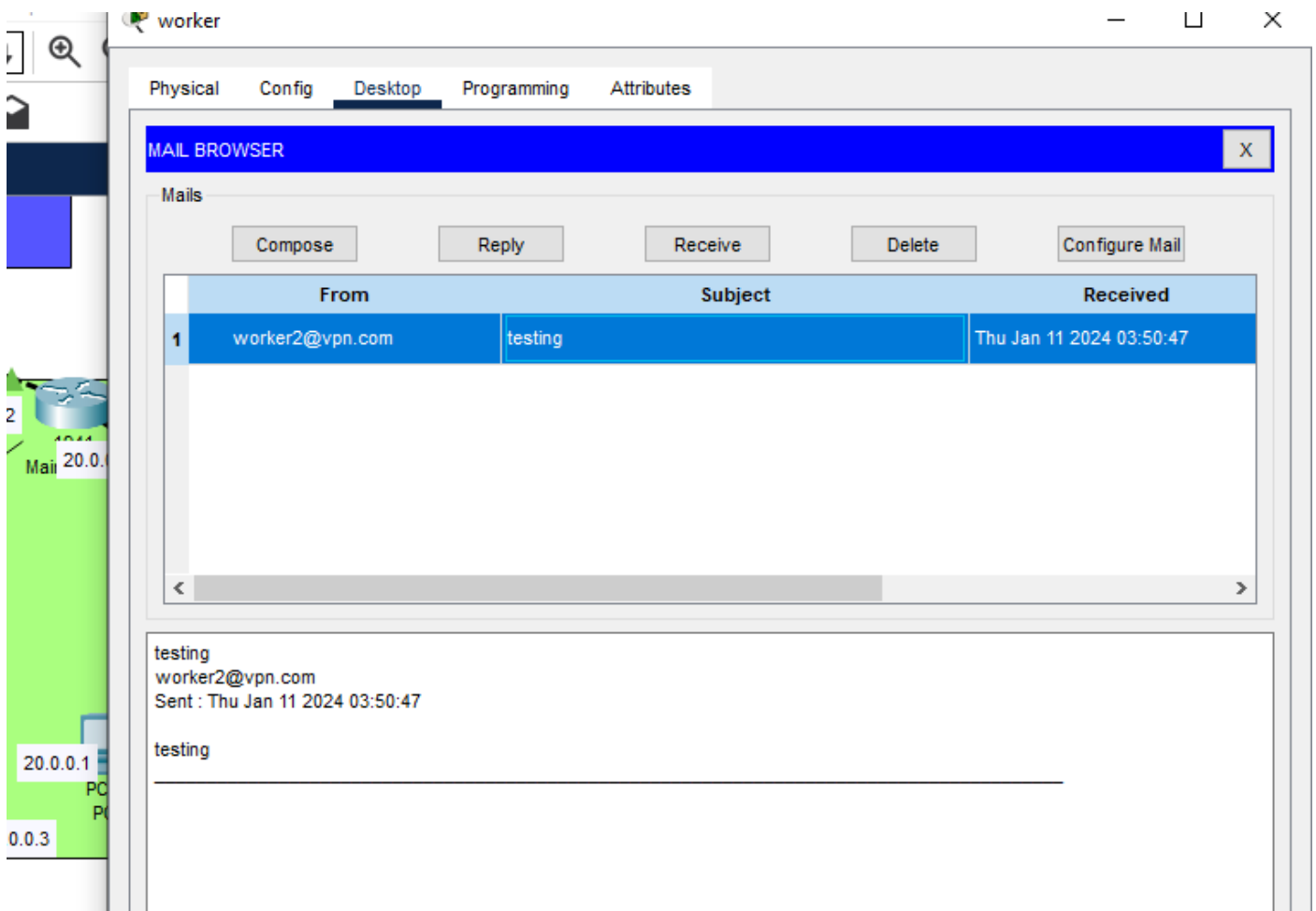
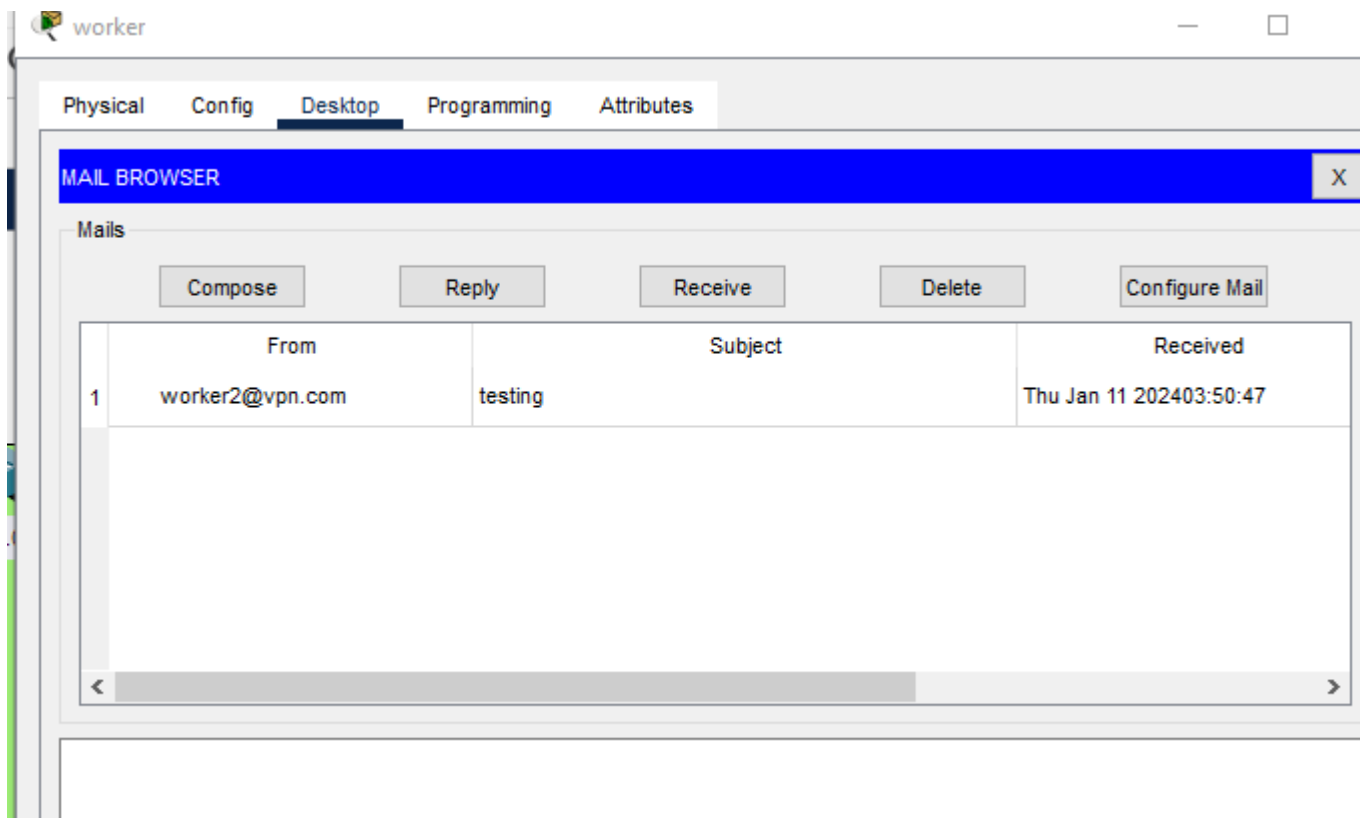
Logon Information

User Name: worker1

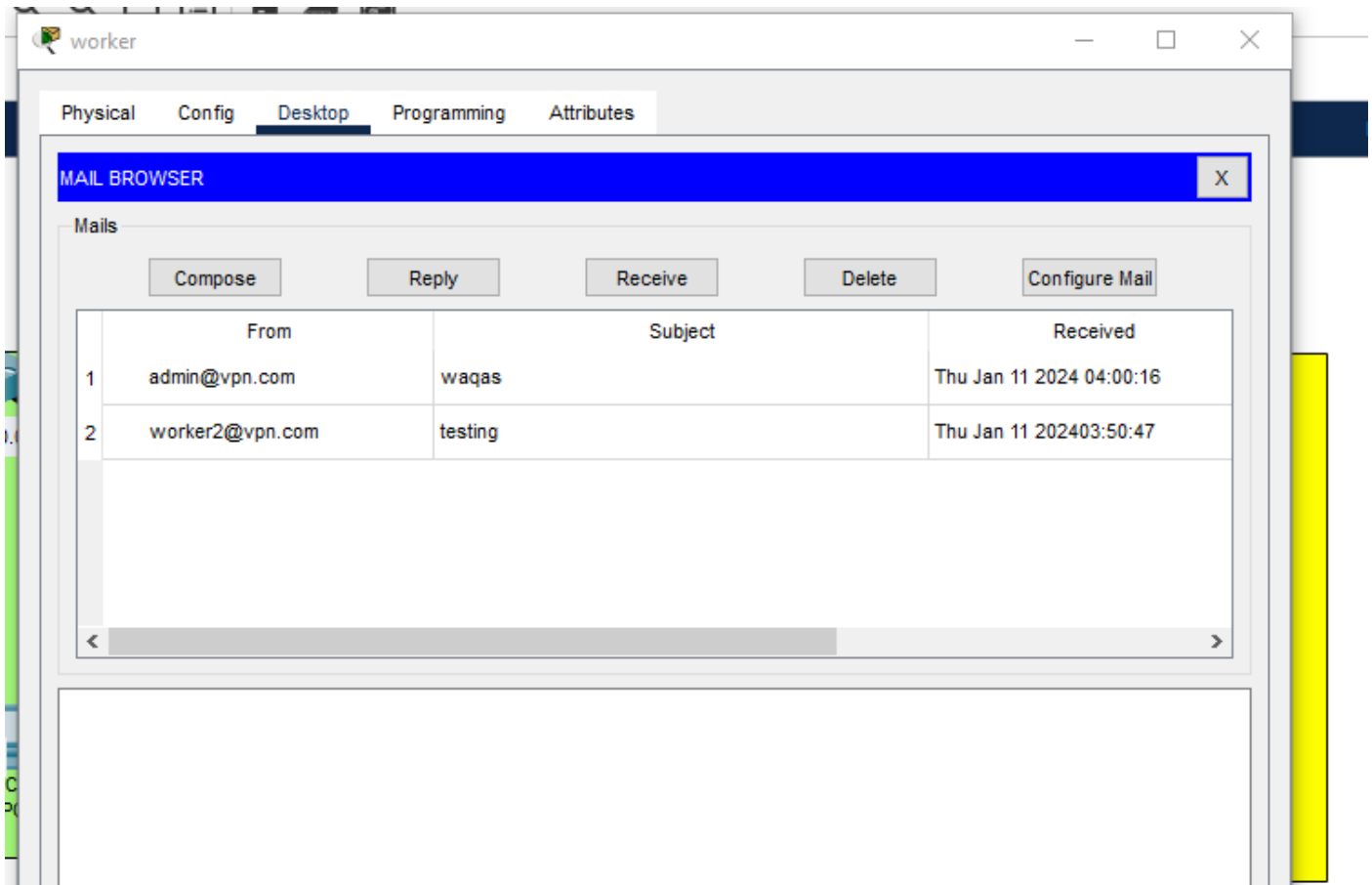
Password: .....

Save Remove Clear Reset

**Sending mail from worker 1 to worker2:** Worker 1 sends an email to Worker 2 using the established SMTP configuration on Server 2.



**From Admin to waqas:**



## Conclusion:

In conclusion, the successful implementation of this project relies on the Cisco 1941 routers, which play a pivotal role in establishing a secure and efficient network infrastructure. Through the deployment of IPsec VPN tunnels, the project ensures data confidentiality and integrity, addressing challenges related to duplicate LAN subnets. The routers excel in routing tasks, enhancing network scalability and reliability. Emphasizing the strategic use of Cisco 1941 routers, the project showcases their adaptability, high-performance routing, and security features, particularly in firewall configurations and intrusion prevention. This streamlined approach underscores the routers' cost-effectiveness, providing a resilient and secure network infrastructure.

## Reference Video:

**Concept From:** <https://youtu.be/LiL2DkFkACo?si=IPsOMUctbyxPouGO>

<https://youtu.be/SYGdxsDApyM?si=zbzzzsL6C5M8rKBF>

<https://youtu.be/lkUq6Pl6his?si=1F5TJhH2QunpZBRV>

<https://youtu.be/8uWmFkrn6qE?si=eLMZ46x2v4IG6UuO>