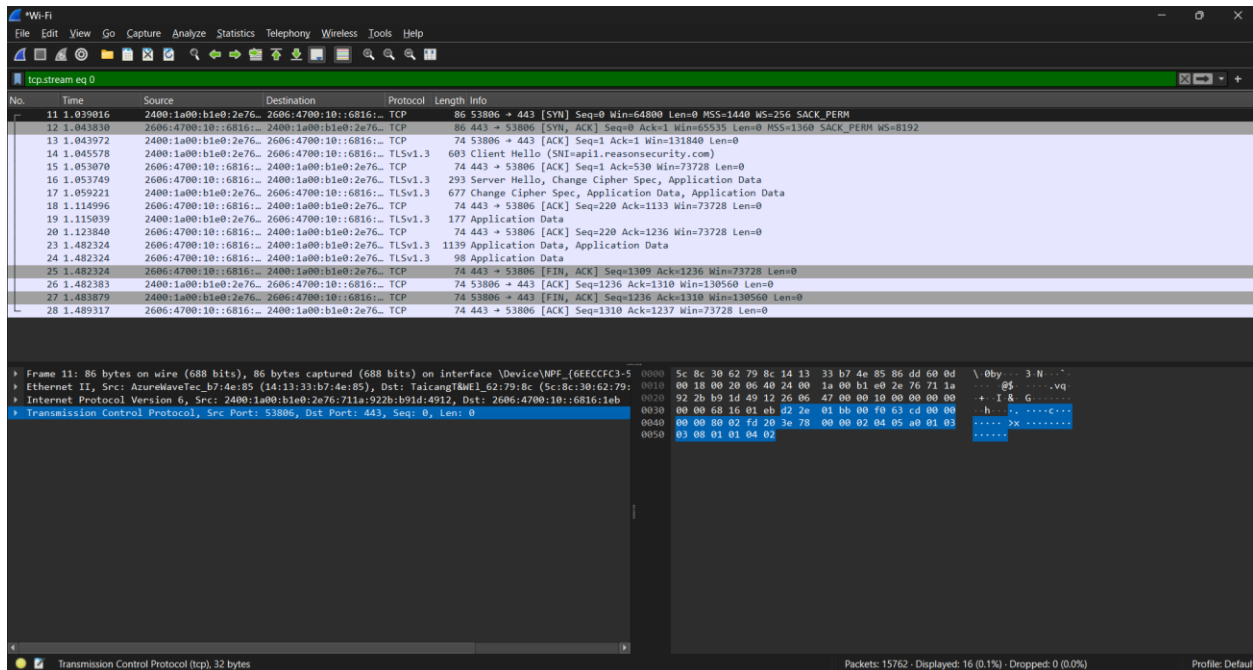


Q) Capture a traffic in Wireshark while uploading a file. Follow the TCP stream and explain connection initialization ,connection maintainance and conncection termination.



Connection Initialization (TCP 3-Way Handshake)

1. SYN (Synchronization):

- The client sends a SYN packet to the server to initiate a connection. This packet contains an initial sequence number (ISN).

2. SYN-ACK (Synchronization-Acknowledgment):

- The server responds with a SYN-ACK packet, acknowledging the client's SYN packet and providing its own initial sequence number.

3. ACK (Acknowledgment):

- The client sends an ACK packet back to the server, acknowledging the server's SYN-ACK packet. The connection is now established.

Connection Maintenance

- **Data Transfer:**
 - Once the connection is established, data packets are exchanged between the client and the server. Each data packet has a sequence number, and each acknowledgment packet (ACK) has an acknowledgment number indicating the next expected sequence number.
- **Window Size:**
 - Both the client and the server advertise their receive window size, which dictates how much data can be sent before an acknowledgment must be received.
- **Retransmissions:**
 - If a data packet is lost or corrupted, the sender retransmits the packet. This is identified by a duplicate ACK from the receiver or a timeout at the sender.
- **Keep-Alive:**
 - To maintain the connection during periods of inactivity, TCP keep-alive packets may be sent. These packets ensure that the connection remains open and is not terminated by intermediaries due to inactivity.

Connection Termination (TCP 4-Way Termination)

1. **FIN (Finish):**
 - The client sends a FIN packet to the server, indicating that it has finished sending data.
2. **ACK (Acknowledgment):**
 - The server acknowledges the FIN packet with an ACK.
3. **FIN (Finish):**
 - The server sends its own FIN packet to the client, indicating that it has also finished sending data.
4. **ACK (Acknowledgment):**
 - The client acknowledges the server's FIN packet with an ACK. The connection is now fully terminated.

