**TCP (TRANSMISSION CONTROL PROTOCOL):**

* It is highly reliable and connection oriented communication protocol (since it does handshaking and reliability control)
* It ensures reliability in terms of congestion control ,error control ,flow control and connection control techniques.

**TCP 3 Way handshaking :**

* Client sends SYN enabled packet to server port with ISN = x and ack = 0
* Server responds with SYN-ACK with seq=y and ack=x+1 (acknowledging client’s syn)
* Client acknowledges by ACK to server to synchronize by sending packet with seq=x+1 and ack=y+1

**TCP 4 Way handshaking :**

* Client initiates termination by sending FIN and ACK with seq=x and ack=y
* Server responds by sending ACK with seq=y and ack = x+1
* After completing, server sends FIN and ACK with seq=y and ack=x+1
* Then, client responds by sending FIN with seq=x+1 and ack=y+1 (now, client waits for 2\* maximum segment lifetime before termination)

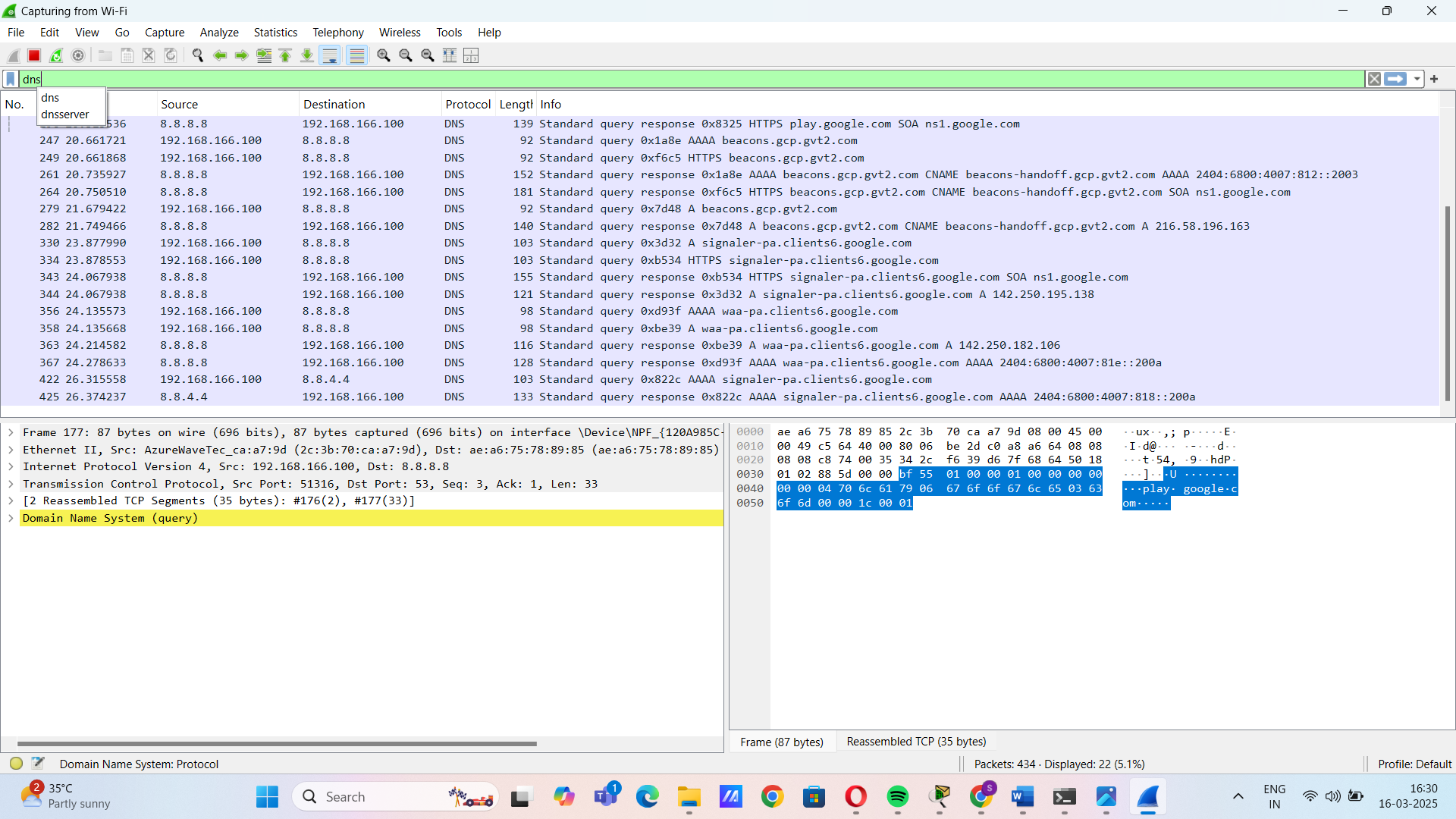
**DNS (DOMAIN NAME SYSTEM):**

* The Domain Name System (DNS) is a hierarchical and decentralized system used to resolve human-readable domain names into IP addresses so that computers can communicate over networks like the internet.
* Whenever, client wants to have communication using hostname, if first checks its local cache for mapping, if no mapping found, it proceeds next.
* It requests recursive configured DNS resolver (ISP provided or Google DNS) for help. If it has records, it provides mapping. If not so, proceeds next.

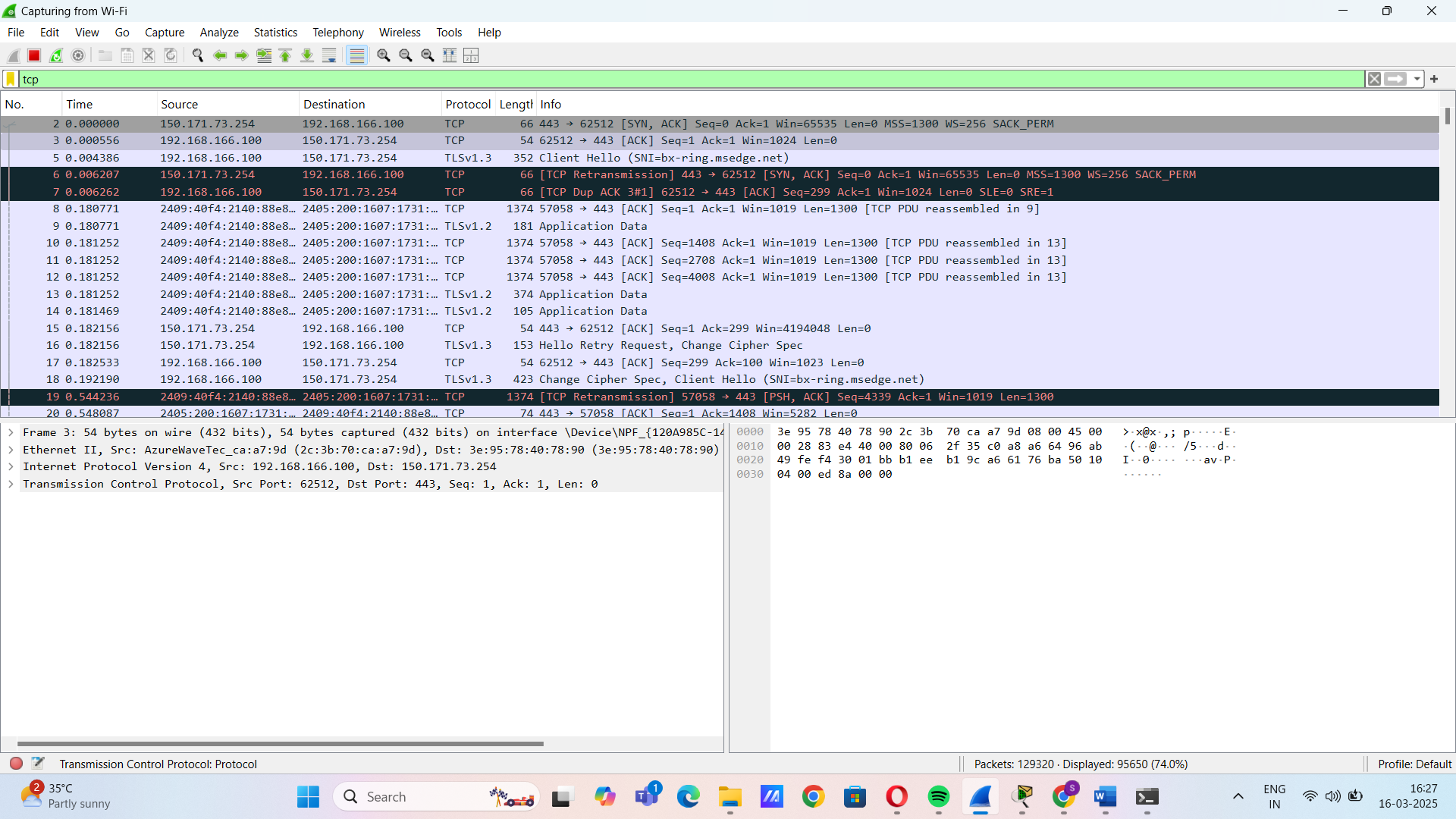
**UDP (USER DATAGRAM PROTOCOL):**

* The User Datagram Protocol (UDP) is a connectionless, lightweight transport-layer protocol .
* It is widely used for real-time applications, DNS, VoIP, streaming, and other latency-sensitive communication. Eg. DNS , DHCP, TFTP, VOIP etc.
* It doesn’t provide reliability and congestion control as like TCP.

Wireshark packet capture of DNS:



Wireshark packet capture of TCP:



Wireshark packet capture of UDP:

