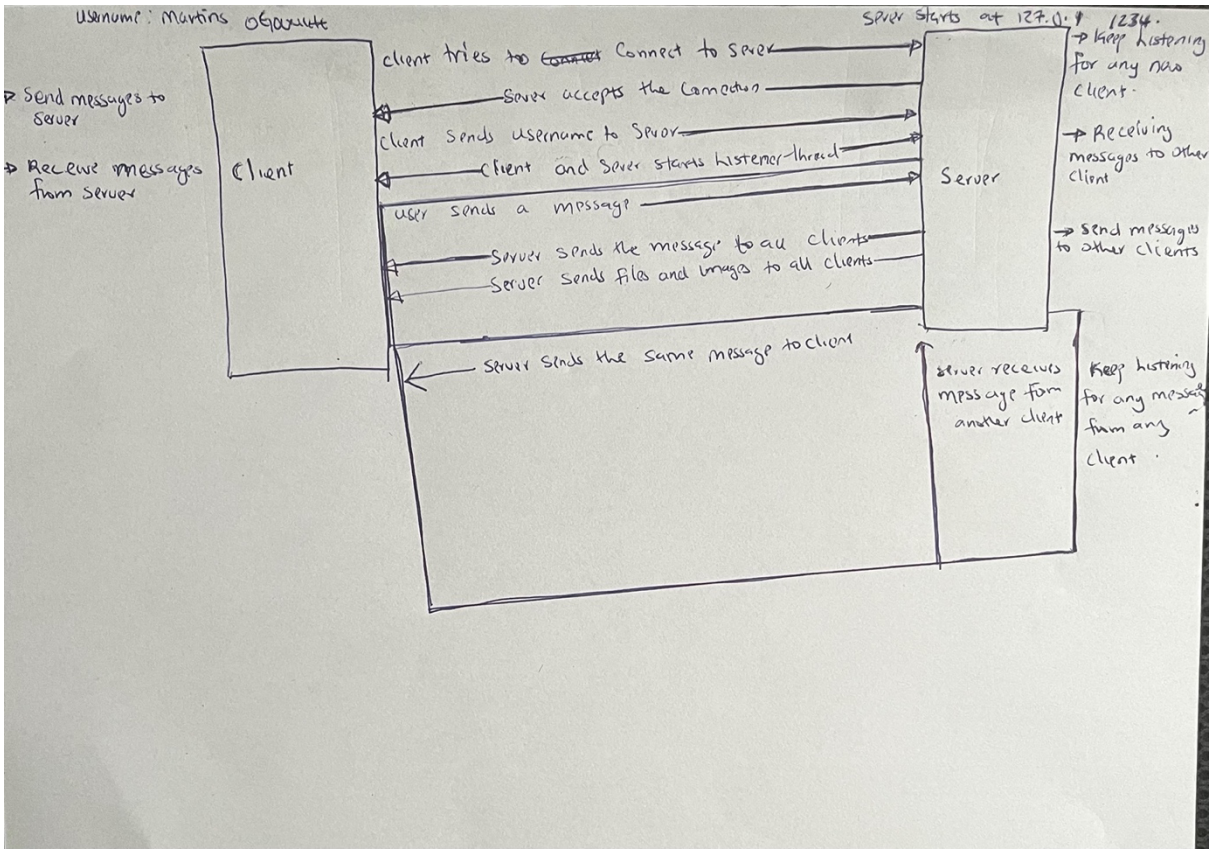
PROJECT REPORT

Task 1

Detailed Project Deliverables



System architecture design (graphical + text description)

The above diagram shows how client connection is made to the server running on a local 127.0.0.1 and a port number of 1234. Client sends messages, files and images through the server to another client user connected to the same server

DETAILED PROTOCOL SPECIFICATION

1.The connection feature is running a TCP protocol and socket. connect() method

2. message feature is running on a UTF -8 Encoded Text protocol and sendall(message. encode()) method

3 . File transfer is running on a TCP, chunked binary protocol and a header +sendal(filedate) method

4. Handling running with a multithreading protocol and a threading.thread() method

NETWORK COMUNICATION FLOW

Client connects to server through the socket

Client sends username

Server accepts connection and adds client to active list

Client send messages or files

Server connects data to all other connected clients

PROTOCOL ANALYSIS

I choose TCP (Transmission control protocol) because it ensures reliable message delivery and in order packet transmission. Which is important for both messaging and file transfer. Compared to the IPV4 the TCP is considered better.

PROS

1. It offers error detection
2. Reliable data delivery (good for file transfer)
3. Easy to work with

CONS

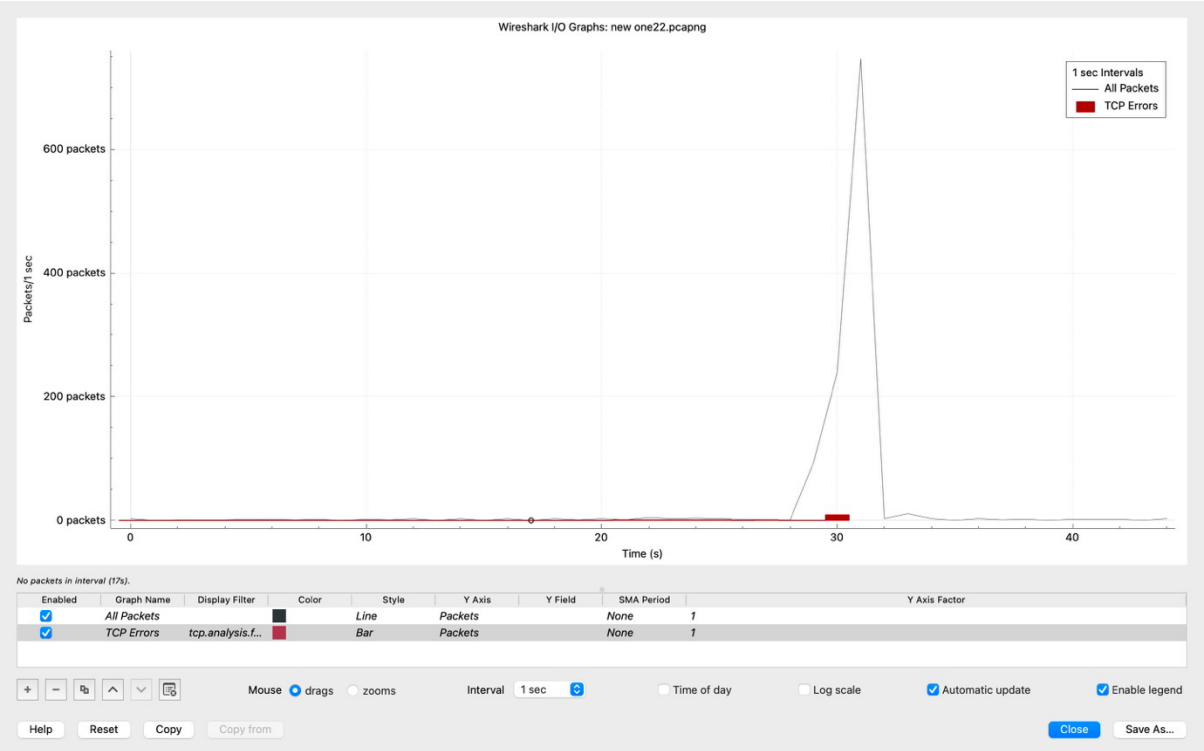
1. High latency
2. Resource consumption

LINKS TO MY DEMO VIDEO :
https://youtu.be/EExDW4bXgF0?si=Ia0eLkaWsmw4EGKB

LINK TO MY GITHUB REPOSITORY :
https://github.com/mart23333/martinschizaramogowuihe.git

Task 2

Wireshark Analysis and Firewall



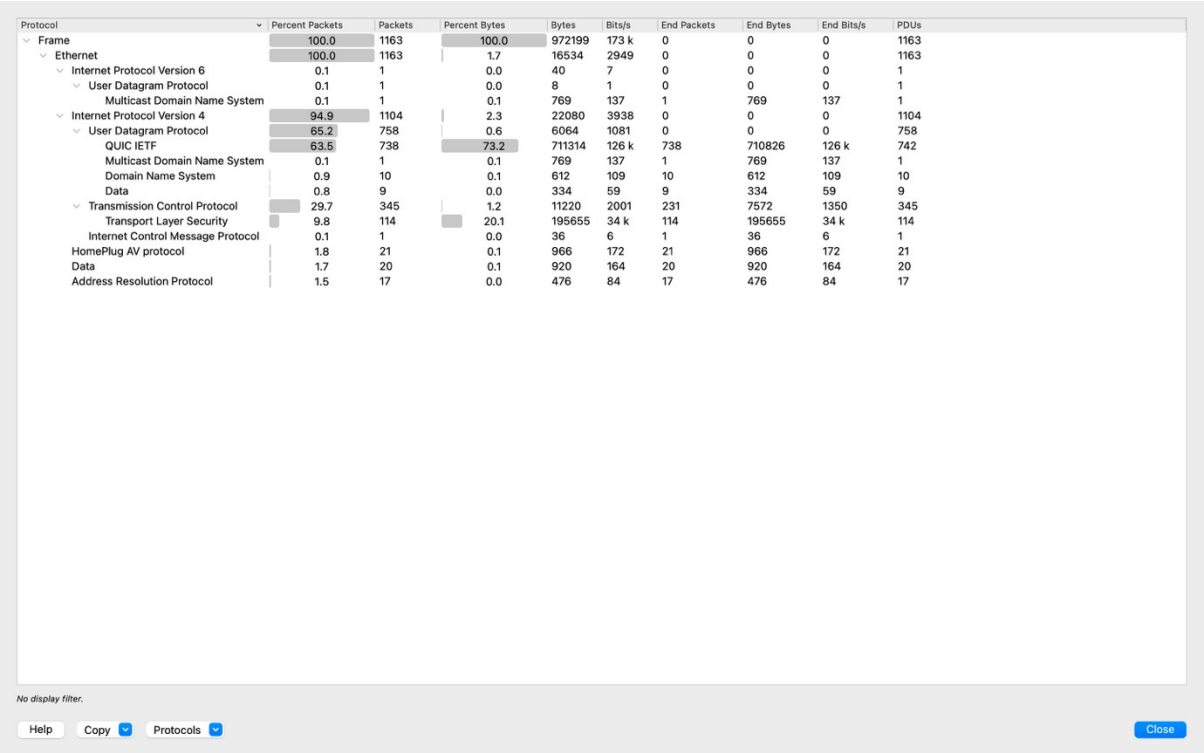
I/O GRAPH

The graph shows that around 30 second mark there was a sudden surge to over 600 packets which can suggest a possible malicious activity this sometimes often

consist of malware beaconing, DDos attempts and port scanning. TCP errors red bars shows or suggests failed connections.

SECURITY ISSUES

1. infested internal device communicating outbound
2. This likely suggests intrusion attempts and compromised host

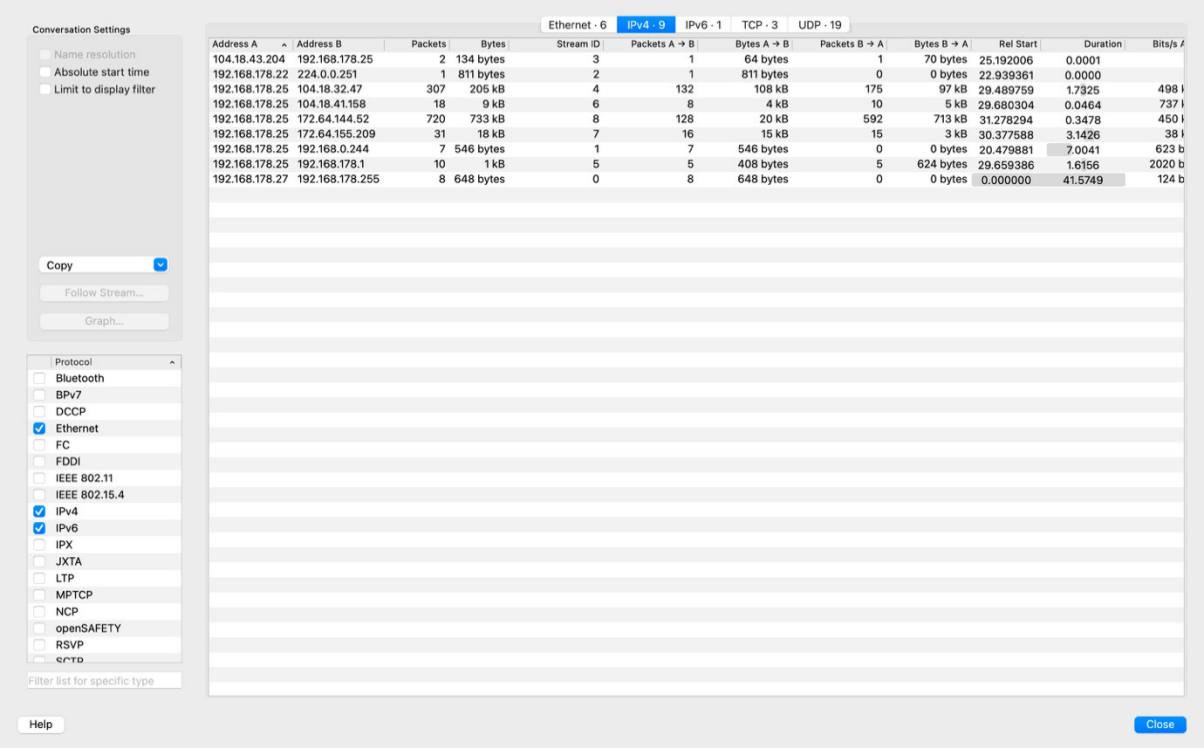


Protocol	Percent Packets	Packets	Percent Bytes	Bytes	Bits/s	End Packets	End Bytes	End Bits/s	PDUs
Frame	100.0	1163	100.0	972199	173 k	0	0	0	1163
Ethernet	100.0	1163	1.7	16534	2949	0	0	0	1163
Internet Protocol Version 6	0.1	1	0.0	40	7	0	0	0	1
User Datagram Protocol	0.1	1	0.0	8	1	0	0	0	1
Multicast Domain Name System	0.1	1	0.1	769	137	1	769	137	1
Internet Protocol Version 4	94.9	1104	2.3	22080	3938	0	0	0	1104
User Datagram Protocol	65.2	758	0.6	6064	1081	0	0	0	758
QUIC IETF	63.5	738	73.2	711314	126 k	738	710826	126 k	742
Multicast Domain Name System	0.1	1	0.1	769	137	1	769	137	1
Domain Name System	0.9	10	0.1	612	109	10	612	109	10
Data	0.8	9	0.0	334	59	9	334	59	9
Transmission Control Protocol	29.7	345	1.2	11220	2001	231	7572	1350	345
Transport Layer Security	9.8	114	20.1	195655	34 k	114	195655	34 k	114
Internet Control Message Protocol	0.1	1	0.0	36	6	1	36	6	1
HomePlug AV protocol	1.8	21	0.1	966	172	21	966	172	21
Data	1.7	20	0.1	920	164	20	920	164	20
Address Resolution Protocol	1.5	17	0.0	476	84	17	476	84	17

PROTOCOL HIERARACY STATISTICS

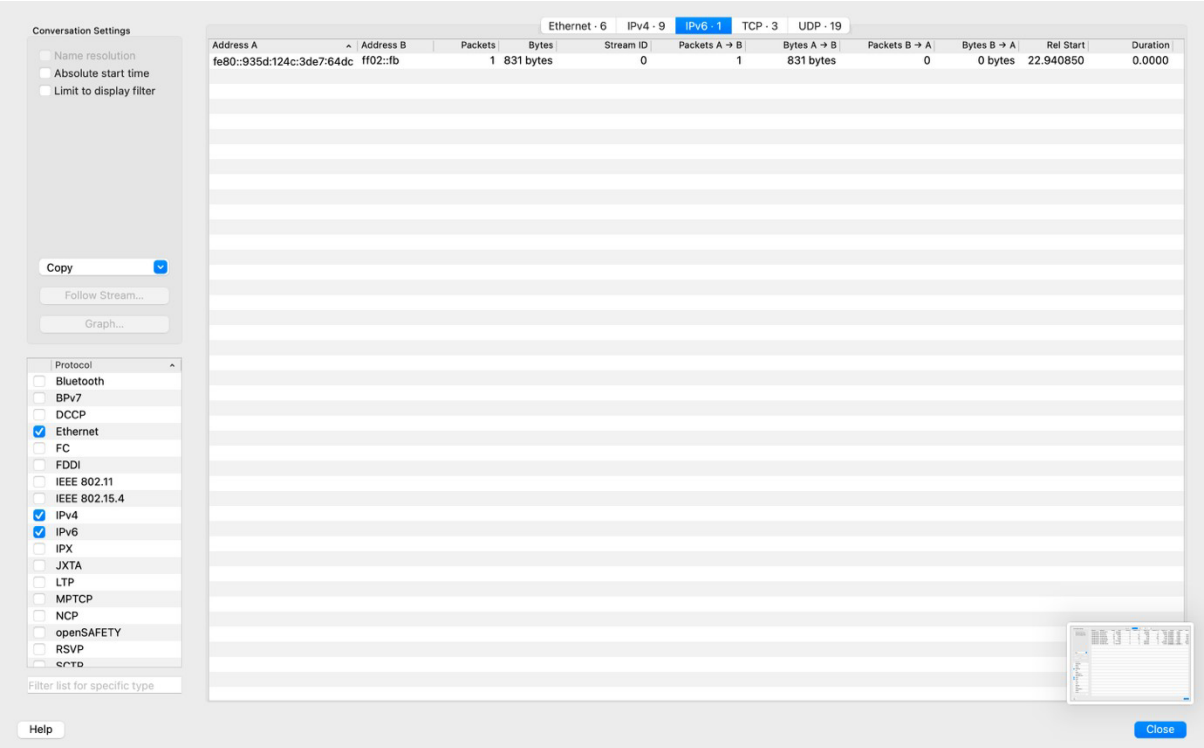
1. TLS9.8%packetshowsencryptedwebtraHicandmonitoringforsuspicious destinations
2. Data1.7% packets shows generic data packets without a clear application protocol which will which suggest an investigation for hidden traffics
3. TCP29.7%which shows potential or mixed use example scanning attempts
4. QUIC63.5%packet prevents threats

CONVERSATION STATISTCS



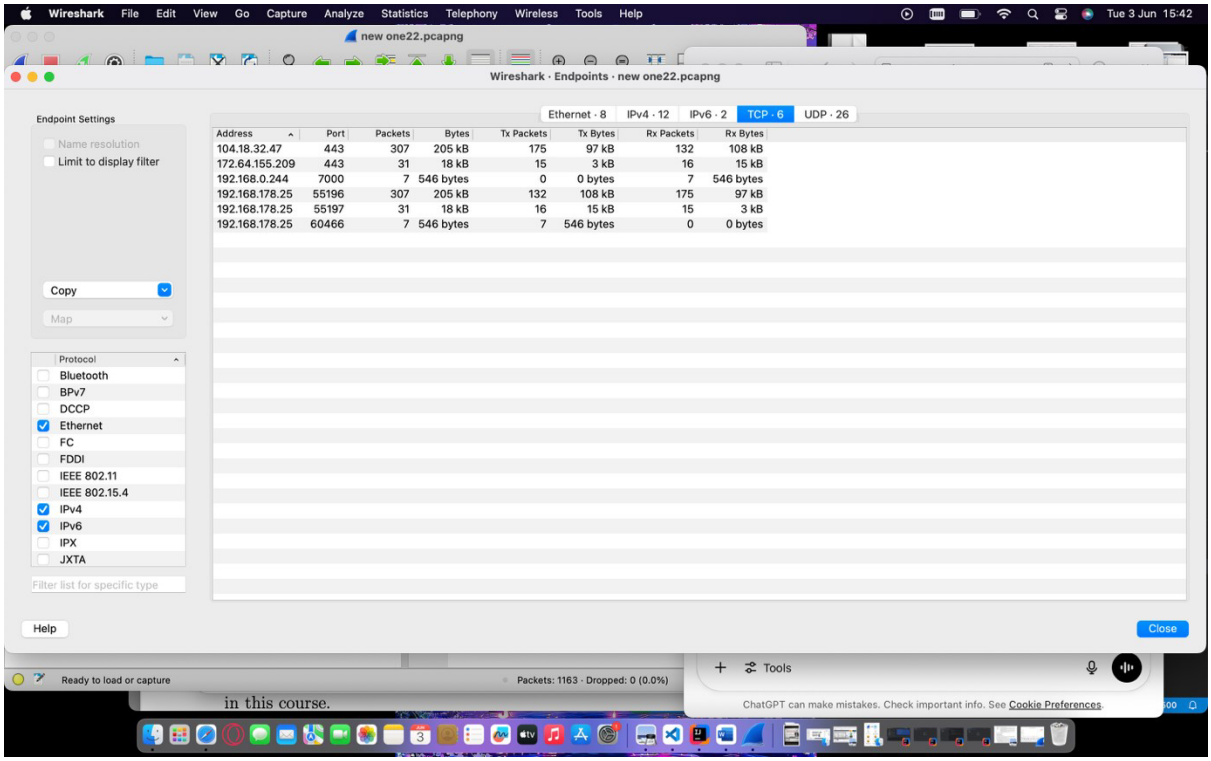
CONVERSATION IPV4

A device (192.168.178.25) shows high throughput communication with multiple Cloudflare Ips this could be signs of malware beaconing or unauthorized software

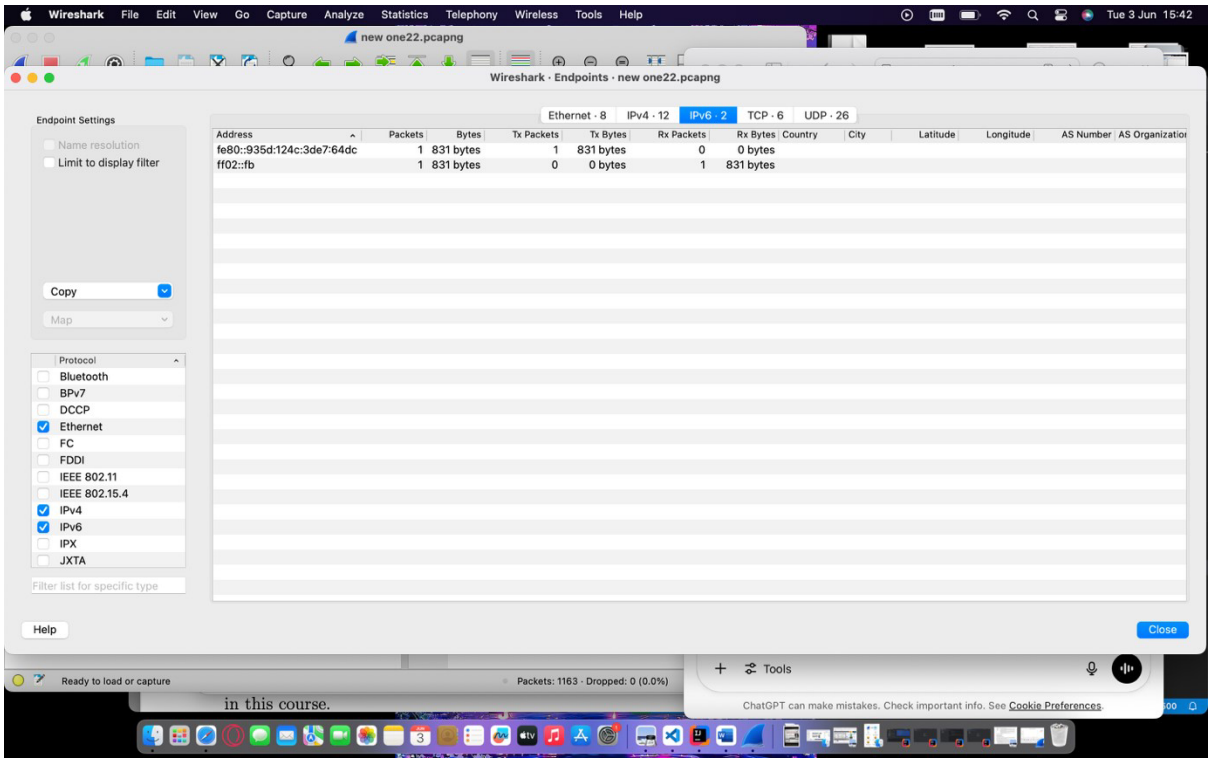


CONVERSATION IPV6 shows only one packet but not really harmful

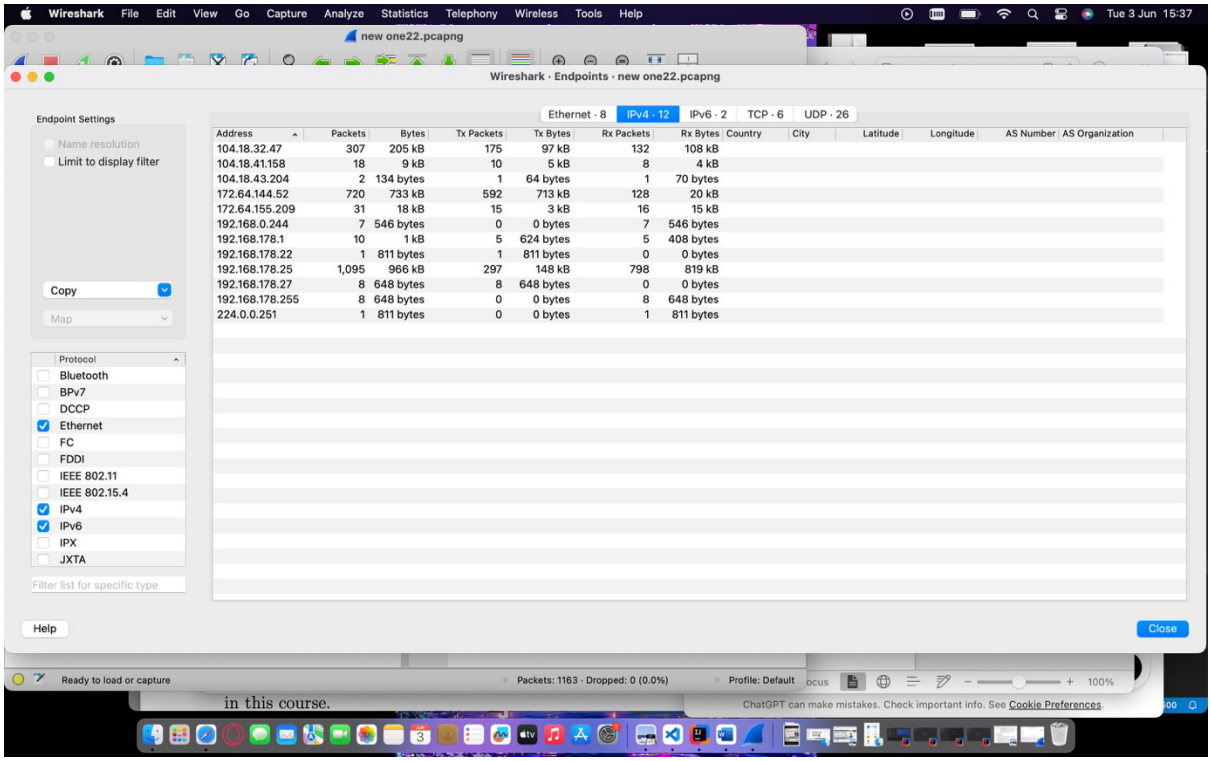
ENDDPOINT STATISTICS



TCP Endpoints well encrypted doesn't raise any suspicious alarm



IPV6 shows no suspicious traffic



IP 192.168.178.25 is the main host and is responsible for 1095 packets and nearly 1mb of total traffic which shows it is very active

FIREWALL DROP/PERMIT RULES

Action Source IP Destination IP Protocol Port Description

Drop	Any	192.168.178.25	TCP	443	Block external traffic from unknown host
PERMIT	192.168.178.0/24	Any	TCP	80	Allow free access to internal users

CONCLUSION

From my analysis I can draw a conclusion that the packet volume, choice of part and external destination warrants an immediate containment and fire wall enforcement. And more monitoring analysis to protect against both known and stealth threats

LINK TO MY GITHUB REPOSITORY :
https://github.com/mart23333/martinschizaramogowuihe.git

BIOGRAPHY

All about python(2021) :How to create a real time chat app in python using socket programming[video] Available at : https://youtu.be/hBnOdIg0jAM?si=njanWgq6sV40U0oh (Accessed : 28 may 2025)