Monday 4 April 2022

ELEC-C7420 Basic Principles in Networking Spring 2022

Assignment VII: Ipsec & VPN

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Goals of the experiment

This experiment is a quite simple implementation of VPN network using socket programming for the traffic we want to sniff. This time the socket is not implemented on a local host but on the ip address for it to be affected by the VPN service. This assigment is to give us an understandting on how vpn tunneling works and get a bigger picture of encrypted/unencrypted VPN service providers.

Experimental Setup

The Experimental Setup is a simple python Server and a client that keeps sending on a loop a simple txt file . This is first done Without VPN and using wireshark to try and sniff the packets. The next case scenario is by deploying the the server and client in the IP adress of the VPN provider. I used both Aalto VPN service as well as my personal one TunnelBear.

ANNEX

SERVER CODE

```
import socket
port =9999
s = socket.socket()
host ="192.168.241.102"

#host = "130.233.20.72"
s.bind((host, port))
s.listen(5)

print ('Server listening....')

while True:
 conn, addr = s.accept()
print ('Got connection from'), addr
 data = conn.recv(1024)
 print('Received', repr(data))

filename='/Users/georgepsaltakis/D
esktop/ASSIGMENT 7/hi.txt'
 f = open(filename,'rb')
 l = f.read(1024)
 while (l):
 conn.send(l)
 print('Sent ',repr(l))
  conn.send('Thank you for recieving
file'.encode())
```

ANNEX

CLIENT CODE

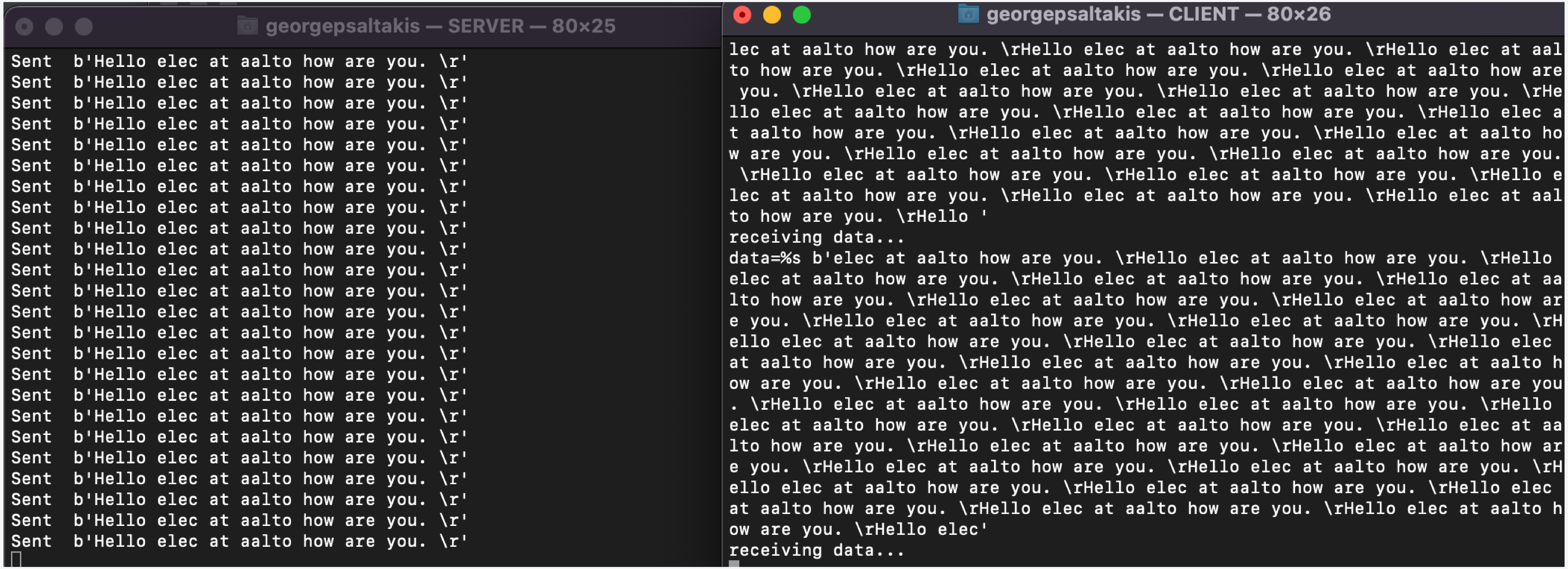
```
import socket
import time
s = socket.socket()
host = "192.168.241.102"
#host = "130.233.20.72"
port = 9999

s.connect((host, port))
s.send('Hello server!'.encode())
while True:
 time.sleep(2)
```

```
with open('received_file', 'wb') as f:
 print ('file opened')
 while True:
 print('receiving data...')
 time.sleep(1)
 data = s.recv(1024)
 print('data=%s', (data))
 if not data:
 break
 f.write(data)
```

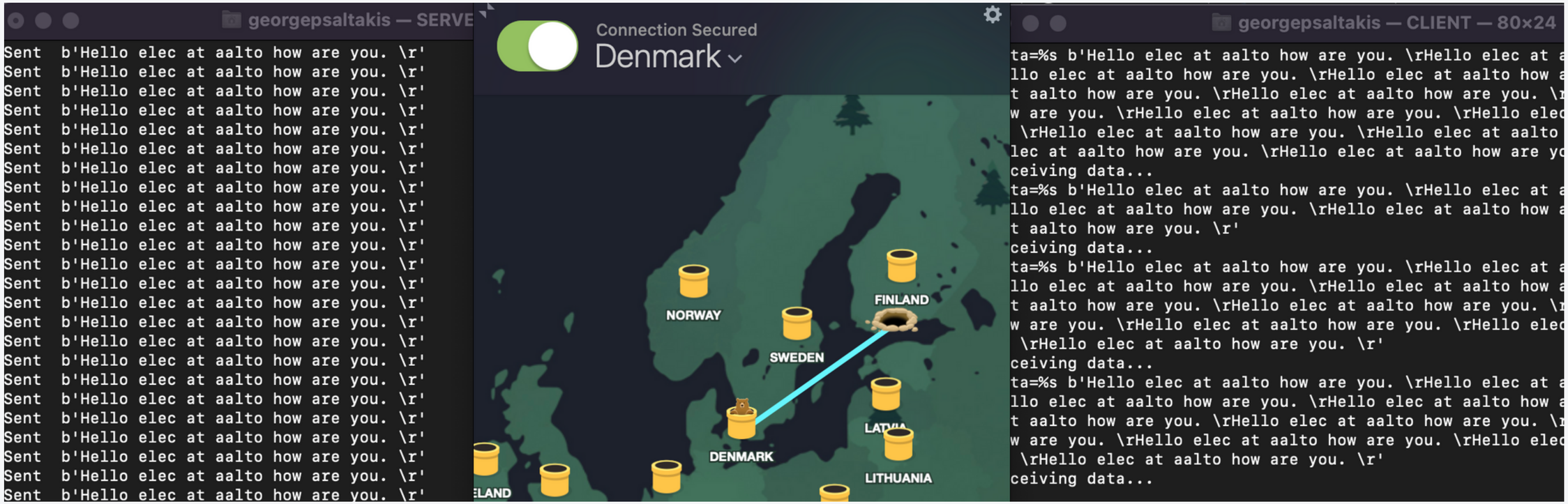
Results & Conclusion

Successful implementation of server and client



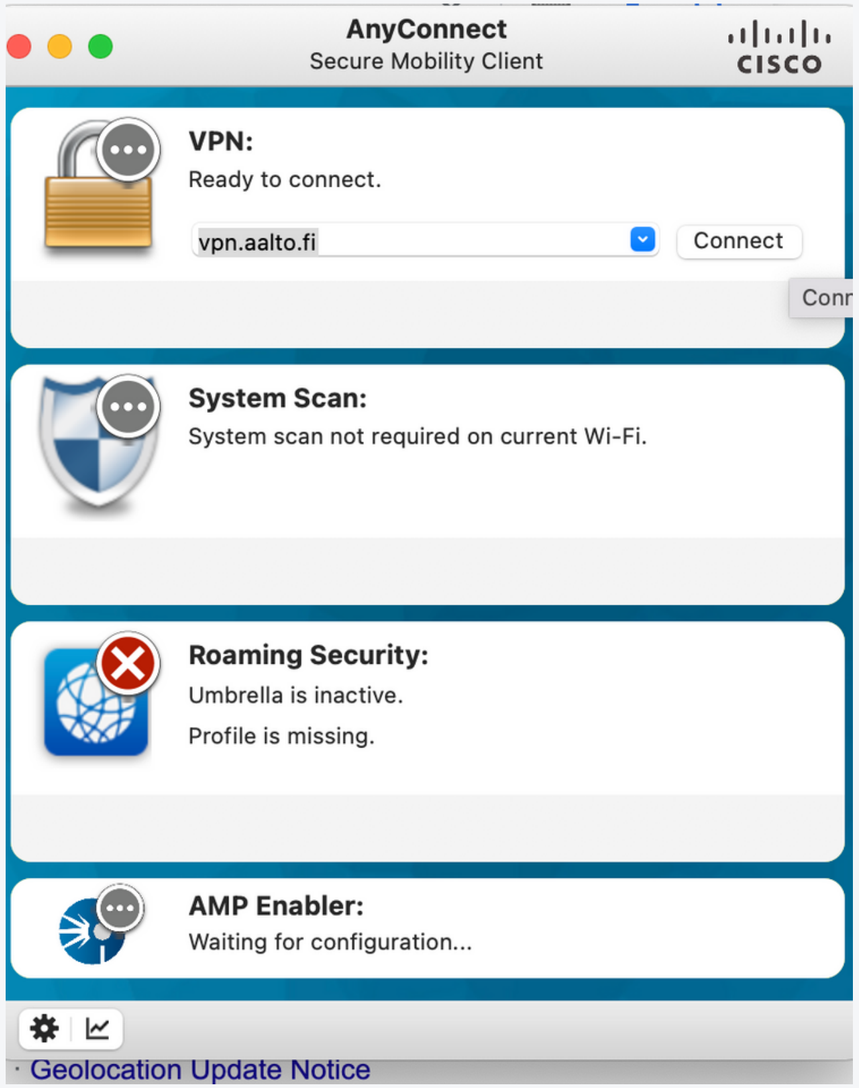
Here we can see the succesfull implementation of the server and the Client.

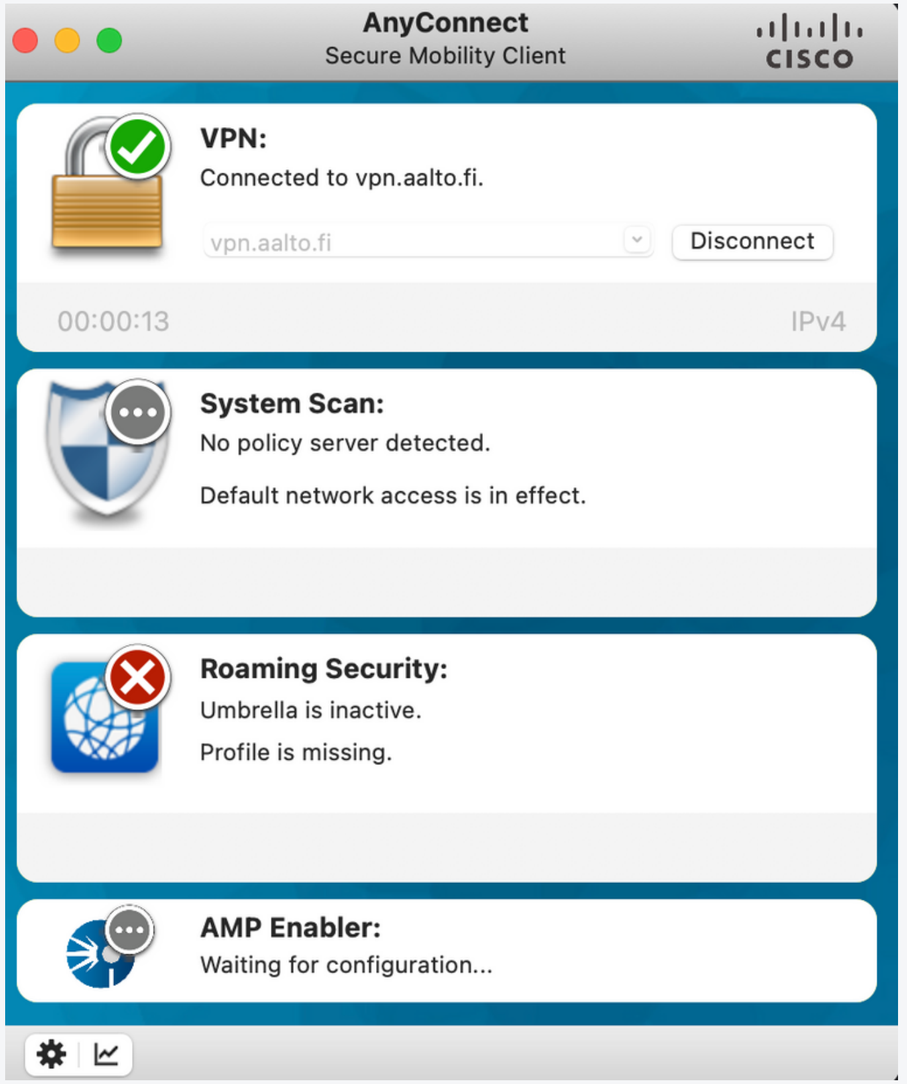
Successful communication between server and client using VPN



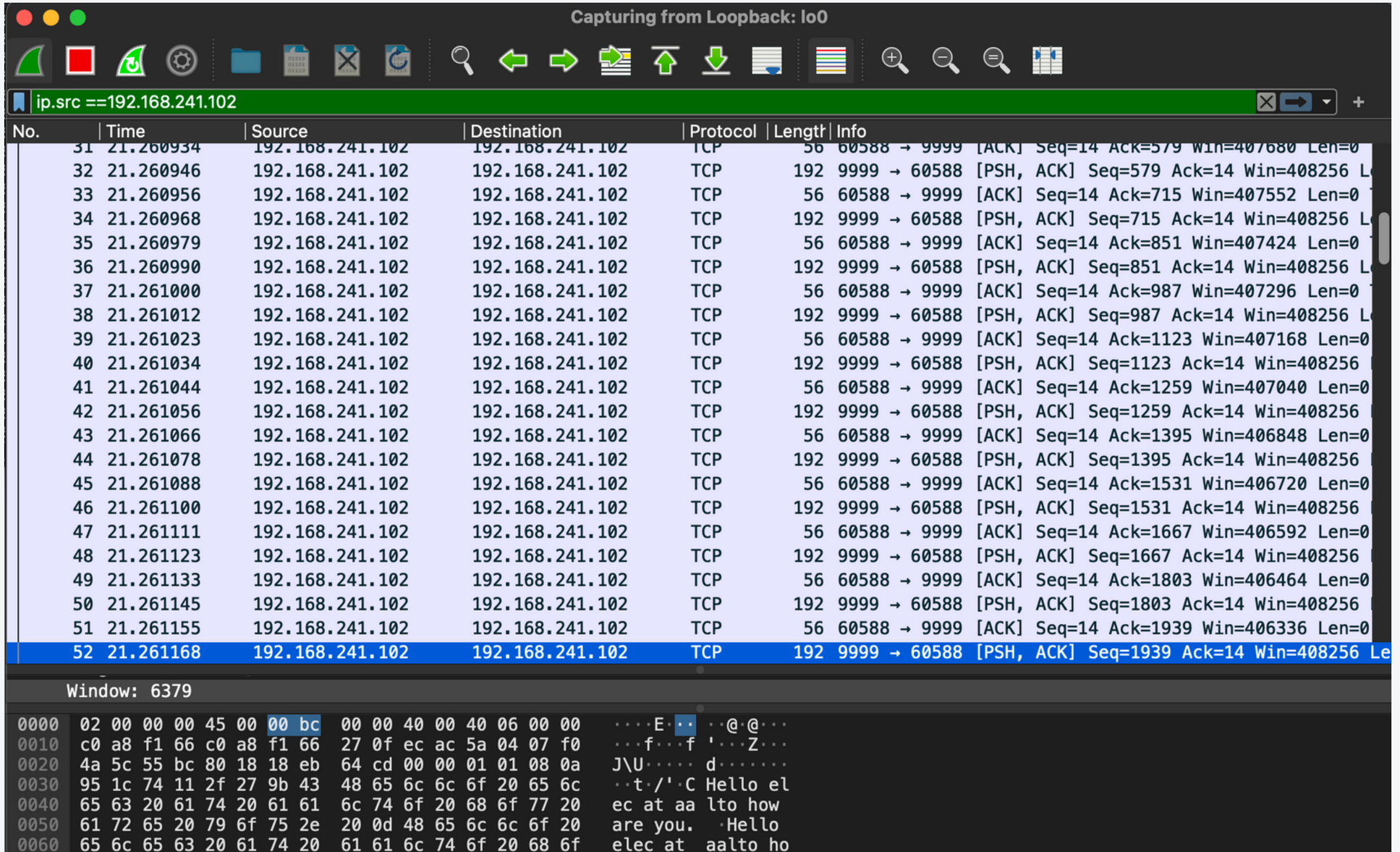
I used my personal and university provided VPN and it works with both of them correctly

VPN SETUP OF AALTO.





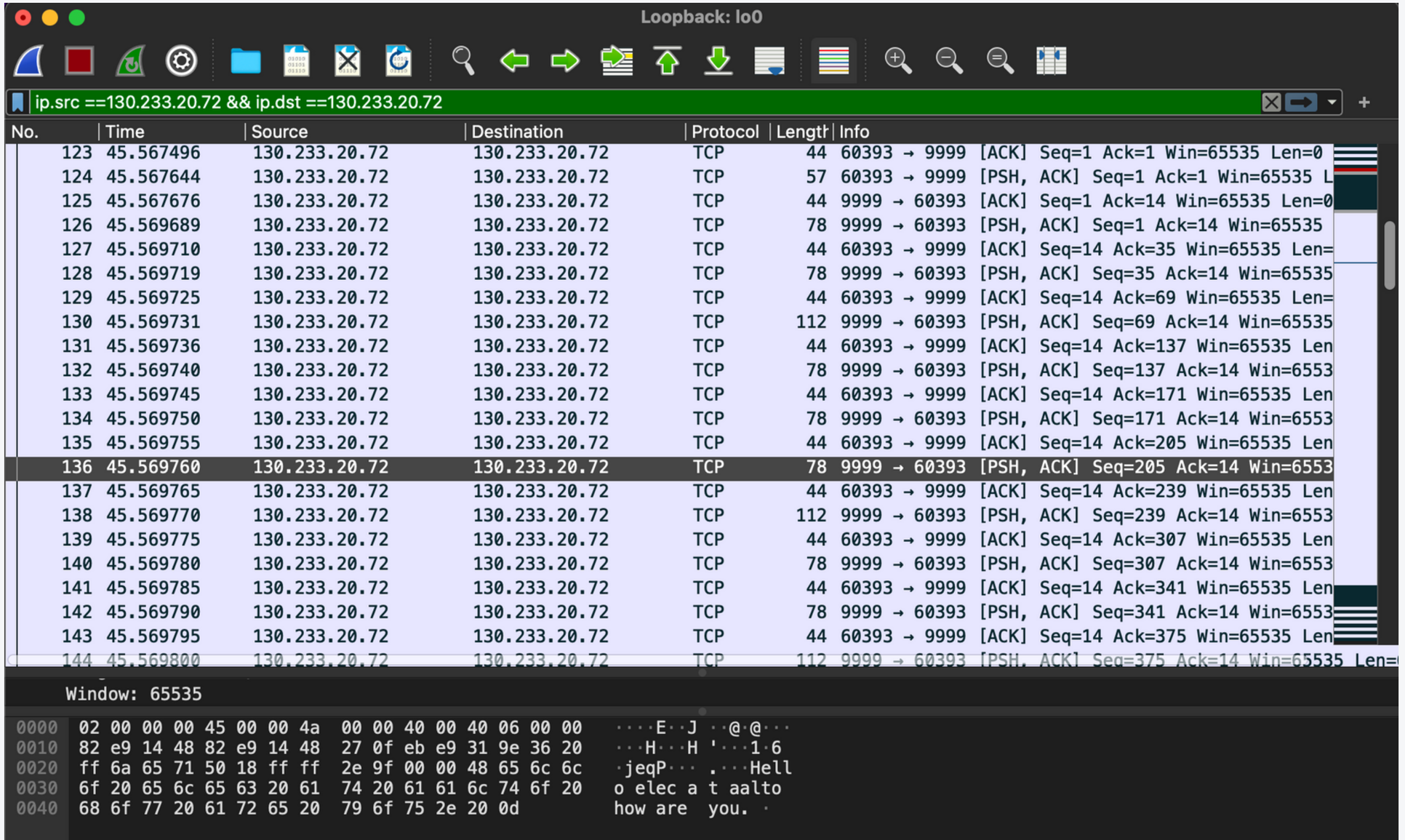
PACKAGE CAPTURE AT WIRESHARK (Without VPN)



Explanation of the above image

This is without any VPN at all. Thats the reason the IP adress is the networks adress as normally. The IP adress is 192.168.241.102
We can see all the traffic since this is an open wifi and there is no encrypted VPN in use. This is also seen since the sender and reciever is the same and we use TCP protocol. So we could easily isolate the package in sent and recieved by the python script i wrote.

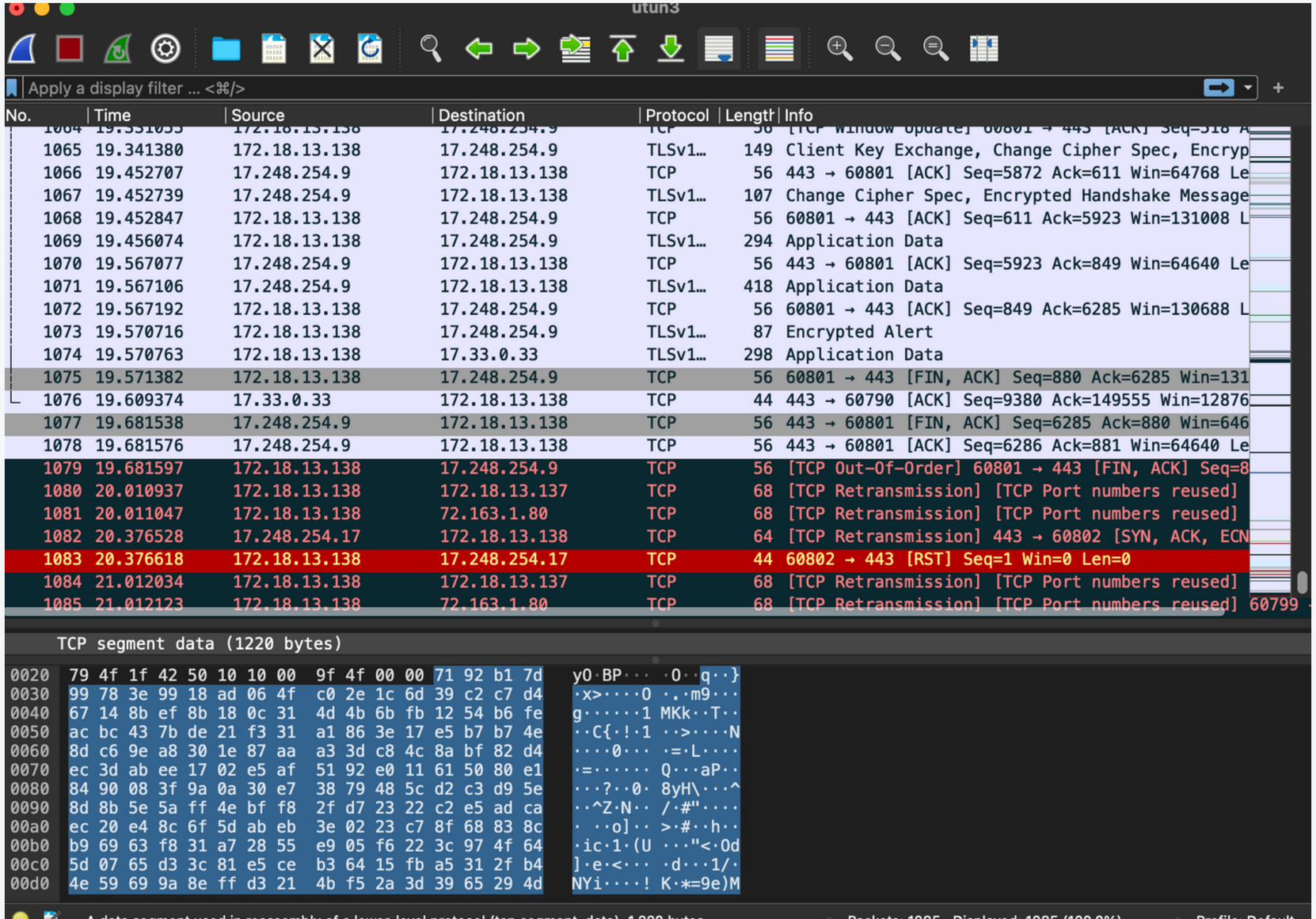
PACKAGE CAPTURE AT WIRESHARK (With Aalto VPN)



Explanation of the above image

This is with the Aalto VPN. I can see the appended IP address of the Server as 130.233.20.72 as well as the receiver of the package. I can also understand due to the fact of the TCP protocol in use as well as the sniffed package. This is of Course is happening due to the fact that not all the VPNs are using encryption as is with this case to just connect to the intranet of the University. That is also the reason why we can see the package normally.

PACKAGE CAPTURE AT WIRESHARK (With Encrypted VPN)



Explanation of the above image

Using a VPN that provides encryption we can get the package encrypted so that it cannot be captured and the contents of it to be seen. This is easily seen in the image above where the captured package is gibberish and we cant see anything since the contents of it have been passed by a Cipher.

Conclusions

This experiment gave me an inside understanding of how VPNs work in comparison to not using them at all. There could be an unencrypted VPN that just pass through the data through a server somewhere else so at the end of the day by using a different IP adress for the traffic (Passthrough). There could also be VPNs using encryption embedded so the data not only gets passthrough a different adress but as well as encrypt the packages making them not understandble by the sniffer . The final use is usually the best use of a VPN.