INTERNET PROTOCOL LAB ASSIGNMNET -2

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TASKS:

1. Understand about PING and document it, then answer the following question ping commands uses ICMP protocol to check if the requested resource is responding or not. These are otherwise called as error-checking protocols as they are used by network devices to identify network connectivity issues.

a. Use ping on google.com and document your results on the output you received. [Find the IP address, Time to live value and round-trip time value from the results you got].

```
C:\Windows\system32>ping google.com

Pinging google.com [2404:6800:4007:814::200e] with 32 bytes of data:
Reply from 2404:6800:4007:814::200e: time=102ms
Reply from 2404:6800:4007:814::200e: time=108ms
Reply from 2404:6800:4007:814::200e: time=546ms
Reply from 2404:6800:4007:814::200e: time=41ms

Ping statistics for 2404:6800:4007:814::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 41ms, Maximum = 546ms, Average = 199ms

C:\Windows\system32>
```

IP address: 2404:6800:4007:814::200e

Time to Live (TTL): None (128 default)

Round-trip time: Minimum=41ms, Maximum=546ms, Average=199ms

b. By default, ping will send 4 packets to check the details, here you have to send 8 packets to check the output over google.com. Explain what the purpose of doing this is.

ping command also has ping -n (count) which states number of times the request has to be sent. The purpose of doing so is to ensure that the path can handle mentioned number of packets and to test the stability of the line.

```
C:\Windows\system32>ping -n 8 google.com

Pinging google.com [2404:6800:4009:811::200e] with 32 bytes of data:
Reply from 2404:6800:4009:811::200e: time=104ms
Reply from 2404:6800:4009:811::200e: time=122ms
Reply from 2404:6800:4009:811::200e: time=89ms
Reply from 2404:6800:4009:811::200e: time=114ms
Reply from 2404:6800:4009:811::200e: time=120ms
Reply from 2404:6800:4009:811::200e: time=132ms
Reply from 2404:6800:4009:811::200e: time=117ms
Reply from 2404:6800:4009:811::200e: time=165ms

Ping statistics for 2404:6800:4009:811::200e:
    Packets: Sent = 8, Received = 8, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 89ms, Maximum = 165ms, Average = 120ms

C:\Windows\system32>
```

c. Ping your localhost. Explain what is the purpose.

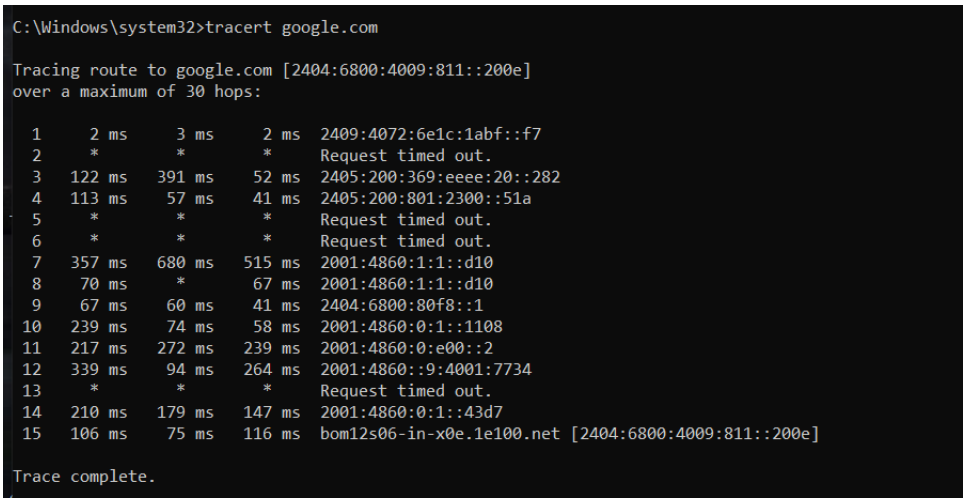
```
C:\Windows\system32>ping localhost

Pinging LAPTOP-VI1RO0K4 [::1] with 32 bytes of data:
Reply from ::1: time<1ms
Reply from ::1: time<1ms
Reply from ::1: time<1ms
Reply from ::1: time<1ms

Ping statistics for ::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Windows\system32>
```

The purpose of pinging the localhost (127.0.0.1) is to verify that your TCP/IP software is installed, started, and working properly.

2.Read the Unix manual page for traceroute OR help for tracert. Experiment with the various options. Describe the three things that you found most useful in the result. Answer the following question:

tracert is an important command useful for troubleshooting large networks and it is handy to find the number of hops from source to destination. tracert command also uses ICMP protocols to reach the destination. tracert follows a mechanism called time-to-live which prevents loop backingof packets being sent continuously to a router. Every time a packet is being forwarded by a router, it is being decreased by 1 so eventually when it is zero, the network will discard the IP packet.In the various options given by tracert, the three options I've found most useful are -d, -w, -4 or -6. -d is used to avoid resolving the IP addresses to hostnames. -w is used to specify the wait timeout milliseconds for each reply.-4 or -6 to force IPv4 or IPv6 tracerouting.

a.Try tracert on google.com.



```
C:\Windows\system32>tracert google.com

Tracing route to google.com [2404:6800:4009:811::200e]
over a maximum of 30 hops:

  1     2 ms     3 ms     2 ms  2409:4072:6e1c:1abf::f7
  2     *        *        *     Request timed out.
  3   122 ms   391 ms    52 ms  2405:200:369:eeee:20::282
  4   113 ms    57 ms    41 ms  2405:200:801:2300::51a
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7   357 ms   680 ms   515 ms  2001:4860:1:1::d10
  8    70 ms     *       67 ms  2001:4860:1:1::d10
  9    67 ms    60 ms    41 ms  2404:6800:80f8::1
 10   239 ms    74 ms    58 ms  2001:4860:0:1::1108
 11   217 ms   272 ms   239 ms  2001:4860:0:e00::2
 12   339 ms    94 ms   264 ms  2001:4860::9:4001:7734
 13     *        *        *     Request timed out.
 14   210 ms   179 ms   147 ms  2001:4860:0:1::43d7
 15   106 ms    75 ms   116 ms  bom12s06-in-x0e.1e100.net [2404:6800:4009:811::200e]

Trace complete.
```

b.Type tracert -d google.com

i. How many hops is your machine away from google.com?
www.google.comserver is 12 hops away from my machine.

```
C:\Windows\system32>tracert -d google.com

Tracing route to google.com [2404:6800:4009:811::200e]
over a maximum of 30 hops:

  1    20 ms     9 ms     3 ms  2409:4072:6e1c:1abf::f7
  2     *        *        *     Request timed out.
  3   105 ms    60 ms    50 ms  2405:200:369:eeee:20::282
  4   122 ms    79 ms   111 ms  2405:200:801:2300::51a
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7     *        *       51 ms  2001:4860:1:1::d10
  8    70 ms    61 ms     *     2001:4860:1:1::d10
  9   104 ms    73 ms    58 ms  2404:6800:80f8::1
 10    80 ms    40 ms    47 ms  2001:4860:0:1::1108
 11    68 ms    46 ms    60 ms  2001:4860:0:e00::2
 12   130 ms    81 ms   123 ms  2001:4860::9:4001:7734
 13     *        *        *     Request timed out.
 14   102 ms   102 ms    92 ms  2001:4860:0:1::43d7
 15    96 ms    84 ms    84 ms  2404:6800:4009:811::200e

Trace complete.

C:\Windows\system32>
```

ii. Wait for a while and execute the same command again. Is the output the same as the first time? Observe and compare the difference, and explain the reason.

```
C:\Windows\system32>tracert -d google.com

Tracing route to google.com [2404:6800:4009:811::200e]
over a maximum of 30 hops:

  1    20 ms     9 ms     3 ms  2409:4072:6e1c:1abf::f7
  2     *        *        *     Request timed out.
  3   105 ms    60 ms    50 ms  2405:200:369:eeee:20::282
  4   122 ms    79 ms   111 ms  2405:200:801:2300::51a
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7     *        *       51 ms  2001:4860:1:1::d10
  8    70 ms    61 ms     *     2001:4860:1:1::d10
  9   104 ms    73 ms    58 ms  2404:6800:80f8::1
 10    80 ms    40 ms    47 ms  2001:4860:0:1::1108
 11    68 ms    46 ms    60 ms  2001:4860:0:e00::2
 12   130 ms    81 ms   123 ms  2001:4860::9:4001:7734
 13     *        *        *     Request timed out.
 14   102 ms   102 ms    92 ms  2001:4860:0:1::43d7
 15    96 ms    84 ms    84 ms  2404:6800:4009:811::200e

Trace complete.

C:\Windows\system32>
```

3.You have to read about NETSTAT from manual page or help before answering the below questions:

Netstat is used for checking the network statistics. It displays the types of services that run on ports. It displays the protocol used, private addresses, foreign addresses and the state of the connections.

```
C:\Windows\system32>netstat -r
===========================================================================
Interface List
 19...08 8f c3 16 9c a5 ......Realtek PCIe GbE Family Controller
 12...76 4c a1 76 ff af ......Microsoft Wi-Fi Direct Virtual Adapter
 18...76 4c a1 76 ff bf ......Microsoft Wi-Fi Direct Virtual Adapter #2
  4...74 4c a1 76 ff df ......MediaTek Wi-Fi 6 MT7921 Wireless LAN Card
 10...74 4c a1 76 ff e0 ......Bluetooth Device (Personal Area Network) #3
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0  192.168.121.181  192.168.121.182     55
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
    192.168.121.0    255.255.255.0         On-link   192.168.121.182    311
  192.168.121.182  255.255.255.255         On-link   192.168.121.182    311
  192.168.121.255  255.255.255.255         On-link   192.168.121.182    311
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link   192.168.121.182    311
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link   192.168.121.182    311
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  4     71 ::/0                     fe80::c804:2ff:fe8d:fe0b
  1    331 ::1/128                  On-link
  4     71 2409:4072:6e1c:1abf::/64 On-link
  4    311 2409:4072:6e1c:1abf:619d:4ea5:7175:93a1/128
                                    On-link
  4    311 2409:4072:6e1c:1abf:d938:e8e3:c6e9:c053/128
                                    On-link
  4    311 fe80::/64                On-link
  4    311 fe80::d938:e8e3:c6e9:c053/128
                                    On-link
  1    331 ff00::/8                 On-link
  4    311 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```

ii.Use netstat to display about ethernet statistics.

```
C:\Windows\system32>netstat -e
Interface Statistics

                           Received            Sent

Bytes                     697990384        48570784
Unicast packets              593256          269480
Non-unicast packets              40            2616
Discards                          0               0
Errors                            0               0
Unknown protocols                 0

C:\Windows\system32>
```

4.What is the purpose of NSLOOKUP? Answer the following questions below:

nslookup is a network administration command-line tool for querying the Domain Name System to obtain the mapping between domain name and IP address, or other DNS records.

i. Use nslookup to find out the internet address of the domain amrita.edu.

```
C:\Windows\system32>nslookup -type=ns amrita.edu
Server:  prithvi.amritanet.edu
Address:  172.17.18.2

Non-authoritative answer:
amrita.edu      nameserver = ns1.amrita.edu
amrita.edu      nameserver = ns3.amrita.edu
amrita.edu      nameserver = ns4.amrita.edu
amrita.edu      nameserver = ns2.amrita.edu

ns1.amrita.edu  internet address = 10.10.10.4
ns3.amrita.edu  internet address = 103.10.24.200
ns4.amrita.edu  internet address = 10.10.10.4
ns2.amrita.edu  internet address = 117.193.77.232
```

ii. What is the mail exchanger for the domain google.com?

```
C:\Windows\system32>nslookup -type=mx google.com
Server:  UnKnown
Address:  192.168.121.181

Non-authoritative answer:
google.com      MX preference = 10, mail exchanger = smtp.google.com

C:\Windows\system32>
```

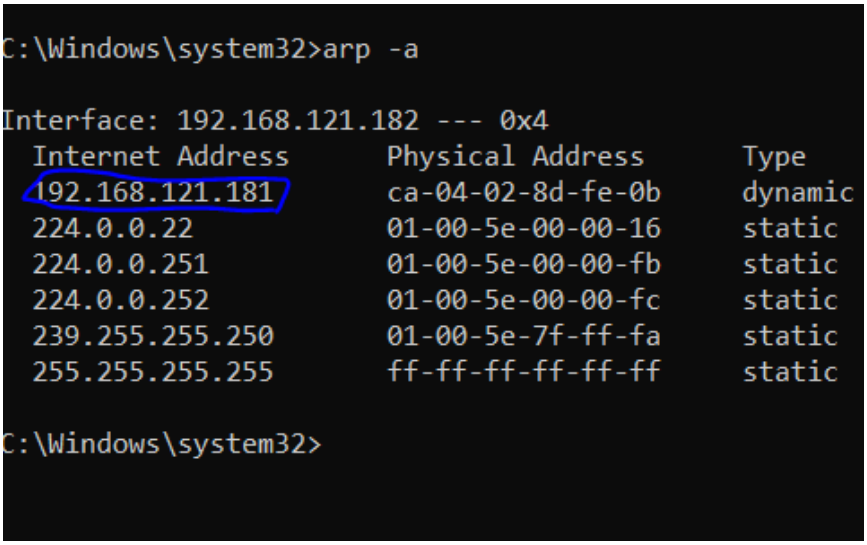
iii. What is the name server for amrita.edu?

```
C:\Windows\system32>nslookup -type=ns amrita.edu
Server:  prithvi.amritanet.edu
Address:  172.17.18.2

Non-authoritative answer:
amrita.edu      nameserver = ns1.amrita.edu
amrita.edu      nameserver = ns3.amrita.edu
amrita.edu      nameserver = ns4.amrita.edu
amrita.edu      nameserver = ns2.amrita.edu
```

5.What is ARP and RARP? Answer the following questions below:

Address Resolution Protocol (ARP) is a communication protocol used to find the MAC (Media Access Control) address of a device from its IP address. This protocol is used when a device wants to communicate with another device on a Local Area Network or Ethernet. Reverse Address Resolution Protocol (RARP) is a networking protocol used by the client system in a local area network (LAN) to request its IPv4 address from the ARP gateway router table. A table is created by the network administrator in the gateway-router that is used to find out the MAC address to the corresponding IP address.

i . Use arp command to find the gateway address and host systems hardware address.



ii. How do you find the arp entries for particular interface?

To find the arp entries for a particular interface we need to use the **–N** flag along with the ip address.

c. How do delete an arp entry?

To delete an arp entry, we need to use the **–d flag** along with the ip address . To delete all the entries we need to use the wildcard flag(*) .

d. How do you add an arp entry in arpcache?

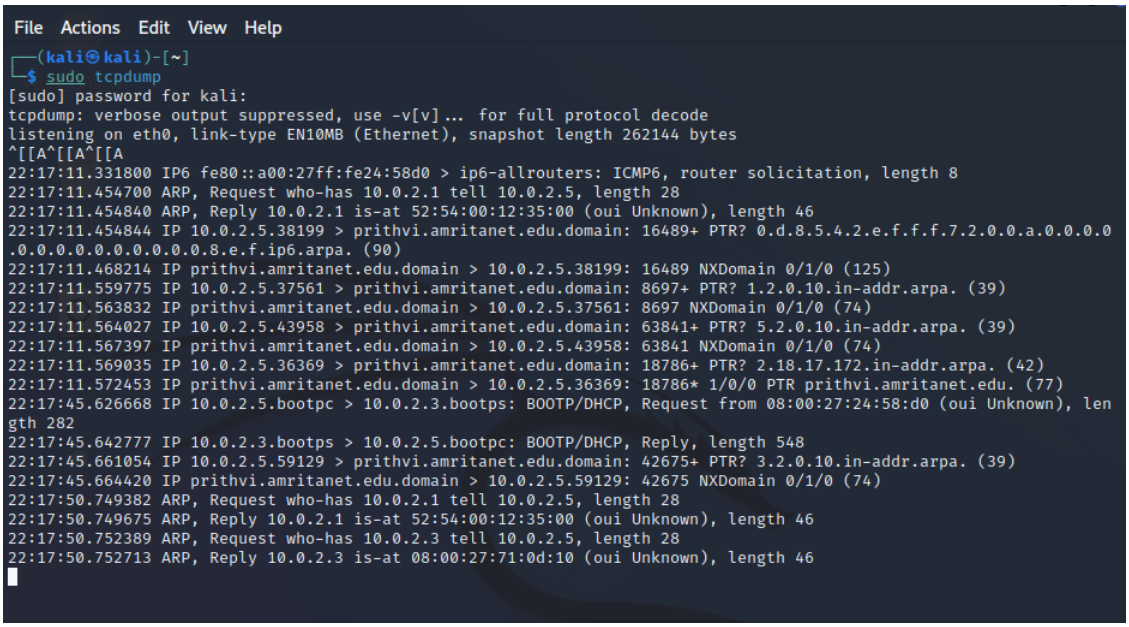
To add an arp entry we need to use –s flag along with IP address and MAC address.

EXAMPLE - arp -s 192.168.43.160 00-aa-00-62-c6-09

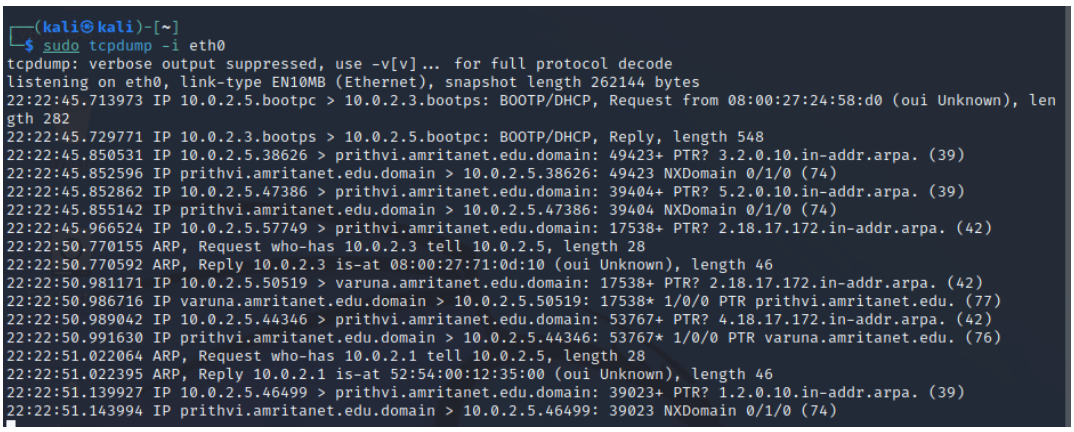
6. Read about TCPDUMP tool [use manual page].

Answer the questions below: (1 marks)

a. Using tcpdump, get the information about the general incoming network traffic with names.



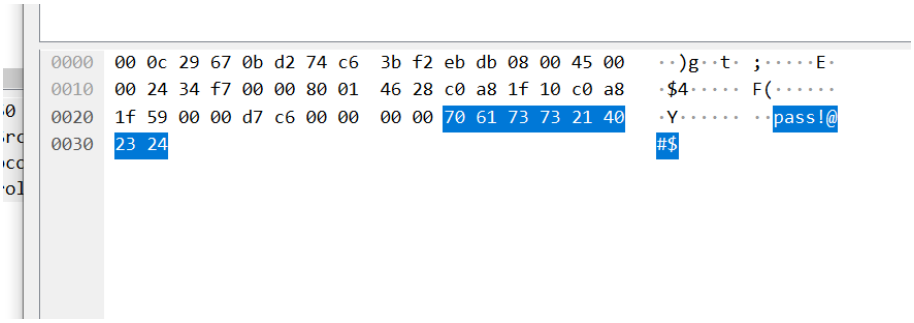
b. Using tcpdump, get the information about the general incoming network traffic with ip address on specific interface.



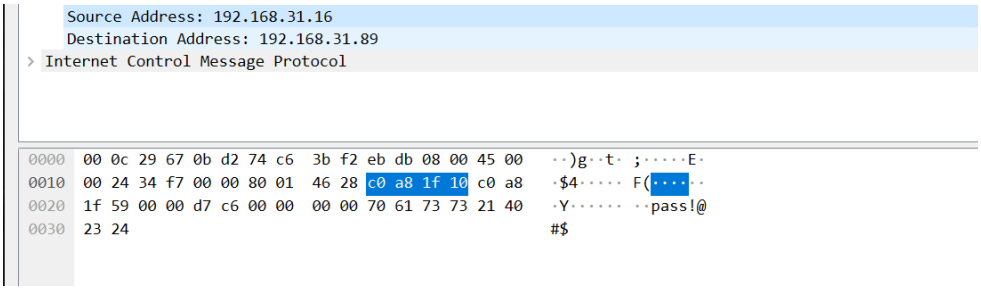
7. Use Wireshark (Latest version) to solve the below scenarios:

1. You, as a SOC analyst noted that someone try to send information (PING) to unknown IP address and you are suspecting some malicious information might transferred in it. Analyze the log file.

a. Find the data transferred. – The data that is transferred in the packet is “pass!@#$”



b. Find the source and destination IP of that log.



Source IP = 192.168.31.89, Destination IP = 192.168.31.16

c. Find the Data length (Bytes) and verify the checksum status on destination.

```
Internet Protocol Version 4, Src: 192.168.31.16, Dst: 192.168.31.89
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  Total Length: 36
  Identification: 0x34f7 (13559)
> 000. .... = Flags: 0x0
  ...0 0000 0000 0000 = Fragment Offset: 0
  Time to Live: 128
  Protocol: ICMP (1)
  Header Checksum: 0x4628 [validation disabled]
  [Header checksum status: Unverified]
```

2. Now you have found that some kind of file is been downloaded by insider in unencrypted web traffic. Your task is to

```
Length  Info
   209 GET /1.jpg HTTP/1.1
 22234 HTTP/1.1 200 OK  (JPEG JFIF image)
```

a. Find the name and type of file.

NAME = 1.jpg , Type of file = JPEG JFIF

b. Export that file from that web traffic, then analyze the file for any secret information.

c. Find the hostname in which the file is stored. – 192.168.31.113

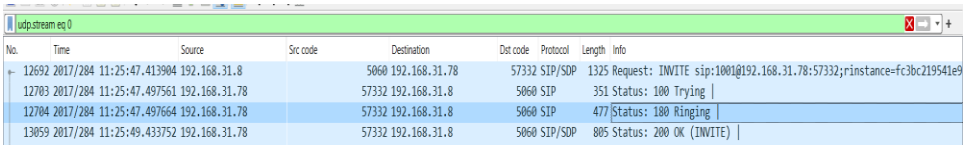
Destination	Dst code	Protocol
192.168.31.67	80	HTTP
192.168.31.113	59380	HTTP

3.Based upon their activities, auditing team has started investigation against them and found that the insider passed some sensitive information via call to someone. The traffic is been captured.

a. Analyze the traffic and find those conversations and extract the sensitive information in it.

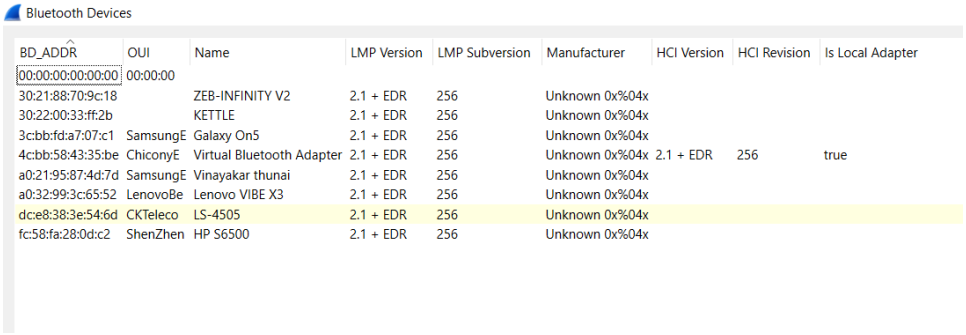
Sensitive Information: Password is “limbo”

b. Find the call-ID when the status of the call is ringing.



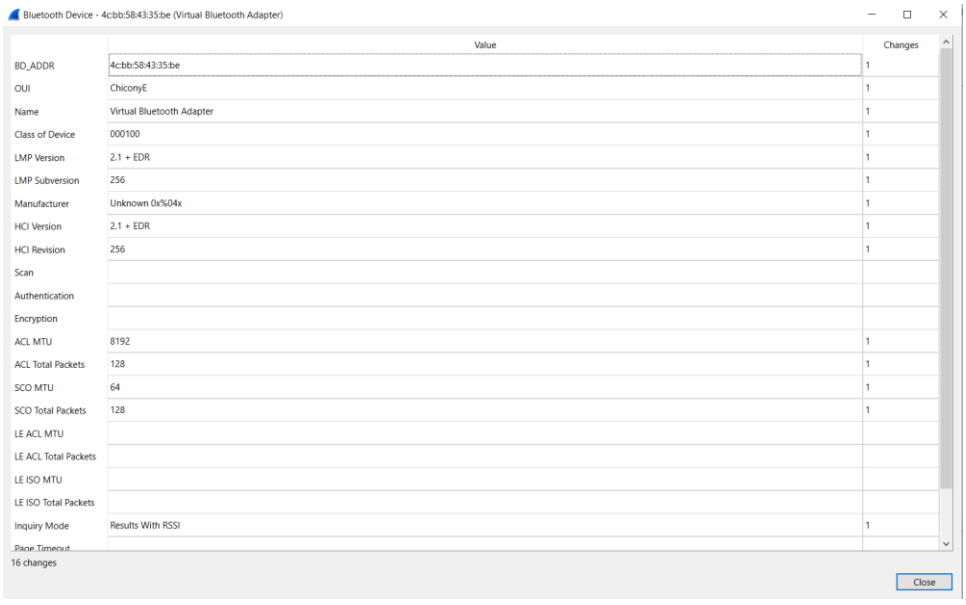
4.On further investigation, you have a suspect on some wireless device communications. List out the Bluetooth devices communications from this traffic and find the details about native Bluetooth adapter.

List of Bluetooth Devices:

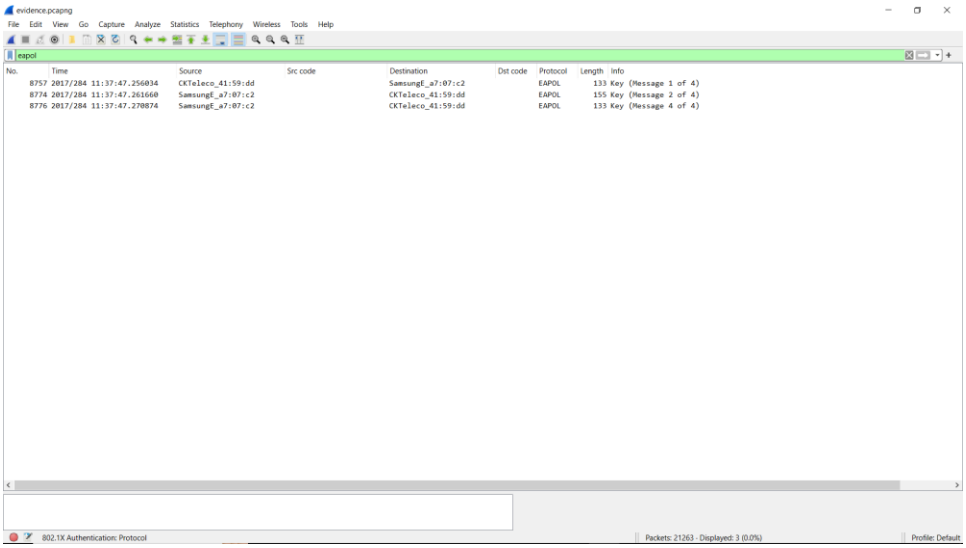


BD_ADDR	OUI	Name	LMP Version	LMP Subversion	Manufacturer	HCI Version	HCI Revision	Is Local Adapter
00:00:00:00:00:00	00:00:00							
30:21:88:70:9c:18		ZEB-INFINITY V2	2.1 + EDR	256	Unknown 0x%04x			
30:22:00:33:ff:2b		KETTLE	2.1 + EDR	256	Unknown 0x%04x			
3c:bb:fd:a7:07:c1	SamsungE	Galaxy On5	2.1 + EDR	256	Unknown 0x%04x			
4c:bb:58:43:35:be	ChiconyE	Virtual Bluetooth Adapter	2.1 + EDR	256	Unknown 0x%04x	2.1 + EDR	256	true
a0:21:95:87:4d:7d	SamsungE	Vinayakar thunai	2.1 + EDR	256	Unknown 0x%04x			
a0:32:99:3c:65:52	LenovoBe	Lenovo VIBE X3	2.1 + EDR	256	Unknown 0x%04x			
dc:e8:38:3e:54:6d	CKTeleco	LS-4505	2.1 + EDR	256	Unknown 0x%04x			
fc:58:fa:28:0d:c2	ShenZhen	HP S6500	2.1 + EDR	256	Unknown 0x%04x			

Bluetooth Adapter:



a. Analyze the captured WPA handshake from this traffic and report in detail about it to your administrator.

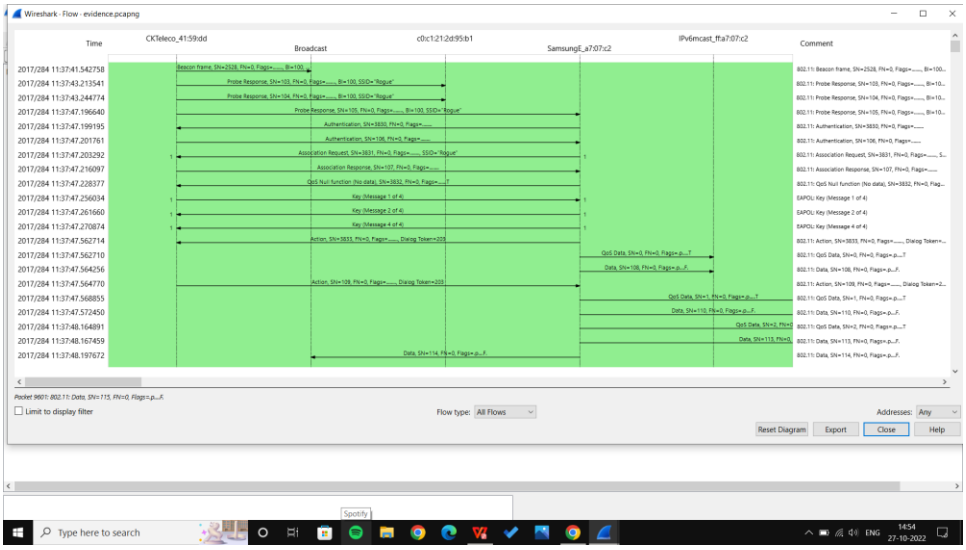


Out of 4 only 3 is available

b. Geo locate all the endpoint of wireless devices.

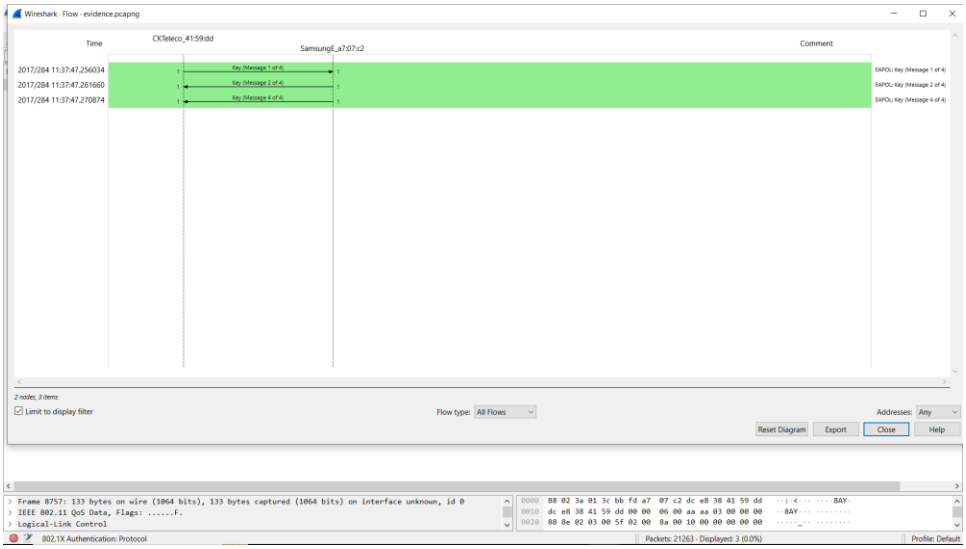
c. Analyze the protocol level information transfer between wireless devices.

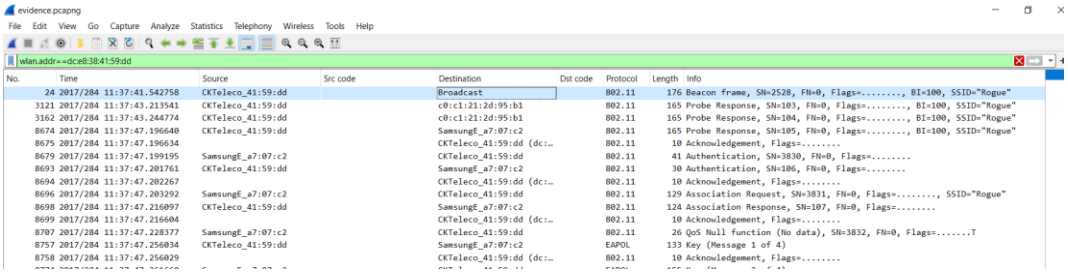
Go to statistics and go to flow graph



Left hand side-time stamp

Limit to Display filter then only we get particular display





Analysis of protocol information transfer:

- AP Beacon, i.e., announces presence and capabilities of AP.
- Probe Request packet, i.e., client looking for AP.
- Probe Response packet, i.e., AP responding to client.
- Open-authentication System packets, i.e., client sending authentication.
- 4-Way Handshake.