

Development Tools Assignment

Module 2 – Network Performance Measurement Tools

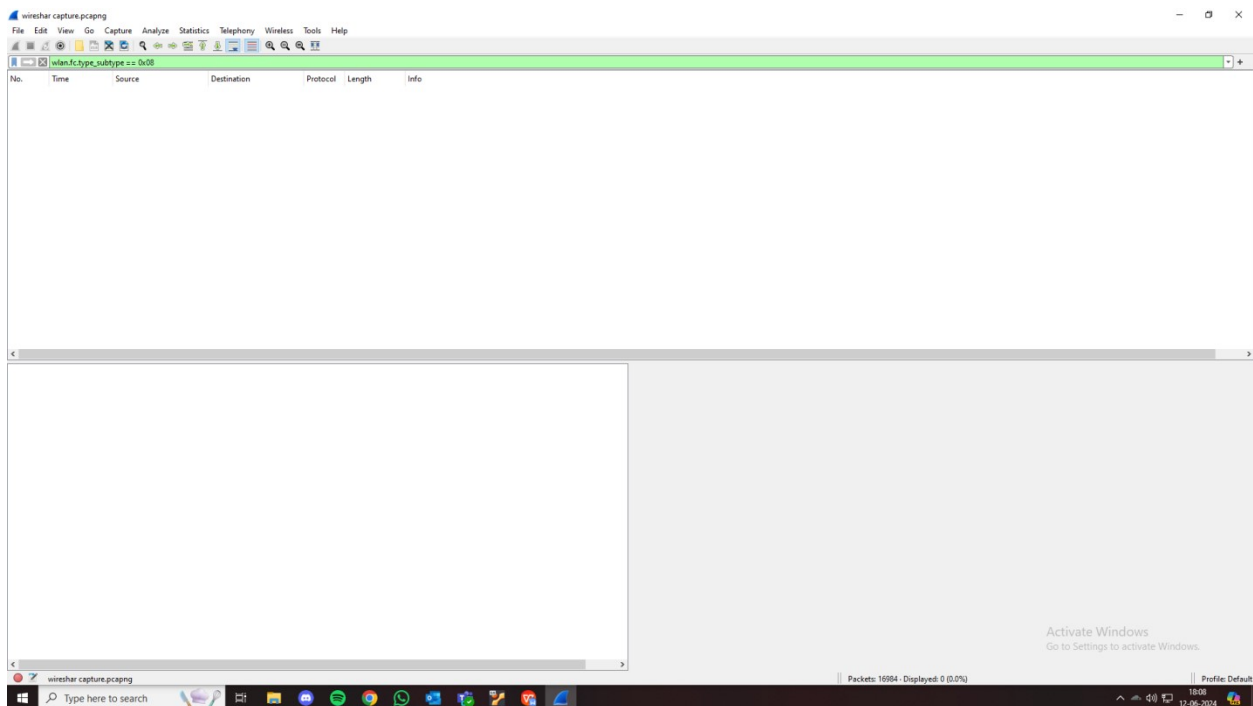
1) Install Wireshark, take capture on WiFi interface

1. Identify the beacon frame using filter.

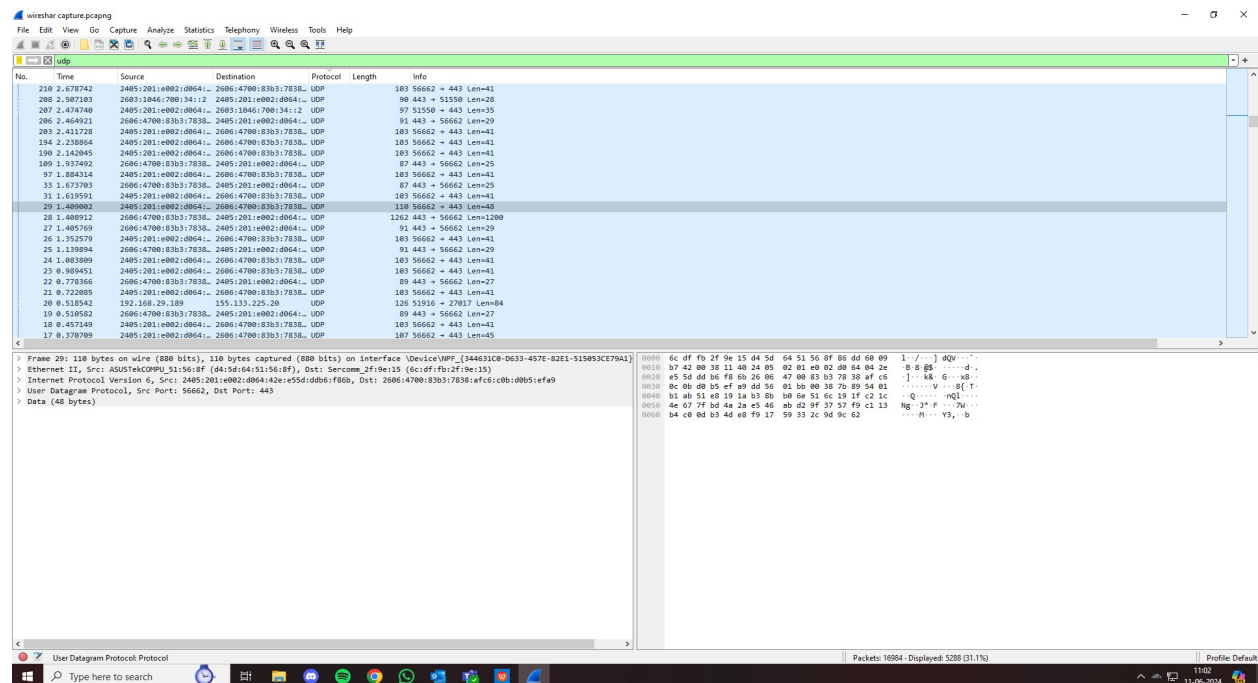
Answer:

To capture beacon frames “wlan.fc.type_subtype == 0x08” is the filter type.

beacons are part of the management frames which has the type field set to 0 and beacons are represented by a hex value of 0x8.



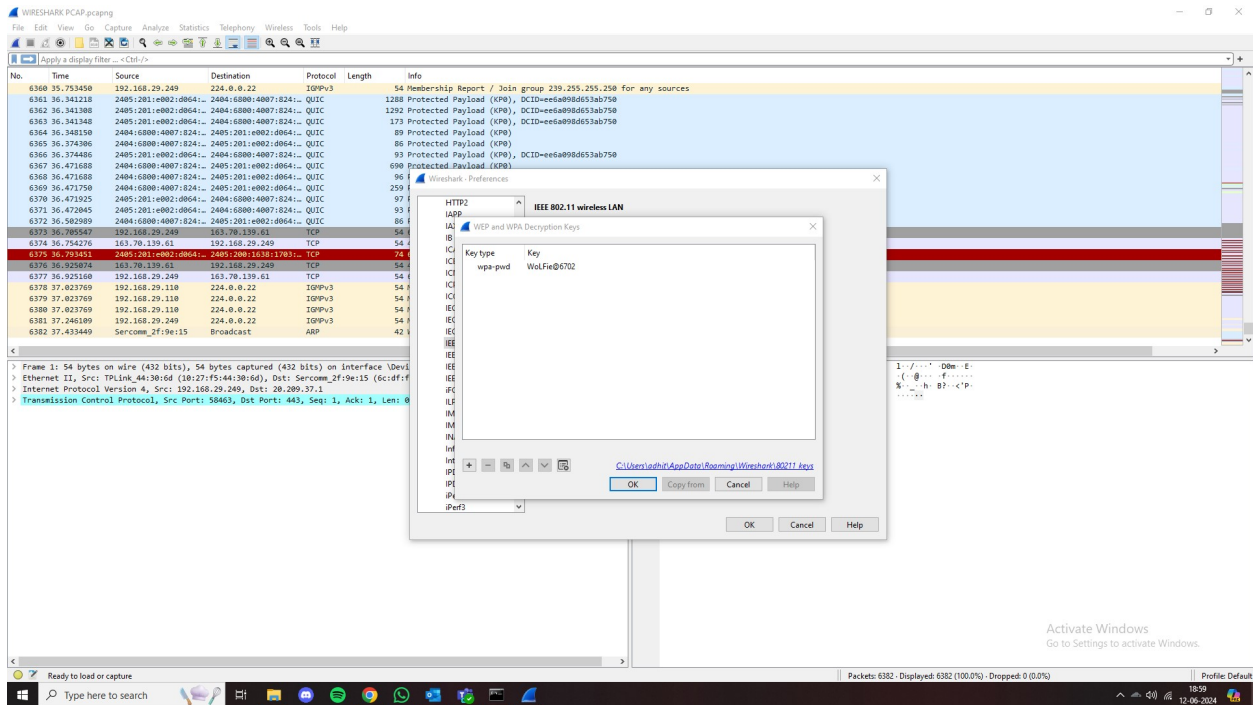
(there are no beacon frames because I don't have wifi monitor mode support).



3. Decrypt the wireshark pcap using passphrase, to view the encrypted packets.

Answer:

The passphrase is the password of the WiFi Router.



4. Point out ethernet and 802.11 frames.

Answer:

Type “eth” in filter to show only frames sent/received over ethernet.

The image shows a Wireshark capture of network traffic. The filter bar at the top is set to "eth". The packet list on the left shows various protocols including ICMPv6, QUIC, UDP, TCP, and HTTP. The packet details pane on the right shows the structure of a selected packet, including Ethernet II, Internet Protocol Version 6, and User Datagram Protocol. The packet bytes pane on the right shows the raw data in hexadecimal and ASCII.

Type “wlan” in filter to show only 802.11 frames.

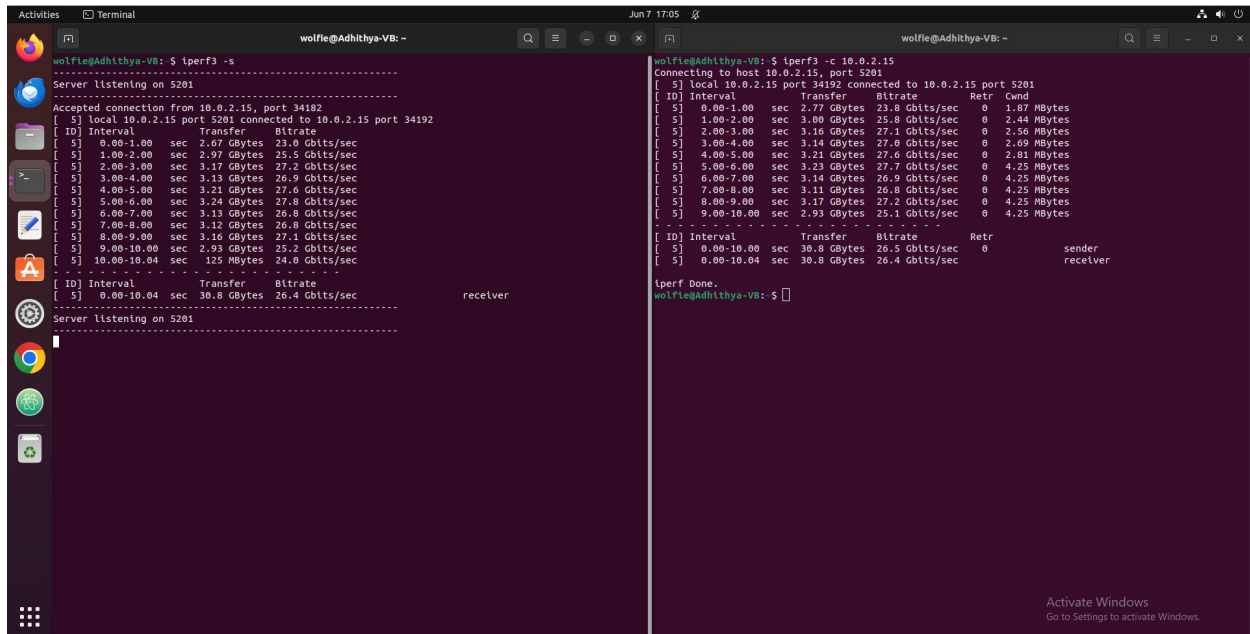
The image shows a Wireshark capture of network traffic. The filter bar at the top is set to "wlan". The packet list on the left shows various protocols including TCP, UDP, and TLSv1.3. The packet details pane on the right shows the structure of a selected packet, including Ethernet II, Internet Protocol Version 4, and Transmission Control Protocol. The packet bytes pane on the right shows the raw data in hexadecimal and ASCII.

2) Install Iperf on client and server device

1. Run TCP traffic

> client side: `iperf3 -c <ip-address>`

> server side: `iperf3 -s`



The screenshot shows two terminal windows side-by-side. The left window is the server side, and the right window is the client side.

Left Terminal (Server):

```
wolfie@Adhithya-VB: ~$ iperf3 -s
Server listening on 5201
Accepted connection from 10.0.2.15, port 34182
[ 5] local 10.0.2.15 port 5201 connected to 10.0.2.15 port 34192
[ ID] Interval      Transfer      Bitrate
[ 5] 0.00-1.00 sec  2.67 GBytes  23.8 Gbits/sec
[ 5] 1.00-2.00 sec  3.07 GBytes  25.5 Gbits/sec
[ 5] 2.00-3.00 sec  3.17 GBytes  27.2 Gbits/sec
[ 5] 3.00-4.00 sec  3.13 GBytes  26.9 Gbits/sec
[ 5] 4.00-5.00 sec  3.21 GBytes  27.6 Gbits/sec
[ 5] 5.00-6.00 sec  3.24 GBytes  27.8 Gbits/sec
[ 5] 6.00-7.00 sec  3.13 GBytes  26.8 Gbits/sec
[ 5] 7.00-8.00 sec  3.12 GBytes  26.8 Gbits/sec
[ 5] 8.00-9.00 sec  3.16 GBytes  27.1 Gbits/sec
[ 5] 9.00-10.00 sec 2.93 GBytes  25.2 Gbits/sec
[ 5] 10.00-10.04 sec 125 MBytes  24.0 Gbits/sec
[ ID] Interval      Transfer      Bitrate
[ 5] 0.00-10.04 sec 30.8 GBytes  26.4 Gbits/sec
Server listening on 5201
```

Right Terminal (Client):

```
wolfie@Adhithya-VB: ~$ iperf3 -c 10.0.2.15
Connecting to host 10.0.2.15, port 5201
[ 5] local 10.0.2.15 port 34192 connected to 10.0.2.15 port 5201
[ ID] Interval      Transfer      Bitrate      Retr      Cwnd
[ 5] 0.00-1.00 sec  2.77 GBytes  23.8 Gbits/sec  0         1.87 MBytes
[ 5] 1.00-2.00 sec  3.00 GBytes  25.8 Gbits/sec  0         2.44 MBytes
[ 5] 2.00-3.00 sec  3.16 GBytes  27.1 Gbits/sec  0         2.56 MBytes
[ 5] 3.00-4.00 sec  3.14 GBytes  27.0 Gbits/sec  0         2.69 MBytes
[ 5] 4.00-5.00 sec  3.21 GBytes  27.6 Gbits/sec  0         2.81 MBytes
[ 5] 5.00-6.00 sec  3.23 GBytes  27.7 Gbits/sec  0         4.25 MBytes
[ 5] 6.00-7.00 sec  3.14 GBytes  26.9 Gbits/sec  0         4.25 MBytes
[ 5] 7.00-8.00 sec  3.11 GBytes  26.8 Gbits/sec  0         4.25 MBytes
[ 5] 8.00-9.00 sec  3.17 GBytes  27.2 Gbits/sec  0         4.25 MBytes
[ 5] 9.00-10.00 sec 2.93 GBytes  25.1 Gbits/sec  0         4.25 MBytes
[ ID] Interval      Transfer      Bitrate      Retr      sender  receiver
[ 5] 0.00-10.00 sec 30.8 GBytes  26.5 Gbits/sec  0
[ 5] 0.00-10.04 sec 30.8 GBytes  26.4 Gbits/sec  0
iperf Done.
wolfie@Adhithya-VB: ~$
```

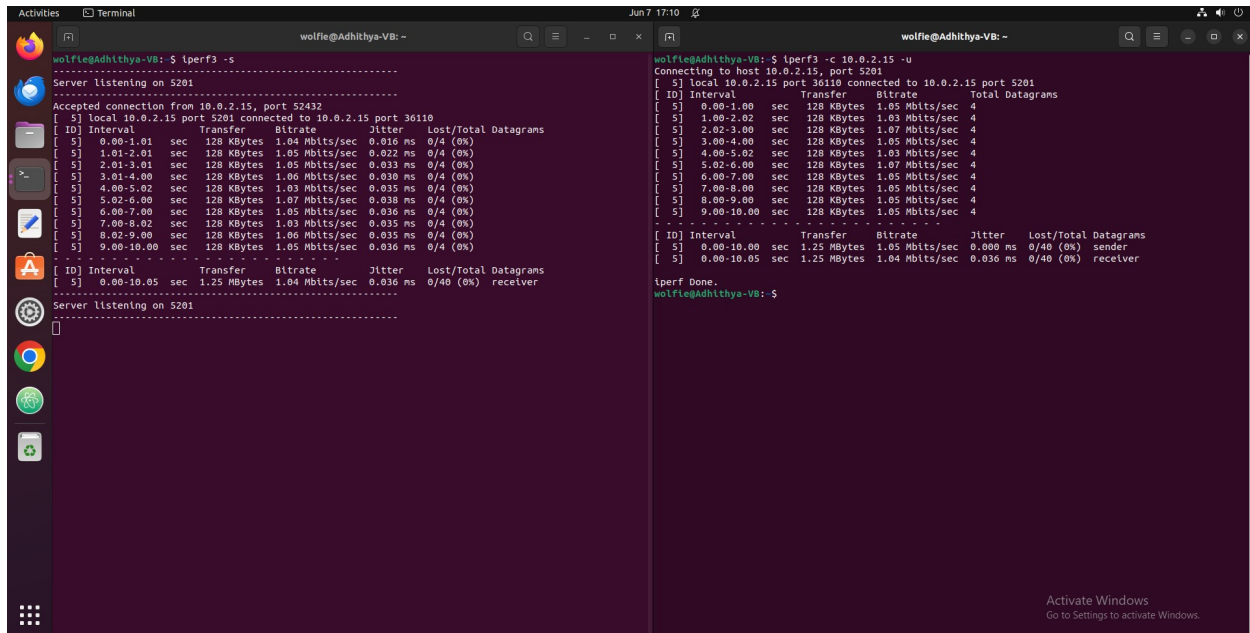
Average Transfer rate : 32.0 GBytes

Average Bitrate : 26.4 Gbits/sec

2. Run UDP traffic

> client side: `iperf3 -c <ip-address> -u`

> server side: `iperf3 -s`



The screenshot shows a terminal window with two panes. The left pane shows the server output for `iperf3 -s`, and the right pane shows the client output for `iperf3 -c 10.0.2.15 -u`. The server output includes a table of statistics for 10 intervals, showing a transfer of 128 KBytes per interval, a bitrate of approximately 1.04 Mbits/sec, and a jitter of 0.036 ms. The client output shows a total transfer of 1.25 MBytes at a bitrate of 1.04 Mbits/sec with a jitter of 0.036 ms. The terminal window also shows the connection details and the final status of the test.

```
wolfie@Adhithya-VB: ~$ iperf3 -s
Server listening on 5201
Accepted connection from 10.0.2.15, port 52432
[ 5] local 10.0.2.15 port 5201 connected to 10.0.2.15 port 36110
[ ID] Interval      Transfer     Bitrate      Jitter    Lost/Tot. Datagrams
[ 5] 0.00-1.01 sec  128 KBytes  1.04 Mbits/sec  0.016 ms  0/4 (0%)
[ 5] 1.01-2.01 sec  128 KBytes  1.05 Mbits/sec  0.022 ms  0/4 (0%)
[ 5] 2.01-3.01 sec  128 KBytes  1.05 Mbits/sec  0.033 ms  0/4 (0%)
[ 5] 3.01-4.00 sec  128 KBytes  1.06 Mbits/sec  0.030 ms  0/4 (0%)
[ 5] 4.00-5.02 sec  128 KBytes  1.03 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 5.02-6.00 sec  128 KBytes  1.07 Mbits/sec  0.038 ms  0/4 (0%)
[ 5] 6.00-7.00 sec  128 KBytes  1.05 Mbits/sec  0.036 ms  0/4 (0%)
[ 5] 7.00-8.02 sec  128 KBytes  1.03 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 8.02-9.00 sec  128 KBytes  1.06 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 9.00-10.00 sec 128 KBytes  1.05 Mbits/sec  0.036 ms  0/4 (0%)
[ ID] Interval      Transfer     Bitrate      Jitter    Lost/Tot. Datagrams
[ 5] 0.00-10.05 sec 1.25 MBytes  1.04 Mbits/sec  0.036 ms  0/40 (0%) receiver
Server listening on 5201

wolfie@Adhithya-VB: ~$ iperf3 -c 10.0.2.15 -u
Connecting to host 10.0.2.15, port 5201
[ 5] local 10.0.2.15 port 36110 connected to 10.0.2.15 port 5201
[ ID] Interval      Transfer     Bitrate      Jitter    Lost/Tot. Datagrams
[ 5] 0.00-1.00 sec  128 KBytes  1.05 Mbits/sec  0.016 ms  0/4 (0%)
[ 5] 1.00-2.02 sec  128 KBytes  1.03 Mbits/sec  0.022 ms  0/4 (0%)
[ 5] 2.02-3.00 sec  128 KBytes  1.07 Mbits/sec  0.030 ms  0/4 (0%)
[ 5] 3.00-4.00 sec  128 KBytes  1.05 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 4.00-5.02 sec  128 KBytes  1.03 Mbits/sec  0.038 ms  0/4 (0%)
[ 5] 5.02-6.00 sec  128 KBytes  1.07 Mbits/sec  0.036 ms  0/4 (0%)
[ 5] 6.00-7.00 sec  128 KBytes  1.05 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 7.00-8.00 sec  128 KBytes  1.05 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 8.00-9.00 sec  128 KBytes  1.05 Mbits/sec  0.035 ms  0/4 (0%)
[ 5] 9.00-10.00 sec 128 KBytes  1.05 Mbits/sec  0.036 ms  0/4 (0%)
[ ID] Interval      Transfer     Bitrate      Jitter    Lost/Tot. Datagrams
[ 5] 0.00-10.00 sec 1.25 MBytes  1.05 Mbits/sec  0.036 ms  0/40 (0%) sender
iperf Done.
wolfie@Adhithya-VB: ~$
```

Average Transfer rate : 1.25 Mbytes

Average Bitrate : 1.04 Mbits/sec

Jitter : 0.036 ms

Lost/total Datagrams : 0/40 (0%)