Date: 26 / 08 / 24

Lab Practical #08:

Study Packet capture and header analysis by Wireshark (HTTP, TCP, UDP, IP, etc.)

Practical Assignment #08:

1. Explain usage of Wireshark tool:

- **Capture Traffic: Start capturing network traffic by selecting the appropriate network interface.**
- **Apply Filters: Use capture filters (before capturing) or display filters (after capturing) to focus on specific traffic, like http for HTTP traffic or ip.addr == 192.168.1.1 for traffic to/from a specific IP.**
- **Analyze Packets: Examine packet details, including protocol layers, headers, and payloads. Expand sections for in-depth analysis.**
- **Follow Streams: Use the "Follow TCP/UDP Stream" feature to view continuous data exchanges between endpoints.**
- **Identify Issues: Spot anomalies, such as retransmissions, duplicate packets, or protocol errors, to diagnose network problems.**
- **Export Data: Save captured data in various formats, or export specific packets for further analysis.**
- **Use Statistics: Access tools like "Protocol Hierarchy," "Conversations," and "Endpoint" statistics for summary views of the traffic.**
- **Customize Views: Colorize packets and customize columns to highlight important information for easier analysis.**
- **Decrypt SSL/TLS Traffic: If you have the right keys, decrypt SSL/TLS traffic for deeper inspection.**
- **Automate Tasks: Use command-line tools like tshark for automated packet capturing and analysis.**

Date: 26 / 08 / 24

2. Packet capture and header analysis by Wireshark (HTTP, TCP, UDP, IP, etc.)

- **Steps Of Packet capture and header analysis by Wireshark:**
- **1. Install and Launch Wireshark**
- Download and Install: Get Wireshark from its official website.
- Launch Wireshark: Open the application after installation.

- **2. Start Packet Capture**
- Select Network Interface: Choose the network interface you want to monitor (e.g., Wi-Fi, Ethernet). You will see a list of interfaces with activity graphs.
- Begin Capturing: Click the "Start Capturing Packets" button (the shark fin icon) to begin capturing packets.

- **3. Generate Network Traffic**
- While Wireshark is capturing, generate some network traffic related to the protocols you're interested in (e.g., visit a website for HTTP traffic, use a network application for TCP/UDP traffic).

- **4. Stop Capture**
- Once you've captured enough packets, click the red stop button to stop capturing.

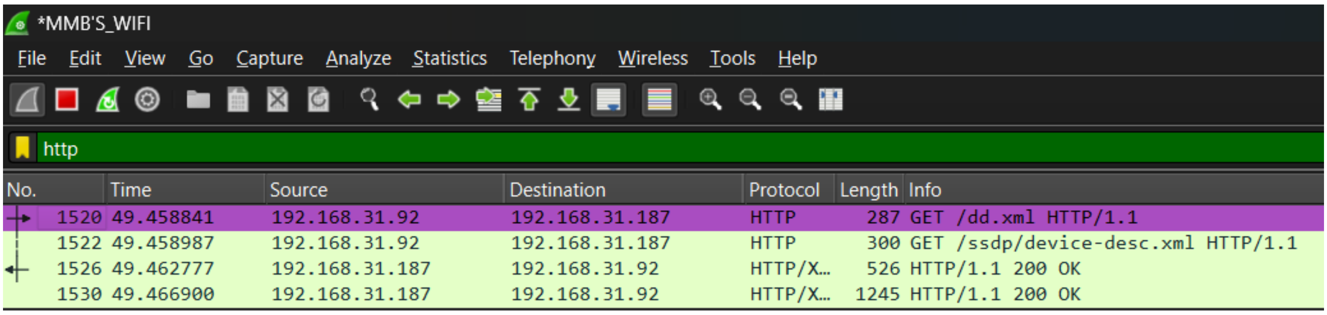
- **5. Filter Packets**
- Apply Protocol Filters: Use the filter bar at the top to focus on specific protocols. For example:
- HTTP: Type http in the filter bar.
- TCP: Type tcp.
- UDP: Type udp.
- IP: Type ip.
- Apply Filter: Press Enter after typing the filter to view only the relevant packets.

- **6. Select and Analyze Packets**
- Packet List Pane: This pane shows a summary of captured packets, including time, source, destination, protocol, and length.
- Packet Details Pane: Click on a packet in the list to see its details in the middle pane. This pane displays a hierarchical view of the packet's headers.

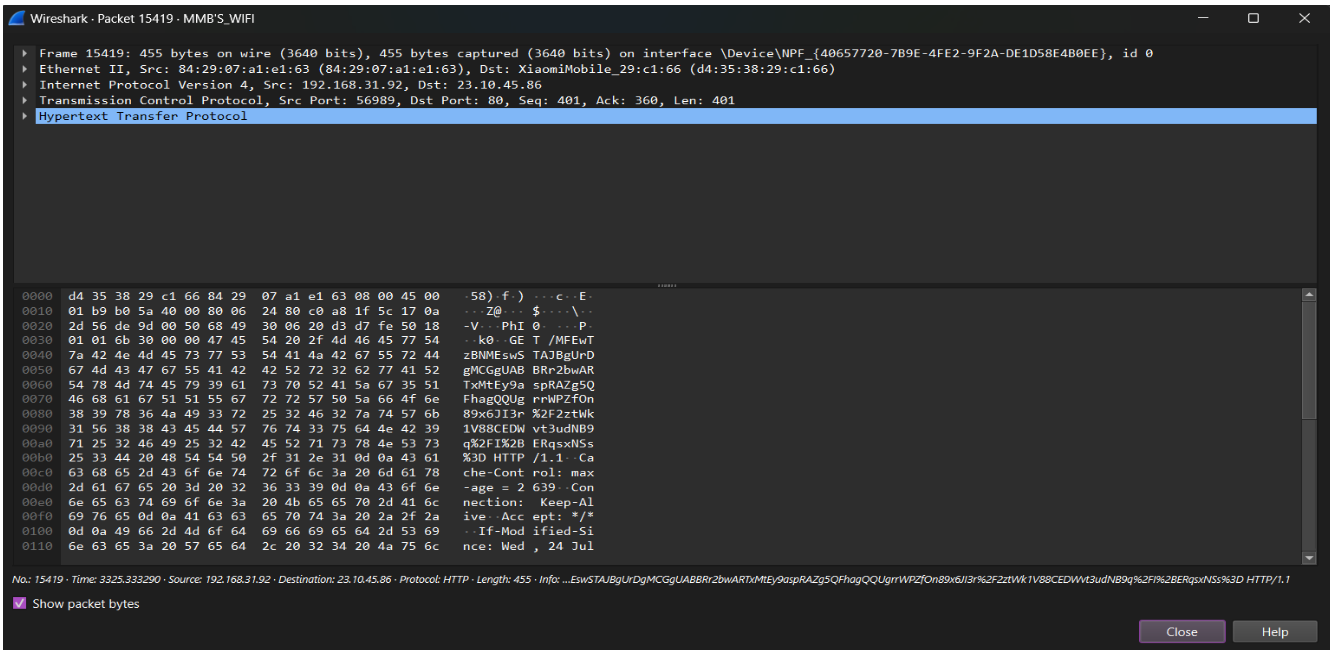
Date: 26 / 08 / 24

- **7. Header Analysis**
- **Frame Header: Displays basic information about the packet, including capture length and timestamp.**
- **Ethernet Header:**
- **Source and Destination MAC Addresses: Hardware addresses of the sender and receiver.**
- **Type: Indicates the type of payload (e.g., IPv4).**

- **HTTP:**



```
http
No.   Time       Source          Destination     Protocol  Length Info
1520  49.458841  192.168.31.92   192.168.31.187  HTTP       287 GET /dd.xml HTTP/1.1
1522  49.458987  192.168.31.92   192.168.31.187  HTTP       300 GET /ssdp/device-desc.xml HTTP/1.1
1526  49.462777  192.168.31.187  192.168.31.92   HTTP/X…    526 HTTP/1.1 200 OK
1530  49.466900  192.168.31.187  192.168.31.92   HTTP/X…   1245 HTTP/1.1 200 OK
```



```
Frame 15419: 455 bytes on wire (3640 bits), 455 bytes captured (3640 bits) on interface \Device\NPF_{40657720-7B9E-4FE2-9F2A-DE1D58E4B0EE}, id 0
Ethernet II, Src: 84:29:07:a1:e1:63 (84:29:07:a1:e1:63), Dst: XiaomiMobile_29:c1:66 (d4:35:38:29:c1:66)
Internet Protocol Version 4, Src: 192.168.31.92, Dst: 23.10.45.86
Transmission Control Protocol, Src Port: 56989, Dst Port: 80, Seq: 401, Ack: 360, Len: 401
Hypertext Transfer Protocol
```

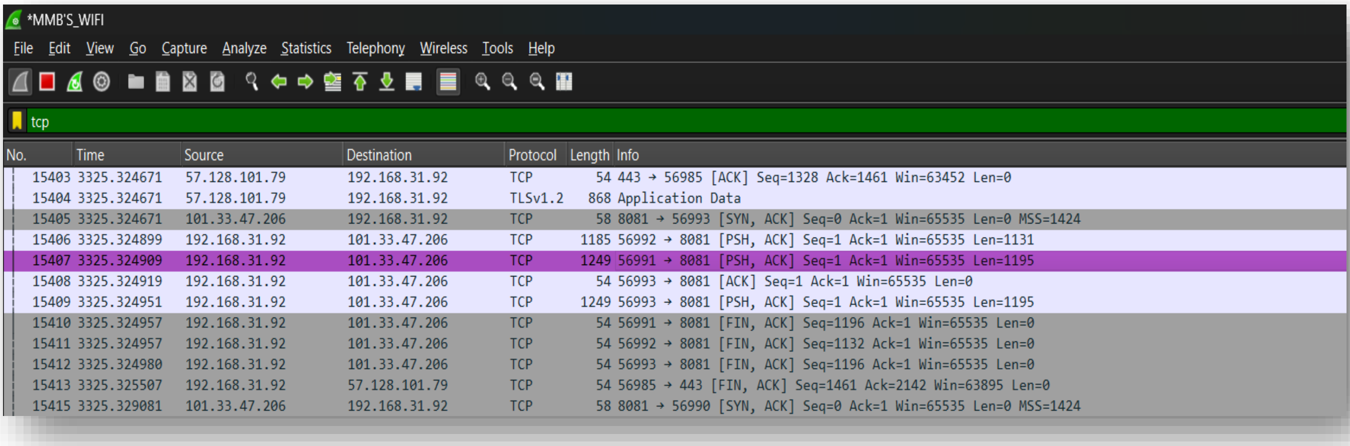
```
0000  d4 35 38 29 c1 66 84 29  07 a1 e1 63 08 00 45 00   ·58)·f·) ···c··E·
0010  01 b9 b0 5a 40 00 80 06  24 80 c0 a8 1f 5c 17 0a   ···Z@··· $····\··
0020  2d 56 de 9d 00 50 68 49  30 06 20 d3 d7 fe 50 18   -V···PhI 0· ···P·
0030  01 01 6b 30 00 00 47 45  54 20 2f 4d 46 45 77 54   ··k0··GE T /MFEwT
0040  7a 42 4e 4d 45 73 77 53  54 41 4a 42 67 55 72 44   zBNMEswS TAJBgUrD
0050  67 4d 43 47 67 55 41 42  42 52 72 32 62 77 41 52   gMCGgUAB BRr2bwAR
0060  54 78 4d 74 45 79 39 61  73 70 52 41 5a 67 35 51   TxMtEy9a spRAZg5Q
0070  46 68 61 67 51 51 55 67  72 72 57 50 5a 66 4f 6e   FhagQQUg rrWPZfOn
0080  38 39 78 36 4a 49 33 72  25 32 46 32 7a 74 57 6b   89x6JI3r %2F2ztWk
0090  31 56 38 38 43 45 44 57  76 74 33 75 64 4e 42 39   1V88CEDW vt3udNB9
00a0  71 25 32 46 49 25 32 42  45 52 71 73 78 4e 53 73   q%2FI%2B ERqsxNSs
00b0  25 33 44 20 48 54 54 50  2f 31 2e 31 0d 0a 43 61   %3D HTTP /1.1··Ca
00c0  63 68 65 2d 43 6f 6e 74  72 6f 6c 3a 20 6d 61 78   che-Cont rol: max
00d0  2d 61 67 65 20 3d 20 32  36 33 39 0d 0a 43 6f 6e   -age = 2 639··Con
00e0  6e 65 63 74 69 6f 6e 3a  20 4b 65 65 70 2d 41 6c   nection:  Keep-Al
00f0  69 76 65 0d 0a 41 63 63  65 70 74 3a 20 2a 2f 2a   ive··Acc ept: */*
0100  0d 0a 49 66 2d 4d 6f 64  69 66 69 65 64 2d 53 69   ··If-Mod ified-Si
0110  6e 63 65 3a 20 57 65 64  2c 20 32 34 20 4a 75 6c   nce: Wed , 24 Jul
```

No.: 15419 · Time: 3325.333290 · Source: 192.168.31.92 · Destination: 23.10.45.86 · Protocol: HTTP · Length: 455 · Info: ...EswSTAJBgUrDgMCGgUABBRr2bwARTxMtEy9aspRAZg5QFhagQQUgrrWPZfOn89x6JI3r%2F2ztWk1V88CEDWvt3udNB9q%2FI%2BERqsxNSs%3D HTTP/1.1

☑ Show packet bytes

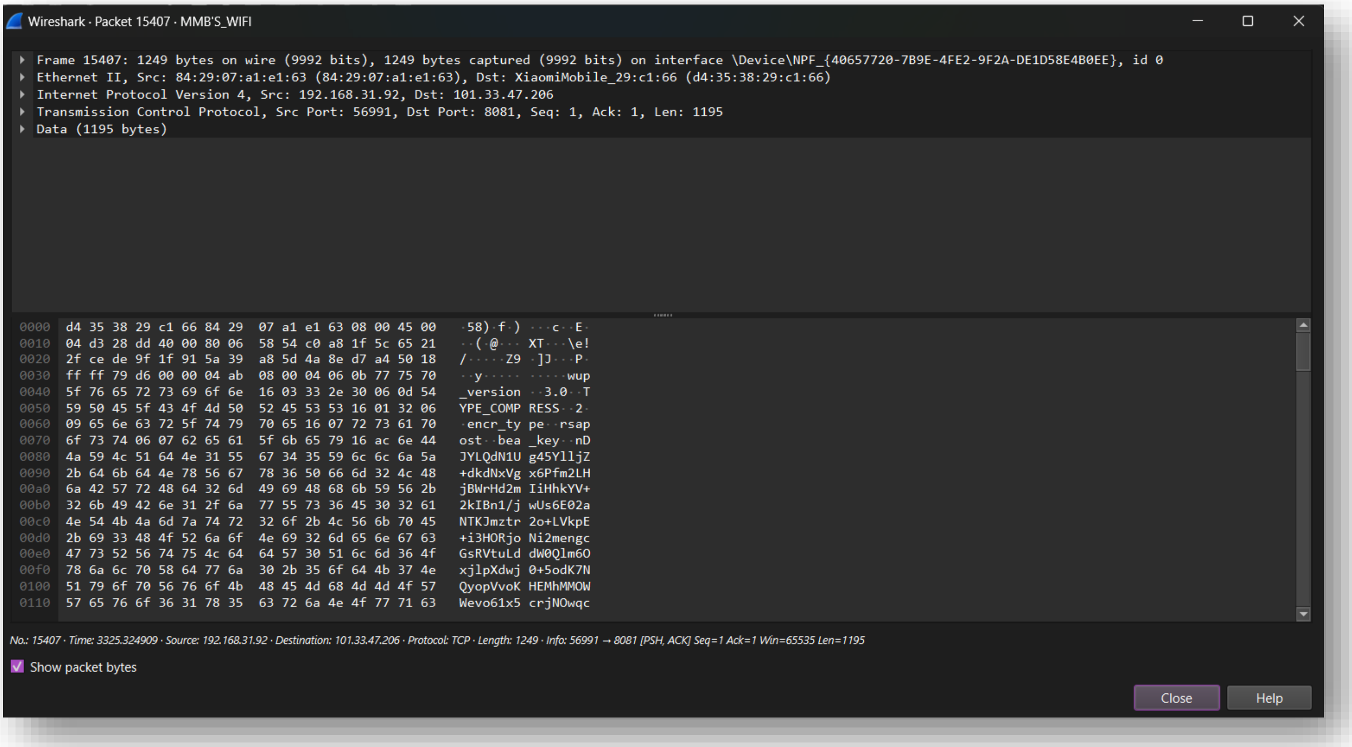
- **TCP:**

Date: 26 / 08 / 24


*MMB'S_WIFI
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
tcp
```

```
No.   Time        Source         Destination    Protocol Length Info
15403 3325.324671 57.128.101.79  192.168.31.92  TCP        54 443 → 56985 [ACK] Seq=1328 Ack=1461 Win=63452 Len=0
15404 3325.324671 57.128.101.79  192.168.31.92  TLSv1.2   868 Application Data
15405 3325.324671 101.33.47.206  192.168.31.92  TCP        58 8081 → 56993 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1424
15406 3325.324899 192.168.31.92  101.33.47.206  TCP      1185 56992 → 8081 [PSH, ACK] Seq=1 Ack=1 Win=65535 Len=1131
15407 3325.324909 192.168.31.92  101.33.47.206  TCP      1249 56991 → 8081 [PSH, ACK] Seq=1 Ack=1 Win=65535 Len=1195
15408 3325.324919 192.168.31.92  101.33.47.206  TCP        54 56993 → 8081 [ACK] Seq=1 Ack=1 Win=65535 Len=0
15409 3325.324951 192.168.31.92  101.33.47.206  TCP      1249 56993 → 8081 [PSH, ACK] Seq=1 Ack=1 Win=65535 Len=1195
15410 3325.324957 192.168.31.92  101.33.47.206  TCP        54 56991 → 8081 [FIN, ACK] Seq=1196 Ack=1 Win=65535 Len=0
15411 3325.324957 192.168.31.92  101.33.47.206  TCP        54 56992 → 8081 [FIN, ACK] Seq=1132 Ack=1 Win=65535 Len=0
15412 3325.324980 192.168.31.92  101.33.47.206  TCP        54 56993 → 8081 [FIN, ACK] Seq=1196 Ack=1 Win=65535 Len=0
15413 3325.325507 192.168.31.92  57.128.101.79  TCP        54 56985 → 443 [FIN, ACK] Seq=1461 Ack=2142 Win=63895 Len=0
15415 3325.329081 101.33.47.206  192.168.31.92  TCP        58 8081 → 56990 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1424
```



```
Frame 15407: 1249 bytes on wire (9992 bits), 1249 bytes captured (9992 bits) on interface \Device\NPF_{40657720-7B9E-4FE2-9F2A-DE1D58E4B0EE}, id 0
Ethernet II, Src: 84:29:07:a1:e1:63 (84:29:07:a1:e1:63), Dst: XiaomiMobile_29:c1:66 (d4:35:38:29:c1:66)
Internet Protocol Version 4, Src: 192.168.31.92, Dst: 101.33.47.206
Transmission Control Protocol, Src Port: 56991, Dst Port: 8081, Seq: 1, Ack: 1, Len: 1195
Data (1195 bytes)
```

```
0000  d4 35 38 29 c1 66 84 29  07 a1 e1 63 08 00 45 00   ·58)·f·) ···c··E·
0010  04 d3 28 dd 40 00 80 06  58 54 c0 a8 1f 5c 65 21   ··(·@··· XT···\e!
0020  2f ce de 9f 1f 91 5a 39  a8 5d 4a 8e d7 a4 50 18   /·····Z9 ·]J···P·
0030  ff ff 79 d6 00 00 04 ab  08 00 04 06 0b 77 75 70   ··y····· ·····wup
0040  5f 76 65 72 73 69 6f 6e  16 03 33 2e 30 06 0d 54   _version ··3.0··T
0050  59 50 45 5f 43 4f 4d 50  52 45 53 53 16 01 32 06   YPE_COMP RESS··2·
0060  09 65 6e 63 72 5f 74 79  70 65 16 07 72 73 61 70   ·encr_ty pe··rsap
0070  6f 73 74 06 07 62 65 61  5f 6b 65 79 16 ac 6e 44   ost··bea _key··nD
0080  4a 59 4c 51 64 4e 31 55  67 34 35 59 6c 6c 6a 5a   JYLQdN1U g45YlljZ
0090  2b 64 6b 64 4e 78 56 67  78 36 50 66 6d 32 4c 48   +dkdNxVg x6Pfm2LH
00a0  6a 42 57 72 48 64 32 6d  49 69 48 68 6b 59 56 2b   jBWrHd2m IiHhkYV+
00b0  32 6b 49 42 6e 31 2f 6a  77 55 73 36 45 30 32 61   2kIBn1/j wUs6E02a
00c0  4e 54 4b 4a 6d 7a 74 72  32 6f 2b 4c 56 6b 70 45   NTKJmztr 2o+LVkpE
00d0  2b 69 33 48 4f 52 6a 6f  4e 69 32 6d 65 6e 67 63   +i3HORjo Ni2mengc
00e0  47 73 52 56 74 75 4c 64  64 57 30 51 6c 6d 36 4f   GsRVtuLd dW0Qlm6O
00f0  78 6a 6c 70 58 64 77 6a  30 2b 35 6f 64 4b 37 4e   xjlpXdwj 0+5odK7N
0100  51 79 6f 70 56 76 6f 4b  48 45 4d 68 4d 4d 4f 57   QyopVvoK HEMhMMOW
0110  57 65 76 6f 36 31 78 35  63 72 6a 4e 4f 77 71 63   Wevo61x5 crjNOwqc
```

No.: 15407 · Time: 3325.324909 · Source: 192.168.31.92 · Destination: 101.33.47.206 · Protocol: TCP · Length: 1249 · Info: 56991 → 8081 [PSH, ACK] Seq=1 Ack=1 Win=65535 Len=1195

☑ Show packet bytes