

# COMPUTER NETWORK LAB-3A

~ Đình Việt Thành \_ 2152966

1. Select *one* UDP packet from your trace. From this packet, determine how many fields there are in the UDP header. (You shouldn't look in the textbook! Answer these questions directly from what you observe in the packet trace.) Name these fields.

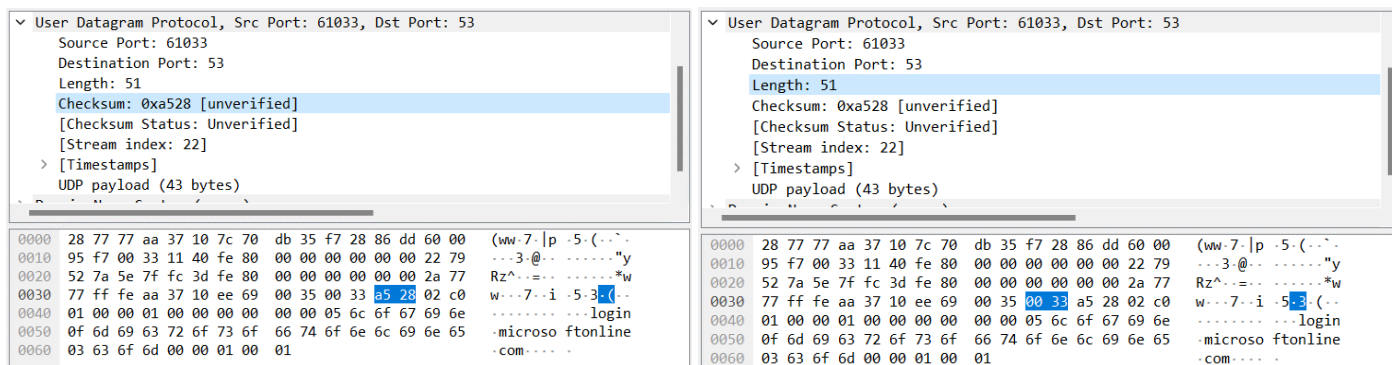
**Answer:** UDP header contains 4 fields: source port, destination port, length, checksum

```
494 17.906916 fe80::2279:527a:5e7f:fc3d fe80::2a77:77ff:feaa:3710 DNS 105 Standard query 0x02c0 A login.microsoftonline.com
  User Datagram Protocol, Src Port: 61033, Dst Port: 53
    Source Port: 61033
    Destination Port: 53
    Length: 51
    Checksum: 0xa528 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 22]
  > [Timestamps]
    UDP payload (43 bytes)
```

2. By consulting the displayed information in Wireshark's packet content field for this packet, determine the length (in bytes) of each of the UDP header fields.

**Answer:** The UDP header has a fixed length of 8 bytes. Each of these 4 header fields is 2 bytes long.

The image displays two side-by-side screenshots of the Wireshark network protocol analyzer. Both screenshots show the details of a User Datagram Protocol (UDP) packet. The left screenshot shows the packet details pane with fields: Source Port: 61033, Destination Port: 53, Length: 51, Checksum: 0xa528 [unverified], [Checksum Status: Unverified], [Stream index: 22], [Timestamps], and UDP payload (43 bytes). The right screenshot shows the packet bytes pane with the same fields highlighted. The packet bytes pane shows the raw data in hexadecimal and ASCII format, with the UDP header fields (Source Port, Destination Port, Length, Checksum) highlighted in blue.



3. The value in the Length field is the length of what? (You can consult the text for this answer). Verify your claim with your captured UDP packet.

**Answer:** The length field specifies the number of bytes in the UDP segment (header plus data). An explicit length value is needed since the size of the data field may differ from one UDP segment to the next.

The length of UDP payload for selected packet is 43 bytes. 51 bytes - 8 bytes = 43 bytes.

Length: 51

4. What is the maximum number of bytes that can be included in a UDP payload? (Hint: the answer to this question can be determined by your answer to 2. above)

**Answer:** The maximum number of bytes that can be included in a UDP payload is the difference between 65535 ( $= 2^{16} - 1$ ) bytes and the header field (8 bytes). Therefore the maximum payload is:  $65535 - 8 = 65527$  bytes.

5. What is the largest possible source port number? (Hint: see the hint in 4)

**Answer:** The largest possible source port number is  $(2^{16} - 1) = 65535$ .

6. What is the protocol number for UDP? Give your answer in both hexadecimal and decimal notation. To answer this question, you'll need to look into the Protocol field of the IP datagram containing this UDP segment (see Figure 4.13 in the text, and the discussion of IP header fields).

**Answer:** The IP protocol number for UDP is 0x11 (hex) which is 17 (decimal).

```

0110 .... = Version: 6
> .... 0000 0000 .... = Traffic Class: 0x00 (DSCP: CS0,
.... 0000 1001 0101 1111 0111 = Flow Label: 0x095f7
Payload Length: 51
Next Header: UDP (17)
Hop Limit: 64
Source Address: fe80::2279:527a:5e7f:fc3d
Destination Address: fe80::2a77:77ff:feaa:3710
[Destination SLAAC MAC: zte_aa:37:10 (28:77:77:aa:37:10)]

```

0000	28 77 77 aa 37 10 7c 70 db 35 f7 28 86 dd 60 00	(ww-7- p-5-(..
0010	95 f7 00 33 11 40 fe 80 00 00 00 00 00 00 22 79	...3@... ....."y
0020	52 7a 5e 7f fc 3d fe 80 00 00 00 00 00 00 2a 77	Rz^...=... ....."*w
0030	77 ff fe aa 37 10 ee 69 00 35 00 33 a5 28 02 c0	w...7-i-5-3-(..
0040	01 00 00 01 00 00 00 00 00 00 05 6c 6f 67 69 6e	..... ..login
0050	0f 6d 69 63 72 6f 73 6f 66 74 6f 6e 6c 69 6e 65	..microso ftonline
0060	03 63 6f 6d 00 00 01 00 01	.com.....

- Examine a pair of UDP packets in which your host sends the first UDP packet and the second UDP packet is a reply to this first UDP packet. (Hint: for a second packet to be sent in response to a first packet, the sender of the first packet should be the destination of the second packet). Describe the relationship between the port numbers in the two packets.

**Answer:** The source port of the UDP packet sent by the host is the same as the destination port of the reply packet. Conversely the destination port of the UDP packet sent by the host is the same as the source port of the reply packet.

#### DNS query message

```

User Datagram Protocol, Src Port: 61033, Dst Port: 53
  Source Port: 61033
  Destination Port: 53
  Length: 51
  Checksum: 0xa528 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 22]
  [Timestamps]
  UDP payload (43 bytes)

```

#### DNS response message

```

User Datagram Protocol, Src Port: 53, Dst Port: 61033
  Source Port: 53
  Destination Port: 61033
  Length: 179
  Checksum: 0x150f [unverified]
  [Checksum Status: Unverified]
  [Stream index: 22]
  [Timestamps]
  UDP payload (171 bytes)

```