

# Computer Networks Lab, Assignment 6

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## 1 Part 1: Part-1: Wireshark UDP

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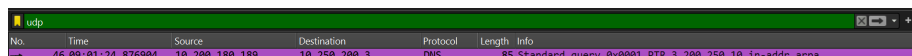
1. Select the first UDP segment in your trace. What is the packet number of this segment in the trace file? What type of application-layer protocol message is being carried in this UDP segment? Look at the details of this packet in Wireshark. How many fields are there in the UDP header? What are the names of these fields?

The packet number is 46. Type of an application-layer protocol message is being carried in this UDP segment is Domain Name System (DNS). There are 4 fields in the UDP header: Source Port: 52851

Destination Port: 53

Length: 51

Checksum: 0x92c7 [unverified]



A screenshot of the Wireshark packet list pane. The title bar says 'udp'. The table has columns: No., Time, Source, Destination, Protocol, Length, and Info. The first row is highlighted in blue and contains the following data: No. 46, Time 09:01:24.876904, Source 10.200.180.189, Destination 10.250.200.3, Protocol DNS, Length 85, and Info Standard query 0x0001 PTR 3.200.250.10.in-addr.arpa.

No.	Time	Source	Destination	Protocol	Length	Info
46	09:01:24.876904	10.200.180.189	10.250.200.3	DNS	85	Standard query 0x0001 PTR 3.200.250.10.in-addr.arpa

Figure 1: Q1: First UDP segment

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

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▼ User Datagram Protocol, Src Port: 52851, Dst Port: 53
  Source Port: 52851
  Destination Port: 53
  Length: 51
  Checksum: 0x92c7 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 0]
  ▸ [Timestamps]
  UDP payload (43 bytes)

```

Figure 2: Q1: First UDP segment

Each of the UDP header fields are 2 bytes long.  $8/4 = 2$  bytes.

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Time to Live: 128
Protocol: UDP (17)
Header Checksum: 0x0000 [validation disabled]
[Header checksum status: Unverified]
Source Address: 10.200.180.189
Destination Address: 10.250.200.3
▼ User Datagram Protocol, Src Port: 52851, Dst Port: 53
  Source Port: 52851
  Destination Port: 53
  Length: 51
  Checksum: 0x92c7 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 0]
  ▸ [Timestamps]
  UDP payload (43 bytes)
  Domain Name System (query)
    Transaction ID: 0x0001
    Flags: 0x0100 Standard query
    Questions: 1

```

Figure 3: Q2: length of each of the UDP header fields

**3. The value in the Length field is the length of what? Verify your claim with your captured UDP packet.**

Length = 51, total length of total header fields is  $2 \times 4 = 8$  bytes and UDP payload is 43 bytes. Thus, value in the length field is equal to **header + data = 8 + 43 = 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)**

Since UDP header fields have already taken 8 bytes of data, the maximum number of bytes that can be included

```

▼ User Datagram Protocol, Src Port: 52851, Dst Port: 53
  Source Port: 52851
  Destination Port: 53
  Length: 51
  Checksum: 0x92c7 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 0]
  ▶ [Timestamps]
  UDP payload (43 bytes)

```

Figure 4: Q2: length of each of the UDP header fields

in a UDP payload is  $2^{16} - 1$  minus the bytes used for the header, which is  $65535 - 8 = 65527$  bytes.

**5. What is the largest possible source port number?**

The largest possible source port number is  $2^{16} - 1$  or 65535.

**6. What is the protocol number for UDP? Give your answer in decimal notation. To answer this question, you'll need to look into the Protocol field of the IP datagram containing this UDP segment.**

The protocol number for UDP in decimal notation is 17.

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.... 0101 = Header Length: 20 bytes (5)
▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 71
Identification: 0xc5cd (50637)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 128
Protocol: UDP (17)
Header Checksum: 0x0000 [validation disabled]
[Header checksum status: Unverified]
Source Address: 10.200.180.189
Destination Address: 10.250.200.3

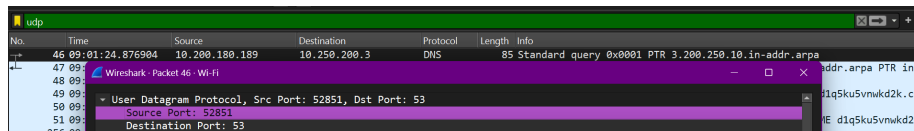
```

Figure 5: Q6: protocol number for UDP

**7. Examine the 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). What is the packet number of the first of these two UDP segments in the trace file? What is the packet number of the second of these two UDP segments in the trace file? Describe the relationship between the port numbers in the two packets.

The packet number of the first of these two UDP segments in the trace file is 46 and that of second is 47. The source port of the UDP packet sent by the host corresponds to the destination port of the reply packet, and the recipient port corresponds to the source port of the UDP packet sent by the host.

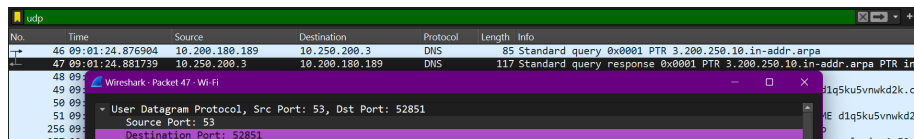


No.	Time	Source	Destination	Protocol	Length	Info
46	09:01:24.876904	10.200.180.189	10.250.200.3	DNS	85	Standard query 0x0001 PTR 3.200.250.10.in-addr.arpa

Details
User Datagram Protocol, Src Port: 52851, Dst Port: 53 Source Port: 52851 Destination Port: 53

Figure 6: Q7: Ist packet



No.	Time	Source	Destination	Protocol	Length	Info
47	09:01:24.881739	10.250.200.3	10.200.180.189	DNS	117	Standard query response 0x0001 PTR 3.200.250.10.in-addr.arpa PTR in...

Details
User Datagram Protocol, Src Port: 53, Dst Port: 52851 Source Port: 53 Destination Port: 52851

Figure 7: Q7: 2nd Packet