

ELEC-5220  
Info. Networks

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Lab 3

## Introduction

In this lab, we'll take a quick look at the UDP transport protocol.

**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.**

Based on the info shown in WireShark show in in *Figure 1* below, the UDP header contains 4 fields. Source Port, Destination Port, Length, and Checksum.

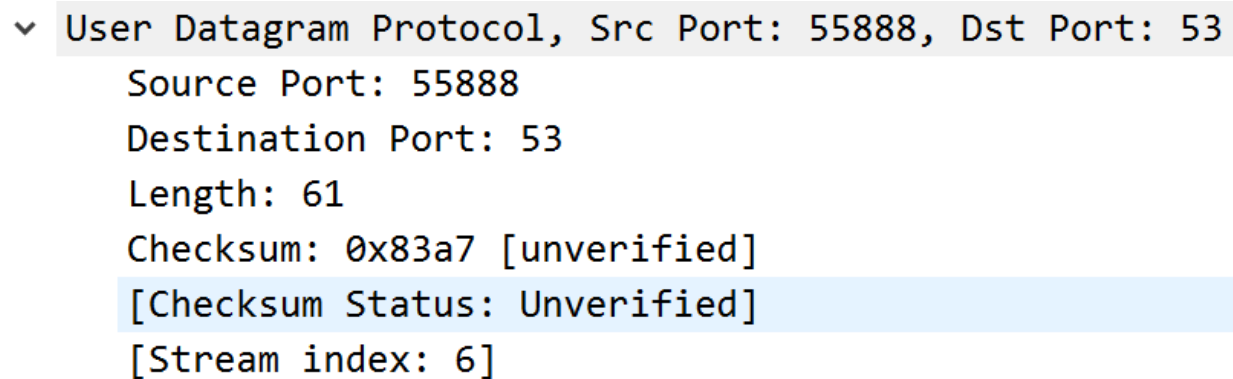


Figure 1 is a screenshot of the Wireshark packet details pane for a User Datagram Protocol (UDP) packet. The pane is expanded, showing the following fields: Source Port: 55888, Destination Port: 53, Length: 61, Checksum: 0x83a7 [unverified], [Checksum Status: Unverified], and [Stream index: 6]. The 'Checksum Status: Unverified' field is highlighted in light blue.

```
▼ User Datagram Protocol, Src Port: 55888, Dst Port: 53
  Source Port: 55888
  Destination Port: 53
  Length: 61
  Checksum: 0x83a7 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 6]
```

*Figure 1*

**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.**

When checking, wireshark shows that the UDPheader has a fixed length of 8 bytes with each header field being 2 bytes long. This is showin in Wireshark below in *Figure 2*.

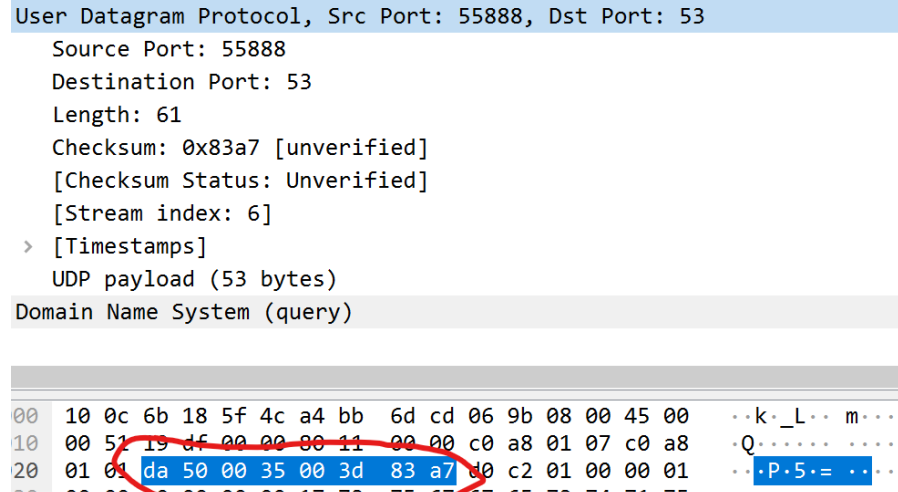


Figure 2

### 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.

The length of the UDP payload for selected packet is Length (61) – 8 bytes. So, the length is 53 bytes. The length of 61 is found from Wireshark and shown below in Figure 3.

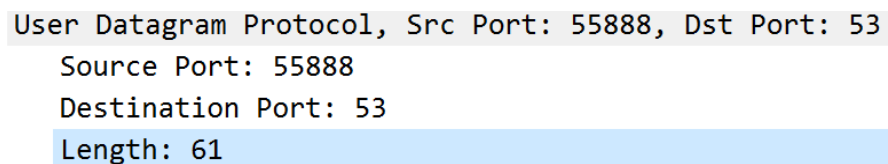


Figure 3

**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)**

The maximum number of bytes that can be included in an UDP payload is  $[2^{16} - 1 \text{ bytes} - \text{header bytes}]$ . This means that the number of bytes is  $[65535 \text{ bytes} - 8 \text{ bytes}] = 65527 \text{ bytes}$ .

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

The largest possible port number is  $[2^{16} - 1 \text{ bytes}] = 65535$ .

**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.**

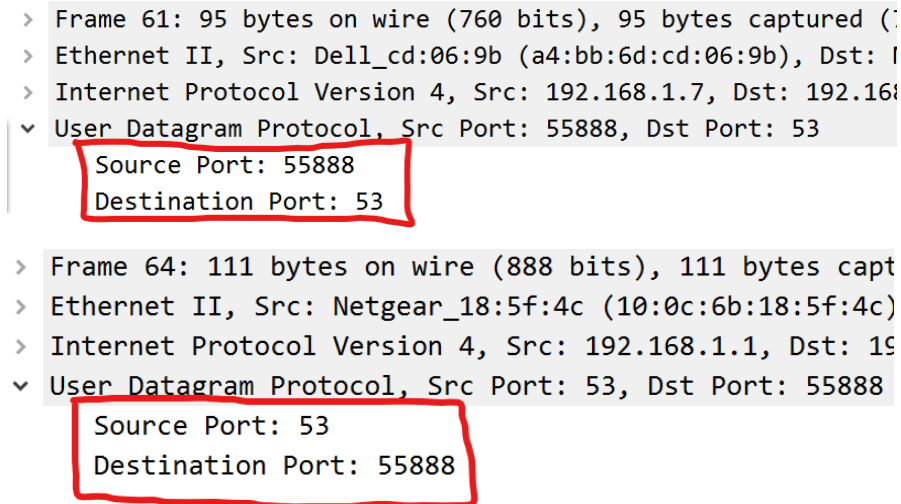
The IP protocol is 0x11 in hex, or 17 in decimal. The value was found in Wireshark and is shown in *Figure 6* below.

```
> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  Total Length: 81
  Identification: 0x19df (6623)
> Flags: 0x00
  Fragment Offset: 0
  Time to Live: 128
  Protocol: UDP (17)
```

*Figure 6*

**7. 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.**

The source port of the UDP packet sent by the host is the same as the destination port of the replay packet, and the destination port sent by the host is the same as the source port of the reply packet. This is shown in *Figure 7* below from Wireshark.



```
> Frame 61: 95 bytes on wire (760 bits), 95 bytes captured (760 bits) on interface 0
> Ethernet II, Src: Dell_cd:06:9b (a4:bb:6d:cd:06:9b), Dst: 192.168.1.1
> Internet Protocol Version 4, Src: 192.168.1.7, Dst: 192.168.1.1
v User Datagram Protocol, Src Port: 55888, Dst Port: 53
    Source Port: 55888
    Destination Port: 53

> Frame 64: 111 bytes on wire (888 bits), 111 bytes captured (888 bits) on interface 0
> Ethernet II, Src: Netgear_18:5f:4c (10:0c:6b:18:5f:4c), Dst: 192.168.1.7
> Internet Protocol Version 4, Src: 192.168.1.1, Dst: 192.168.1.7
v User Datagram Protocol, Src Port: 53, Dst Port: 55888
    Source Port: 53
    Destination Port: 55888
```

*Figure 7*