

1. When we look at a packet that uses the UDP protocol we can see that it has 4 fields. It has a source port, destination port, length, and checksum.

> Frame 6: 172 bytes on wire (1376 bits), 172 bytes captured (1376 bits) on interface en0, id 0

> Ethernet II, Src: HUMAX\_69:6a:0f (a0:72:2c:69:6a:0f), Dst: Apple\_d2:e3:78 (d4:57:63:d2:e3:78)

> Internet Protocol Version 4, Src: 192.168.1.80, Dst: 239.255.255.250

> User Datagram Protocol, Src Port: 49152, Dst Port: 1900

Source Port: 49152

Destination Port: 1900

Length: 138

Checksum: 0x9abe [unverified]

[Checksum Status: Unverified]

[Stream index: 0]

> [Timestamps]

UDP payload (130 bytes)

> Simple Service Discovery Protocol

2. The length of each of the 4 UDP header fields is 2 bytes per the content field per Wireshark. If we click on any of the UDP headers its shows they are 2 bytes. For example if we click on Source Port it corresponds to BYTES 34 and 35

Source Port: 49152

Destination Port: 1900

Length: 138

Checksum: 0x9abe [unverified]

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[Stream index: 0]

[Timestamps]

0000	d4	57	63	d2	e3	78	a0	72	2c	69	6a	0f	08	00	45	00
0010	00	9e	00	00	40	00	04	11	c4	5c	c0	a8	01	50	ef	ff
0020	ff	fa	c0	00	07	6c	00	8a	9a	be	4d	2d	53	45	41	52
0030	43	48	20	2a	20	48	54	54	50	2f	31	2e	31	0d	0a	48
0040	6f	73	74	3a	20	32	33	39	2e	32	35	35	2e	32	35	35
0050	2e	32	35	30	3a	31	39	30	30	0d	0a	4d	41	4e	3a	20
0060	22	73	73	64	70	3a	64	69	73	63	6f	76	65	72	22	0d
0070	0a	4d	58	3a	20	31	30	0d	0a	53	54	3a	20	75	72	6e
0080	3a	73	63	68	65	6d	61	73	2d	75	70	6e	70	2d	6f	72
0090	67	3a	64	65	76	69	63	65	3a	4d	65	64	69	61	52	65
00a0	6e	64	65	72	65	72	3a	31	0d	0a	0d	0a				

Bytes 34-35: Source Port (udp.srcport)

3. The length value is the number of bytes in the UDP segment which includes the header, and data per the book and the length in the segment that I am looking at is 138.

ning on the destination end system (that is, to perform the demultiplexing function). 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 checksum is used by the receiving host to

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UDP payload (130 bytes)

4. The maximum number of bytes that can be included in a UDP payload is  $(2^{16}-1)-8$  which is from the header. So in total that would be 65527 bytes.

*Datagram length.* This is the total length of the IP datagram (header plus data), measured in bytes. Since this field is 16 bits long, the theoretical maximum size of the IP datagram is 65,535 bytes. However, datagrams are rarely larger than 1,500 bytes, which allows an IP datagram to fit in the **payload** field of a maximally sized Ethernet frame.

5. The largest source port number is  $(2^{16}-1)= 65535$  bytes

6. The protocol number for UDP is 17 in decimal or 0x11 in hex

## Protocol: UDP (17)

7. After examining 2 packets that my host sends then received. I found the packet number of the packet my host send to be 72 and the packet number it received to be 73. If we take a closer look in the packet content field we can see that the source port on the packet we sent is the destination port on the package we received. Also the destination port for the packet we sent is the source port for the packet we received.

The image displays two side-by-side Wireshark packet capture windows. The left window shows Packet 72, which is a User Datagram Protocol (UDP) packet. The packet details pane highlights the 'Source Port: 52139' and 'Destination Port: 1900' fields. The packet length is 105 bytes, and the checksum is 0x9314 (unverified). The packet bytes pane shows the raw data in hexadecimal and ASCII. The right window shows Packet 73, which is also a UDP packet. The packet details pane highlights the 'Source Port: 1900' and 'Destination Port: 52139' fields. The packet length is 525 bytes, and the checksum is 0x80ab (unverified). The packet bytes pane shows the raw data in hexadecimal and ASCII. Both packets are captured on interface en0.