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ID : 16

1) There are four fields which are source port , destination port , length and checksum.

2) Source port is 2 bytes

Destination port is 2 bytes

Length is 2 bytes

User Datagram Protocol, Src Port: 57039, Dst Port: 53
    Source Port: 57039
    Destination Port: 53
    Length: 40
    Checksum: 0x4f87 [unverified]

```
0000   d4 6e 0e c0 41 50 cc b0   da 5d 37 d1 08 00 45 00   ·n··AP·· ·]7···E·
0010   00 3c 7d 61 00 00 80 11   ea 2f c0 a8 00 66 09 09   ·<}a···· ·/···f··
0020   09 09 de cf 00 35 00 28   4f 87 55 5b 01 00 00 01   ·····5·( O·U[····
0030   00 00 00 00 00 00 03 77   77 77 06 61 6d 61 7a 6f   ·······w ww·amazo
0040   6e 03 63 6f 6d 00 00 01   00 01                     n·com··· ··
```

🔴 📝   Length (udp.length), 2 bytes

Checksum is 2 bytes

User Datagram Protocol, Src Port: 57039, Dst Port: 53
    Source Port: 57039
    Destination Port: 53
    Length: 40
    Checksum: 0x4f87 [unverified]

```
0000   d4 6e 0e c0 41 50 cc b0   da 5d 37 d1 08 00 45 00   ·n··AP·· ·]7···E·
0010   00 3c 7d 61 00 00 80 11   ea 2f c0 a8 00 66 09 09   ·<}a···· ·/···f··
0020   09 09 de cf 00 35 00 28   4f 87 55 5b 01 00 00 01   ·····5·( O·U[····
0030   00 00 00 00 00 00 03 77   77 77 06 61 6d 61 7a 6f   ·······w ww·amazo
0040   6e 03 63 6f 6d 00 00 01   00 01                     n·com··· ··
```

🔴 📝   Details at: https://www.wireshark.org/docs/wsug_html_chunked/ChAdvChecksums.html (udp.checksum), 2 bytes

3) Length is total length of header fields + length of data sent = 8 bytes + 32 bytes = 40 bytes

```
No.     Time           Source          Destination     Protocol Length Info
  21 13:41:11.846127    192.168.0.102   9.9.9.9          DNS      74    Standard query 0x555b A www.amazon.com
Frame 21: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{495AEA71-B264-4AB4-B682-FF9AA9A1AI
Ethernet II, Src: LiteonTe_5d:37:d1 (cc:b0:da:5d:37:d1), Dst: Tp-LinkT_c0:41:50 (d4:6e:0e:c0:41:50)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 9.9.9.9
User Datagram Protocol, Src Port: 57039, Dst Port: 53
    Source Port: 57039
    Destination Port: 53
    Length: 40
    Checksum: 0x4f87 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 1]
    [Timestamps]
    UDP payload (32 bytes)
```

4) The length field is 2 bytes = 16 bits then the maximum length it can hold is
2^16 - 1 = 65535 bytes but this includes the size of header fields so
size of data = 65535 - 8 = 65527 bytes

5) Source port is of length 2 bytes = 16 bits so
the maximum source port number is 2^16 - 1 = 65535

6) Protocol number is (17) in decimal notation and (11) in hexadecimal notation.

```
∨ Internet Protocol Version 4, Src: 192.168.0.102, Dst: 9.9.9.9
      0100 .... = Version: 4
      .... 0101 = Header Length: 20 bytes (5)
    > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
      Total Length: 60
      Identification: 0x7d61 (32097)
    > Flags: 0x00
      Fragment Offset: 0
      Time to Live: 128
      Protocol: UDP (17)
      Header Checksum: 0xea2f [validation disabled]
      [Header checksum status: Unverified]

0000   d4 6e 0e c0 41 50 cc b0   da 5d 37 d1 08 00 45 00   ·n··AP·· ·]7···E·
0010   00 3c 7d 61 00 00 80 11   ea 2f c0 a8 00 66 09 09   ·<}a··· ·/···f··
0020   09 09 de cf 00 35 00 28   4f 87 55 5b 01 00 00 01   ·····5·( O·U[····
0030   00 00 00 00 00 00 03 77   77 77 06 61 6d 61 7a 6f   ·······w ww·amazo
0040   6e 03 63 6f 6d 00 00 01   00 01                     n·com··· ··
```

7) The source port of client/sender (57039) is same as the destination port of the
server/receiver and the destination port of client/sender (53) is same as the
source port of the server/receiver.

```
No.    Time                 Source            Destination       Protocol Length Info
    21 13:41:11.846127      192.168.0.102     9.9.9.9           DNS      74     Standard query 0x555b A www.amazon.com
Frame 21: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{495AEA71-B264-4AB4-B682-FF9AA9A1AD2
Ethernet II, Src: LiteonTe_5d:37:d1 (cc:b0:da:5d:37:d1), Dst: Tp-LinkT_c0:41:50 (d4:6e:0e:c0:41:50)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 9.9.9.9
User Datagram Protocol, Src Port: 57039, Dst Port: 53
   Source Port: 57039
```

```
No.    Time                 Source            Destination       Protocol Length Info
    22 13:41:11.909174      9.9.9.9           192.168.0.102     DNS      169    Standard query response 0x555b A www.amazon.com CN.
tp.47cf2c8c9-frontier.amazon.com CNAME d3ag4hukkh62yn.cloudfront.net A 143.204.93.225
Frame 22: 169 bytes on wire (1352 bits), 169 bytes captured (1352 bits) on interface \Device\NPF_{495AEA71-B264-4AB4-B682-FF9AA9A1AD2F},
0
Ethernet II, Src: Tp-LinkT_c0:41:50 (d4:6e:0e:c0:41:50), Dst: LiteonTe_5d:37:d1 (cc:b0:da:5d:37:d1)
Internet Protocol Version 4, Src: 9.9.9.9, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port: 57039
   Source Port: 53
```