

Linux Networking: udp

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UDP

- Stateless, unreliable transport protocol with no delivery guarantee
- performance over reliability
- well suited to broadcast and discovery type messaging
- RFC 768 and RFC 1122 (STD 6)

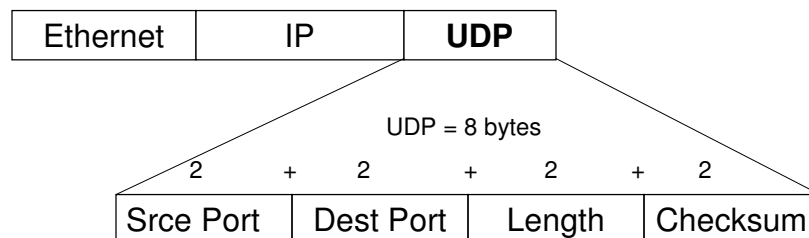
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UDP Ports

- UDP multiplexes among various upper layer protocols by using PORTS
- 16 bit port numbers are assigned to specific applications by UDP
- Some UDP ports use "Well Known" numbers (53 DNS, 69 TFTP etc)

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UDP header



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UDP Header

- Source Port - originator of the data
 - Not required can legally be 0
- Destination Port - destination application
- Length - length of the UDP header and following data
- Checksum - over IP "pseudo header", UDP header and data
 - Optional - can be left 0xFFFF

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UDP checksum

- To detect errors (sent-vs-received mismatch)
- Sender algorithm
 - sum all 16-bit words in packet
 - take binary 1's-complement
 - place in checksum field
- Receiver algorithm
 - sum all 16-bit words in packet
 - add to that the checksum
 - result should be 1111111111111111

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Algorithm example

data:

in ASCII- A B C D
in binary- 01000001 01000010 01000011 01000100

sum: 01000001 01000010
 01000011 01000100
 10000100 10000110

1's-comp: 01111011 01111001
(checksum)

these add to
11111111 11111111
so had better sum of
received data plus
received checksum

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Who uses UDP instead of TCP?

- streaming applications
- discovery tools
- certain application protocols
 - DNS
 - TFTP
 - traceroute

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UDP Trace (traceroute -m1 www.ucla.edu)

The image shows a Wireshark packet capture of a traceroute to www.ucla.edu. The packet list pane shows the following packets:

No.	Time	Source	Destination	Protocol	Info
1	0.000000	66.159.240.70	66.51.205.100	DNS	Standard query A www.ucla.edu
2	0.023184	66.51.205.100	66.159.240.70	DNS	Standard query response A 169.232.56.135 [Short Frame]
3	0.026552	66.159.240.70	169.232.56.135	UDP	Source port: 1048 Destination port: 33435
4	0.045266	66.159.240.1	66.159.240.70	ICMP	Time-to-live exceeded
5	0.076306	66.159.240.70	169.232.56.135	UDP	Source port: 1048 Destination port: 33436
6	0.094790	66.159.240.1	66.159.240.70	ICMP	Time-to-live exceeded
7	0.095518	66.159.240.70	169.232.56.135	UDP	Source port: 1048 Destination port: 33437
8	0.114716	66.159.240.1	66.159.240.70	ICMP	Time-to-live exceeded

The packet details pane for the selected packet (No. 1) shows the following structure:

- Ethernet II
- Internet Protocol Version 4, Src: 66.159.240.70, Dst: 66.51.205.100
- User Datagram Protocol, Src Port: 1048, Dst Port: 53**
- Domain Name System (query)
 - Source port: 1048 (1048)
 - Destination port: 53 (53)
 - Length: 38
 - Checksum: 0x202f (correct)

The packet bytes pane shows the raw data in hexadecimal and ASCII:

```

0000  00 10 67 00 d3 72 00 60 08 96 ab b2 08 00 45 00  ..g..r.....E.
0010  00 3a 13 0b 40 00 40 11 e5 2a 42 9f f0 46 42 33  ...a..@..@..B..FB3
0020  cd 64 00 00 00 00 00 00 00 00 7f 7f 7f 04 75 63 6c 61  .d..@..@..@..@..m..
0030  00 00 00 00 00 00 03 77 77 77 04 75 63 6c 61 03  ....w ww.ucla.
0040  65 64 75 00 00 01 00 01  .edu.....
    
```

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