The User Datagram Protocol

This lesson gives an introduction to one of the protocols at the heart of the transport layer: UDP!

What is UDP?

UDP, or **User Datagram Protocol**, is a transport layer protocol that works over the network layer's famous **Internet protocol** (which we'll look at in-depth in the next chapter). RFC 768 is the official RFC for UDP.

How It Works

UDP does not involve any initial handshaking like TCP does, and is hence called a **connectionless** protocol. This means that there are no established 'connections' between hosts.

UDP prepends the **source and destination ports** to messages from the application layer and hands them off to the network layer. The Internet Protocol of the network layer is a **best-effort** attempt to deliver the message. This means that the message-

1. May or **may not get delivered**.
2. May get **delivered with changes in it**.
3. May get **delivered out of order**.

UDP only adds the **absolute bare minimum** functionality over the network layer. So it...

- Does not ensure that messages get sent.
- It does check, however, if a message got 'corrupted' yet does not take any measures to correct the errors by default.

Structure of A UDP Datagram

Header

UDP prepends **four** 2-byte header fields to the data it receives from the application layer. So in total, a UDP header is **8 bytes** long. The fields are:

1. **Source** port number
2. **Destination** port number
3. **Length** of the datagram (header and data in bytes)
4. **Checksum** to detect if errors have been introduced into the message. We'll study this in detail in the next lesson!

Data

Other than the headers, a UDP datagram contains a body of data which can be up to **65,527** bytes long. Since the maximum possible length of a UDP datagram is 65,535 bytes which includes the 8-byte header, we are left with 65,527 bytes available. The nature of the data depends on the overlying application. So if the application is querying a DNS server, it would contain bytes of a zone file.

Here's what a UDP message looks like:

Source Port Number (2 bytes)	Destination Port Number (2 bytes)
Length (2 bytes)	Checksum (2 bytes)
Data	
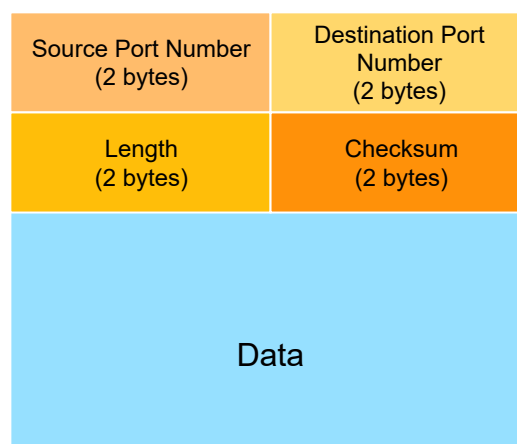
A UDP Datagram. The header is a total of 8 bytes or 64 bits long.

Quick Quiz!

1 An application layer hands down 10 bytes to be sent in a UDP datagram. The value in the length field in the datagram will be _____.

A) 0x000A

B) 0x0012

C) 0x0018

D) None of the above

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Let's go on to look at how UDP does error detection, why UDP is used, and what well-known protocols are built on top of it in the next lesson!