

CP372 Assignment 2: TCP over UDP

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Datagram Format

The header for each datagram is one byte in length, in the form of: [HS][EoT][ACK][seq]0000.

The first bit of the header (HS) indicates whether the datagram packet is the handshake (see below).

The next bit is the End-of-Transmission bit (EoT); it indicates whether the datagram is an EoT datagram. If the Receiver receives an EoT, it sends an acknowledgement before closing its sockets. If the Sender fails to receive an acknowledgement after re-sending the EoT datagram up to three times, it also closes its sockets.

The next bit is the acknowledgement (ACK) bit. It indicates if the current packet is an acknowledgement for a previous datagram packet.

Finally is the sequence (seq) bit. It holds the sequence number of the current datagram packet.

After the header of the datagram is the actual data and metadata of the file as a byte array of the specified maximum datagram size (MDS) minus one byte for the header.

Handshaking

Each handshake begins with a three-byte message sent from the Sender to Receiver. The first datagram of the handshake is identified by a header whose settings are HS=1, EoT=0, ACK=0, seq=0. The next two bytes contain a short Java primitive that represents the MDS. The Receiver uses this MDS in future transmissions.

Upon receiving this handshake packet, the Receiver sends an ACK with header settings HS=1, EoT=0, ACK=1, seq=0. When the Sender receives this ACK, it considers the connection open. It then begins sending data packets. Upon receiving the first of these data packets, the Receiver considers the connection open.

Report on Transfer Timing

	1,500 ms 256 B Reliable	1,500 ms 256 B Unreliable	750 ms 256 B Reliable	750 ms 256 B Unreliable	1,500 ms 512 B Reliable	1,500 ms 512 B Unreliable	750 ms 512 B Reliable	750 ms 512 B Unreliable
2.08 kB file	0.0267 s	1.5498 s	0.0229 s	0.7667 s	0.0114 s	0.0144 s	0.0143 s	0.0129 s
0.538 MB file	0.4422 s	361.4284 s	0.4132 s	180.9783 s	0.2853 s	185.0683 s	0.2795 s	92.7183 s