

Network Systems Capstone Homework 5 Report

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Explain how you implement error control

To implement error control, when the receiver receives a packet with a STREAM frame, it sends an ACK frame back to the sender. This allows the sender to verify whether the data segment has successfully arrived or not. It's important to note that there's no explicit mechanism to confirm the status of the ACK, so the sender might need to resend the packet if the STREAM frame arrives but the corresponding ACK frame does not.

Explain how you implement flow control

During the connection establishment stage, both the client and server include their maximum receiving window size in the ACK frame within the initial packet. The received window size is then used as their maximum sending window size. This approach ensures that the receiver is not overwhelmed by the sender's data transmission.

Explain how you implement congestion control

Congestion control is also handled through the ACK frame. If the sender does not receive an ACK frame within a certain timeout period, it assumes that the packet has been lost and infers network congestion. Consequently, the sender reduces the sending window size, which slows down the transmission rate to alleviate congestion.

If you use two streams to send data simultaneously from the client to the server or in the other direction, what will happen if one packet of a stream gets lost? Is the behavior of QUIC different from that of TCP? Why?

If a packet belonging to one stream gets lost, the other stream will continue its transmission without any knowledge of the packet loss on the other stream. Furthermore, subsequent packets of the same stream will also be sent without waiting for the lost packet to be retransmitted. This behavior differs from TCP, as TCP strictly enforces in-order packet delivery and requires the lost packet to be retransmitted before proceeding with subsequent packets.