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CPRE 489

Lab 3: UDP Socket Programming

Pre-Lab: udpVideoForwarder.c

Lab:

Coming into this lab, I had knowledge of socket programming from last lab using the TCP protocol. This previous knowledge helped me a lot in creating the UDP packet forwarder. Because we were using a different internet protocol, I had to do plenty of linux manpage research about UDP socket and how they differ from TCP sockets. I learned that UDP sockets use a datagram instead of a stream to transmit messages, and I knew that they were connectionless, so we do not need to accept a connection form a client socket.

With help from a TA, I was able to bind the server socket to the IP and port that was passed in as an argument. Because I needed to send to a different IP than from where I was receiving, I had to make a second unbound socket to only use sendto(). This taught me that anyone could create a C program and send as many messages as they want to a given address, whether the communication goes through or not. This allows for much faster packet sending. I also learned the effects of packet loss by implementing it somewhat forcefully to see how it affects the given data stream.

Exercises:

1. Increasing the packet loss on the stream had major effects on the video stream. For every packet that we lost, we were losing frames of the video. With a higher loss rate, we can see that the video becomes shorter, as not all the packets are being received. This causes the video to skip around a lot, and the audio becomes very choppy. Even with a packet loss 1%, the video becomes noticeably affected.
2. I think that TCP has its place in video streaming, but it depends on the use case. If we are streaming an existing file, TCP would be better, as we can pre-load the video and use re-transmission to allow for any data loss to be corrected. If we did the same for a live stream, this would cause a large delay as any lost packets would need to be re-sent before any more video can be loaded. This would cause a lot of starts and stops due to lost packets. UDP is better for this as it is much faster, and because the live stream is not saved to storage, it is impossible to pre-load the information.