

1. What are the initial sequence numbers for the sender and receiver? (be sure to look at the "raw" sequence number.)

Sender: 3080860215

Receiver: 2919951681

2. What is the main purpose of the *3 way handshake*?

It makes sure that both sides know they are ready to transfer data and it also allows both sides to agree on the initial sequence numbers, which are sent and acknowledged during the handshake.

3. If these are the first packets exchanged, why aren't the sequence numbers (raw sequence numbers) both 0?

It is randomly generated to avoid confusion. We must prevent segments from one incarnation of a connection from being used while the same sequence numbers may still be present in the network from an earlier incarnation.

4. Why is the data fragmented? Why not send the entire "alice.txt" in one large packet? (1 - 2 paragraphs for this answer only)

Data is fragmented when the maximum size of datagram is greater than maximum size of data that can be held in a frame, the Maximum Transmission Unit, which defines the maximum packet size for network transmission. Larger data, such as "alice.txt", is broken into smaller packets to fit within the MTU limit, ensuring successful transmission over the network without issues like packet loss or rejections due to oversized packets. This fragmentation allows for smoother data transmission and reassembly at the receiving end.

5. Which is bigger? The client's window? or the server's window? Why is this the case?

The client window size is constant after the initial handshake while the server's increase over time. Initially, the client's is larger and after a while, the server's become much larger. This happens perhaps because of the Flow Control. The receiver has allocated a limited capacity for storing received packets. Each incoming packet uses some of this capacity. While the ongoing processing of packets frees up capacity, the receiver might enlarge its window to tell the sender that it has more capacity for receiving. The TCP protocol wants to avoid an overrun of receivers, which would lead to a collapse of the connection. Therefore the current size of the receiver window is communicated back to the sender with each ACK.