CSS432 A

Discussion – Homework 3

Sliding Window

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# **Discussion**

## Performance: Stop-and-Wait vs Sliding Window

When referring to the gnuplot visualization, the Stop-and-Wait’s performance had zero variation in its time, obviously due to the fact that there weren’t any windows and the plot does not display the number of retransmissions. On the other hand, to Sliding Window performance does show that as the number of frames increased, as did the rate in which the data was processed.

Simply looking at the elapsed time, it’s interesting that although the Sliding Window and Stop-and-Wait functions are virtually identical when the Sliding Window is set to 1 that the results vary as much as they do. It seems as though when the Sliding Window is at 2, they are closer in their performance. Still, despite the difference, it isn’t incredibly significant, and could be attributed to resources available on the machine processing the functions at run-time.

## Effects of Window Size: Sliding Window

As mentioned above, the pattern is obvious from looking at the numbers generated in the output, but the gnuplot visualization makes it even more apparent: when the number of frames in a sliding window increases, so does the rate at which they are processed. I believe this has to do not only with the overhead on the client and server side with processing additional acknowledgments (ACK), but also the delay in which a client experiences as it is waiting for each ACK. By using cumulative ACKs up to the window size, the server is able to send fewer ACKs, meaning fewer potential errors or lost packets. Additionally, the client can send multiple packets without having to wait for an acknowledgment for each. As a result, the rate at which information is processed increases with window size, although it appears as though the rate slows its noticeable increases around a window size of 15.

## Retransmission: Stop-and-Wait vs Sliding Window

Interestingly enough, in the several times I ran test cases 2 and 3 on the remote servers 13 and 14 of the UWB Linux Lab, I observed 0 retransmissions for both Stop-and-Wait *and* Sliding Window. I have to assume this is due to the speed of not only the link (at an assumed 1GBPS) and the resources available on the machines at the time of testing.

## Effects of Drop Rate: Window Size 1 and Window Size 30

In the several times I ran case 4 simulating a 0 – 10% dropped packet rate, I observed a very similar overall drop rate for window sizes of both 1 and 30, and thus as one might expect from the data mentioned above from test case 3, elapsed time was far less due to the rate at which data was processed with a 30-frame window compared to 1. I initially thought the larger window could have a negative effect on performance due to there being potential for more dropped packets in a single window, but the effects didn’t seem to be as considerable as my initial assumptions.