COL334 Assignment 3

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1 Our Implementation

We have implemented an Adaptive Increase Multiplicative Decrease (AIMD) technique to manage burst sizes, but we've introduced a modification. Instead of incrementing the burst size by a fixed value like 1 upon receiving a successful response, we're increasing it fractionally by a factor of 1 divided by the current burst size. Furthermore, if any of the burst's requests are not received within the estimated time, we are reducing the burst size by half. This approach allows us to dynamically adjust burst sizes in a more fine-grained and responsive manner.

In our implementation of this logic, we have standardized the packet size at 1448 bytes. We maintain a list that contains all conceivable offset values that can be requested. Based on the current burst size, we extract offsets from the end of this list. If a response is not received for a specific offset, we recycle it back into the list. This process continues until the list is exhausted, ensuring that we request data continuously until all available offsets have been processed.

The previous logic has indeed enhanced the overall time efficiency. However, concerns regarding congestion, penalties, and squishing still persist. To address these issues, we've incorporated a strategy involving the introduction of a minimum sleep duration using system sleep commands. This break in action gives the system more space to preventing congestion, minimizing penalties, and handle squishing issues (which finally comes to 0, we can see in the graph below as well). Notably, this approach has proven to be highly effective in resolving these concerns.

2 Plots

2.1 Plot of Dynamically Changing Burst size vs time

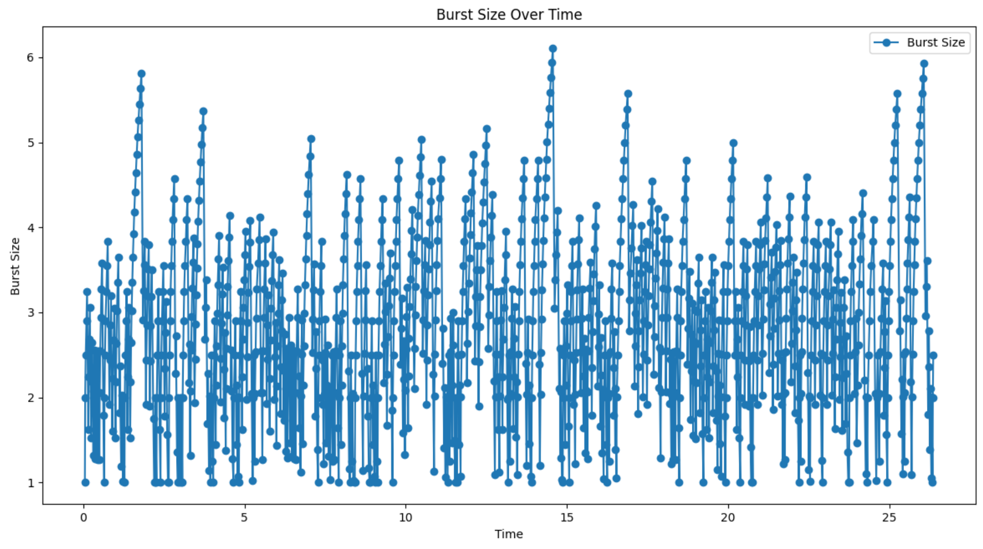


Figure 1: Burst Size vs Time

2.2 Number of Squishing over time

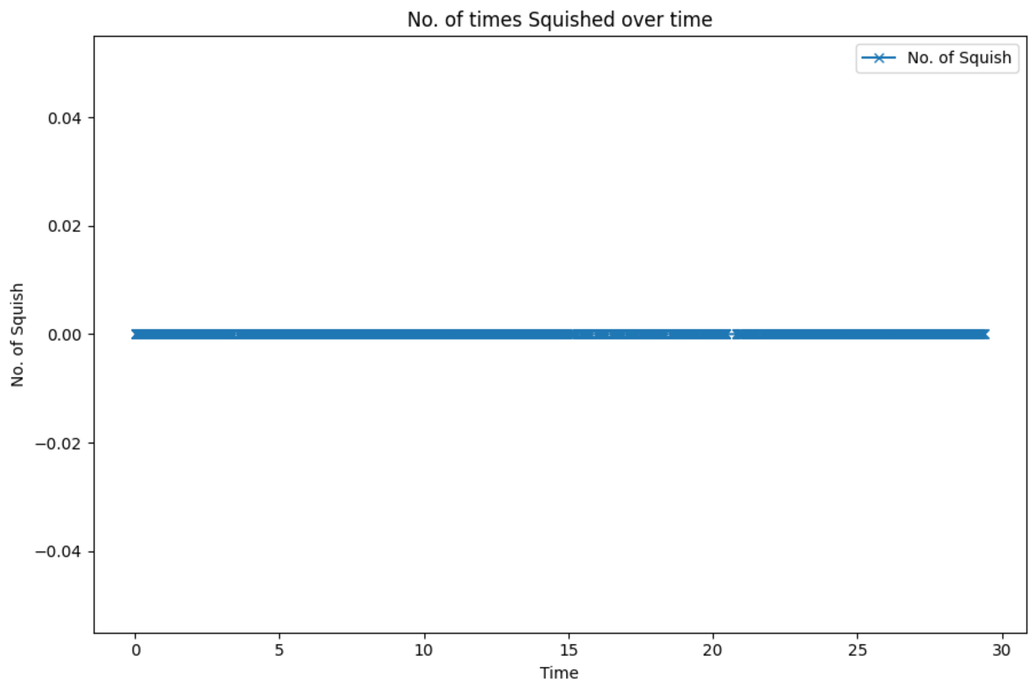


Figure 2: Squish vs Time

2.3 Plot showing the offset and the time for requests sent and replies received

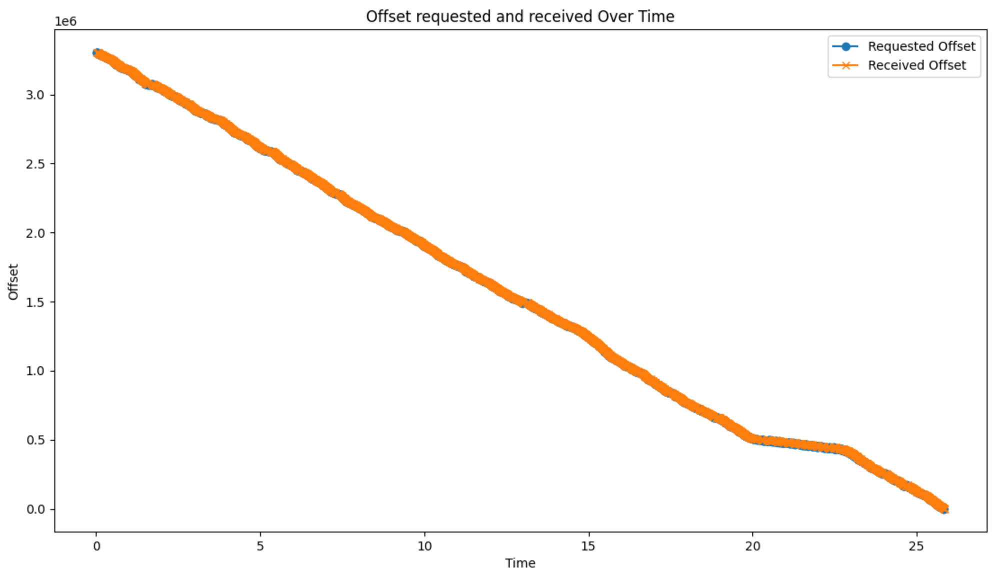
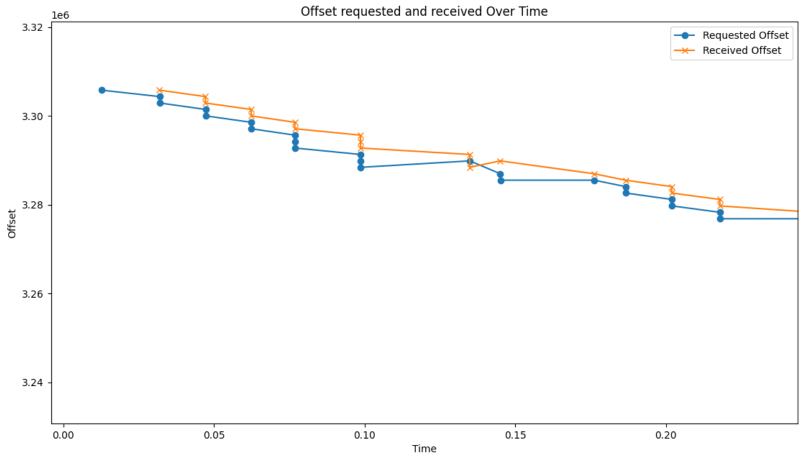
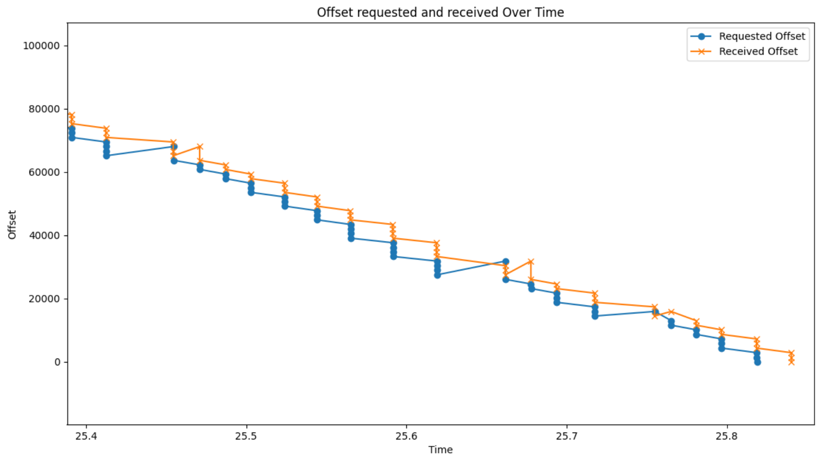


Figure 3: Sequence-number trace



(a) Zoomed in sequence-number trace at the beginning



(b) Zoomed in sequence-number trace at the ending

3 Observations

Below, are the observations we get from above plots:

1. Figure 1 shows the burst-size over time. Every time we get all the requests the burst size has been incremented according to the strategy explained in the implementation and if it is not so then we have halved the burst size.

2. Why squishing is zero? Sleep time or what?

3. In the sequence number trace we have requested highest offset first which leads the plot to come downwards. Also, due to the scale of the axes, the replies appear to almost overlap with the requests. In the zoomed in version plot which has been provided below, we can see that everytime we didn't received the same number as requested our request number has become halved otherwise has got increased.