Assignment 2: Reliable Data Transfer and Congestion Control

EE5150: Communication Networks

P. Kavinesh Kumar (EE21B068)

March 24, 2025

1 Overview

This report outlines the congestion control strategy used in a UDP client for reliable transmission of 10,000 packets. Since UDP lacks built-in reliability, a custom mechanism using Go-Back-N retransmission and Additive Increase Multiplicative Decrease (AIMD) was implemented.

2 Congestion Control Mechanism

- Additive Increase: On receiving an acknowledgment (ACK), the congestion window (cwnd) increases linearly by 1 packet.
- Multiplicative Decrease: On timeout (packet loss or congestion), cwnd is halved.
- Go-Back-N Retransmission: Lost packets trigger retransmission from the last unacknowledged sequence number.
- Sliding Window: The sender tracks unacknowledged packets and adjusts transmission dynamically.

3 Observations

S.No.	Capacity (Pps)	RTT(msec)	PER (%)	Buffer Size (packets)	Throughput (Pps)
1	1000	100	0	100	639.14
2	1000	100	0	10	88.08
3	10	1	0	1	9.57
4	10	1	10	10	5.36

Table 1: Network Performance Metrics

4 Inference

- The congestion control strategy successfully adapts to network conditions, maintaining a balance between efficiency and reliability.
- AIMD effectively prevents congestion collapse while ensuring high throughput in stable conditions.
- The Go-Back-N retransmission strategy efficiently handles packet losses but may limit throughput in high-loss scenarios.