Lab 02- Simulating TCP Tahoe: Understanding Congestion Control Mechanisms

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1 Lab Questions

1.1 Task 1: Running the TCP Tahoe Simulation

1.1.1 What happens to cwnd during slow start?

cwnd (the congestion window) increases for each time ACK is successfully recieved until a packet is lost (ACK was not recieved) then cwnd goes back to its original size (2) and tries to transmit packets again. When the algorithm detects that the window size has exceeded the threshold then we move into congestion avoidance.

1.1.2 How does TCP Tahoe handle packet loss?

Tahoe reduces the slow start threshold to half the window size (or 2 in the edge case), then sets the window size to 1, then returns to slow start state. The cwnd is how much data we can send without recieving and ACK, so in theory, reducing the window increases the rate at which we check for ACK messages slowing down hour throughput giving the communication a chance to "catch back up".

1.1.3 What triggers the transition from slow start to congestion avoidance?

When the algorithm detects that the window size has exceeded the threshold then we move into congestion avoidance.

1.2 Task 2: Analyzing the Simulation Code

1.2.1 How is cwnd growth modeled during slow start and congestion avoidance?

1.2.2 What role does ssthresh play in TCP Tahoe?

1.3 Task 3: Modifying the Simulation

1.3.1 How does the packet loss rate affect TCP Tahoe's performance?

1.3.2 How does increasing the maximum congestion window size impact the simulation?

1.4 Task 4: Exploring Scenarios

1.4.1 How does a higher packet loss rate affect cwnd dynamics?

1.4.2 What differences do you observe when modifying ssthresh values?

1.5 Task 5: Extending the Simulation

1.5.1 How does your chosen algorithm differ from TCP Tahoe?

1.5.2 Which algorithm performs better under high packet loss?