Group 5

Wireless Networks

Analysis of TCP Variants in Congestion Control

8 September 2024

Problem Statement

This project involves analyzing the performance of TCP variants, which are essential for managing network congestion. The task requires setting up a network environment, generating traffic, and simulating different congestion scenarios. By automating web browsing and file transfer tasks, the goal is to compare how each TCP variant handles congestion, focusing on metrics like throughput, congestion window behavior, and Quality of Experience.

Tools, Technologies, and Platforms

For this project, we will use iperf for network performance measurement and tuning, and Python for scripting and data analysis. Additional tools for network traffic analysis, scripting, and network simulation will be selected as we progress further into the project to efficiently manage the network environment.

Expected deliverables

- **Detailed Performance Report**: Comprehensive comparison of TCP variants in terms of throughput, congestion window behavior, and QoE under various congestion scenarios.
- **Automated Testing Framework**: Automated setup for generating traffic, simulating congestion, and logging key performance metrics.
- **Traffic Capture Files**: Captures of network traffic for different test cases, highlighting congestion events and packet behavior.
- **Scripts and Configurations**: Scripts for setting up the network environment, running simulations, and automating data collection.
- **Visualizations**: Graphs representing key metrics including throughput, congestion window behavior, and packet loss for each variant.