

## ENHANCED APPROACH TO LATENCY MITIGATION IN 4G LTE MOBILE COMMUNICATION NETWORKS

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### ABSTRACT

4G networks currently provide the highest broadband internet connectivity in areas where 5G is not yet available. Studies on latency in 4G networks exist, but they often rely on analytical estimations without considering the factors that affect packet latency. Measurements of one-way packet latency in LTE networks are primarily conducted using ping programming, assuming symmetric latency in uplink and downlink directions, which may not reflect real-life scenarios accurately. In contrast to lab environments with low reported latency, a comprehensive study on the factors impacting packet latency in realistic 4G (LTE) networks is lacking. This paper aims to understand how packet latency is affected by various factors in a realistic environment and propose strategies for improving latency mitigation in 4G LTE networks. The paper further focuses on designing and simulating a latency mitigation technique for 4G networks. The interest is to maintain optimal Quality of Service (QoS) in the network, given the high traffic demand. Traffic scenarios were emulated by integrating five mobile users with varying demands and 20 wired node users in the radio network. Through simulations using Riverbed Modeler®, it was observed that without mitigation, latency increased steadily over time, becoming unmanageable. However, after implementing a differentiated scheduling algorithm, latency significantly decreased and remained constant, indicating success in mitigating latency in the 4G network.

**Keywords:** Latency mitigation, 4G LTE, QoS, Riverbed Modeler®.