Abstract

V2X technologies have seen great progress in vehicular applications in the last decade. this evolution can be credited to availability of sensor data made available by evolution in IOT. this project is motivated to design a communication system that fulfils advanced V2X applications, requiring high throughput, low latency and high reliability. the background study conducted as part of the project concludes key technology choices made in the project, which are, i) to base the design on IEEE standards based physical layer and data link layer, ii) base the core distributed messaging system on Kafka, iii)develop a collection/delivery system for CVs that takes close considerations to challenges involved in bridge them to core messaging system. the proposed design is optimized for exchange of data streams between CVs and other vehicular infrastructure. for that purpose, design purposes reliability and buffering mechanisms that can provide the continuous flow of data. Close attention has been paid to challenges that are faced with communication between CVs and RSUs, for instance, intermittent connectivity and high reliability requirement which it poses. Kafka forms the backbone of the proposed design as the messaging system that various services can produce and consume data from. while Kafka is a system capable of fulfilling latency and throughput requirements set forth by advanced V2X, it is a rigid system that supports static topics for different data streams. the collection system proposed is based on RabbitMQ which provides dynamic queues to support CVs and bridge them to messaging backbone. RabbitMQ uses AMQP protocol designed to fulfil low latency requirements. The design is implemented in a simulated V2X environment that takes into consideration the handover of CV between RSUs and simulates message drops to test the capabilities of design. the implementation draws results and conclusions on the latency and throughput performance of the design.