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A simulation study of a new rate-and-queue-based active queue management algorithm

Ali Asghar Jomah Adham and Razman Mat Tahar

Abstract

Nowadays, e-queues are built up everywhere where customer online service is necessary such as in banks' e-service, enterprises' e-business, etc. In order to enhance quality of service (QoS), active queue management (AQM) algorithms are frequently employed due to their efficiency in congestion avoidance as well as the differentiated forwarding of packets. This paper aims at developing a novel AQM algorithm to better QoS in terms of congestion prediction, queuing delay, packet loss and link utility, etc. Upon the traditional designs of AQM, this paper establishes a new integrated AQM scheme (RQ-AQM) by employing input rate and current queue length to calculate the packet dropping/marking probability. In this way, the rate feedback control enables to rapid response to congestion, decreasing the packet loss from buffer overflow. Meanwhile, the queue length feedback control stabilizes the queue length around a given target, achieving predictable queuing delay and lower delay jitter. Thus, the main feature of the design is to use coefficients of both proportional rate control and proportional-integral queue length control, and to simplify parameter setting, the control parameters were scaled by the link capacity C to normalize the rate and by the bandwidth-delay product BDP to normalize the queue length, respectively.

Keywords

Active queue management, Congestion control, Queue-based, Rate-based, Simulation model, Algorithm management, Programming and algorithm theory, Simulation

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