ANLRED: A Robust AQM Mechanism for Congestion Avoidance

Internet over the past few years has undergone dramatic changes in terms of scale, penetration rate and the diversity of applications. The demand for continuous network connectivity is proliferating. Moreover, it has been observed that the usage of real time applications like Voice over IP (VoIP) and Live Streaming has increased drastically. Passive Queue Management (PQM) mechanisms in the routers do not react to congestion till the buffers overflow. This has two severe consequences: (i) large queueing delays that hurt the performance of real time traffic because such traffic is sensitive to delay and (ii) a large number of consecutive packet drops which affect the network stability. Recently, there has been a lot of interest in the deployment of Active Queue Management (AQM) mechanisms in modern Internet routers to overcome drawbacks of buffer overflow. Although Random Early Detection (RED) is the most widely studied AQM mechanism, it is highly sensitive to parameter settings. In this paper, we propose a robust AQM mechanism named Adaptive Nonlinear RED (ANLRED) which minimizes the parameter sensitivity of RED. Results obtained using ns-2 in a wide variety of Internet scenarios show that ANLRED improves the overall performance of the network in terms of link utilization while maintaining an acceptable mean queue length and minimal packet drop rate. Moreover, ANLRED implementation requires minimum algorithmic changes and hence, is easy to deploy.

Abstract

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