The dynamic threthold control algorithm of RED for thousands of TCP flows

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Abstract

The number of flows accommodated at the backbone router is rapidly increasing, as the Internet population glows. Due to the nature of the congestion control algorithm of TCP, the fairness among connecions degrades when the number of competing connections at the bottleneck router gets larger. RED (Random Early Detection) mechanism is considered to be an effective algorithm to solve the unfairness problem, and detailed investigations have been done by the many researchers. However, they do not consider the situation where the number of active connections at the bottleneck router is more than a thousand, and the performance of RED under such situations has not been revealed.

Therefore, in this paper, I first investigate the performane of RED and the traditional TD (Tail-Drop) routers when over 1000 flows in the network, especially in term of fairness among conections.

The result is that RED can achieve better fairness than TD when the control parameters of RED are appropriately tuned according to the network condition. However, when the parameters are not regulated well, the performance of RED will seriously degdare.

That is, for the effective usage of RED, the control parameters must be carefully set. However, that is very hard task because the network condition varies largely, especially when the number of accommodated connections is large. In this report, therefore, I propose the algorithm to dynamically tune the RED parameters according to the observed behavior of the RED queue.

I confirm the effectiveness of the proposed algorithm through some simulation experiments, and the results show that it can provide better fairness than the original RED, and TD routers.