On Optimizing Backoff Procedure to Enhance Throughput and Fairness For Wireless LANs

Abstract

There is more demand on the services provided by the Wireless devices complying with the IEEE 802.11 standard. Much research is going on to enhance the distributed coordination function (DCF) of the IEEE 802.11 as to support quality of service (QoS) requirements needed by real time services. This is achieved by enhancing the throughput, delay characteristics, and fairness properties of the DCF. The throughput of DCF degrades in high loaded situations. In this paper, we propose and evaluate a novel algorithm to enhance the backoff procedure of DCF. The new algorithm capitalizes on the need to reduce collisions especially when the network is congested. Therefore, the algorithm attempts to adaptively control the DCF contention window in order to alleviate congestion. Evaluation results indicate that better throughput and delay figures are obtained using the proposed algorithm. In addition the algorithm also achieves good fairness compared to DCF.