Rated window and packet size differentiation methods for per-rate TCP fairness over IEEE 802.11

ABSTRACT

In WLANs, with the existence of multi-rate capability, the Distributed Coordination Function (DCF) of MAC layer protocol equalizes the throughput of all the stations regardless of their own link rate. This equalization leads to the Performance Anomaly of IEEE 802.11 where the throughput of the station with the higher data transmission rate is decreased as much as that of the lower rate station. The objective of this study was to provide fair proportional throughput for TCP flows of competing stations in multi-rate IEEE 802.11 WLANs infrastructure. This research considers the scenarios when there are other kinds of unfairness along with per-rate unfairness. In this work, Rated Window and Packet Size Differentiation schemes are proposed by adjusting window and packet size according to the availability of buffer size in the access point and transmission rates of each flow. We validate the proposed methods by means of simulation and compare the results of the total throughput and fairness index with previous methods. The results show that the proposed methods generate fair service in terms of proportional throughput among wireless stations having different numbers and directions of flow with various data transmission rates. By getting appropriate fairness among stations in WLAN infrastructure, a Wireless Internet Service Provider (WISP) can significantly increase its revenue by providing various appropriate service plans.