

An Approach to Increase Channel Utilization in IEEE 802.11 Networks Family by Improving MAC-layer Fairness

A Masters Thesis Defense

By

Vikram V. Kamath

Adviser: Dr. Bijan Jabbari

Committee Members: Dr. Brian Mark and Dr. Rao Mulpuri

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Abstract

The IEEE 802.11 technology serves as an access mechanism for multiple wireless stations to exchange data over the wireless medium in a distributed fashion. This distributed nature results in collisions when two or more stations try to transmit simultaneously. The Binary Exponential Back off (BEB) mechanism in Carrier-Sense Multiple Access/Collision Avoidance (CSMA/CA) reduces this probability of collision to some extent. However, under saturation conditions, the behavior of BEB is somewhat unfair, which leads to degradation of average channel utilization. This degradation increases linearly with the number of stations contending for the channel. A new scheme, Enhanced Binary Exponential Back off (EBEB) is proposed, which improves the average channel utilization by improving degree of fairness for BEB, which also blends with all flavors of IEEE 802.11. In this presentation, a detailed analysis of EBEB will be discussed, followed by comparison of analytical and simulation results of both schemes.

