

# **Interoperation between 802.11e EDCA and Differentiated Services with Admission Control**

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This thesis focuses on IEEE 802.11e Enhanced Distribution Channel Access (EDCA). IEEE 802.11e was standardized in July 2005, and there are already numerous papers about 802.11e and its applications. Even so, there are still many untouched issues regarding 802.11e EDCA, and this thesis will try to answer some of those issues.

The interoperation between Differentiated Services (DiffServ) and 802.11e EDCA is one of the issues explored in this thesis. Several architectures and mapping schemes for the interoperation between DiffServ and 802.11e are discussed and evaluated together with simulation results. Our work presents a very interesting finding regarding the rate configuration of 802.11e classes and the drop probability of these. These results make us question if 802.11e EDCA is designed to interoperate correctly with DiffServ.

Another important issue that we have explored is admission control mechanisms for 802.11e EDCA. The IEEE 802.11e standard assumes implementation of admission control, but no specific algorithm is specified. Admission control is an important supplement to the differentiation features of 802.11 EDCA. An admission control unit is also necessary in an interoperation environment between DiffServ and 802.11e EDCA.

Both measurement and model based admission control algorithms are presented and discussed. As an enhancement to one of the most promising measurement based algorithms, we propose a new and enhanced admission control algorithm. We also propose a model based admission control algorithm, which uses delay instead of throughput as its threshold, which is quite unique compared to existing proposals. Our two new proposals are evaluated by simulations.

Four papers have been published during this work.