

Multi-Channel Aware MAC Protocol for Mobile Ad Hoc Networks

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Abstract

This paper introduces a novel MAC scheme operating on multiple channels that maximizes network performance and provides differentiated services in mobile ad hoc networks (MANETs). Specially, the IEEE 802.11 in ad hoc mode, the most popular MAC protocol in mobile ad hoc networks, is extended from single channel to multiple channels operation. The current standard allows the practical use of three channels in 802.11b and eight in 802.11a, but multiple channels operation is not supported in ad hoc mode. The proposed protocol ensures maximum performance, low delay, reliability, efficiency and fairness, while allowing transmission priorities to be set on a per-channel basis. In addition, a solution is provided for the *Hidden Multi-Channel Problem*, which arises when only one network interface card is used. Basic considerations for mobility management in multi-channel environment is also given. We show through simulation that the *Multi-Channel MAC Protocol* greatly outperforms the original IEEE 802.11 MAC protocol.

Index Terms

802.11a/b/g; Multi-Channel; Frequency Switching; Quality of Service;