Time Division Hashing (TDH): A New Scheduling Scheme for Wireless Ad-Hoc Networks

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Abstract

The current 802.11 MAC protocol uses RTS-CTS-DATA-ACK packet exchange and exponential backoffs to prevent collisions at both the sender's side and the receiver's side. While the protocol works well in prevention of collisions, it degrades throughput due to a significant amount of overhead produced by RTS/CTS message exchange. In addition, aggressive backoffs used in current 802.11 MAC protocol can lead to long channel idle time, resulting in the channel under-utilization. In this paper, we propose a new scheduling scheme, TDH, for ad hoc wireless networks which minimizes the chance of collisions by eliminating RTS/CTS message exchange and the use of backoffs. We also study and compare the performance of our proposed scheme with the performance of MAC RTS/CTS scheme under different types of topologies. Our analysis leads to the conclusion that, our scheme has higher throughput in many cases compared to MAC RTS/CTS scheme, however, at the expense of a slightly higher collision rate.