Design, Simulation and Implementation of A TDMA-Based Multi-Channel MAC Protocol

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ABSTRACT:

The original designed MAC protocol was a CSMA-based multi-channel MAC protocol. First we investigated the traffic pattern of the application environment, and found that most payloads of the network were short broadcast packets and few payloads were long unicast packets. And for their specific application, each node need broadcast some data periodically. Large numbers of broadcast packet are easy to cause collision for CSMA-based MAC protocol, which leads to low efficiency. We proposed a TDMA-based multi-channel MAC protocol to improve the performance. This plan also made it more convenience to work with the physical layer.

Then in a week, we simulated both TDMA-based and CSMA/CA-based MAC protocols and the physical layer in the network simulator ns-2. We also simulated the traffic pattern and got the simulation results. In a seminar, we presented our simulation results and analyses, and then TDMA-based design was accepted. In the following two weeks, we implement the C code of MAC layer, and then transplanted and adapted the original routing code to the new platform.