

Abstract

Over the past decade wireless LANs have gained tremendous importance because of its convenient nature, mobility support and the scalability option which allows any organisation to expand its territory with utmost ease. On the other hand, many factors like network traffic, network topologies, network protocols, hardware and software affect the behaviour of wireless LANs. These in turn have a profound impact on the network performance and usability of the system. IEEE 802.11 MAC standard plays a key role in operating wireless LANs by coordinating access to a shared radio channel and utilizing protocols that enhance communications over a wireless medium. It provides the detailed specifications of Medium Access Control layer and Physical layer for implementing wireless LANs. The fundamental MAC technique of 802.11 is Distributed Co-ordination Function. It employs Carrier Sense Multiple Access with Collision Avoidance scheme. The contention resolution mechanism used in DCF is Binary Exponential Back-off algorithm. The DCF protocol performance mainly depends on back-off procedure which reduces the probability of collision.

In this project, our main goal is to improve the performance of IEEE 802.11 Distributed Co-ordinated Function by reducing the DIFS overhead resulting from the back-off procedure. As per the IEEE 802.11 standard, after each collision the channel must remain idle for an interval equal to DIFS period. As the number of collisions increase, this overhead becomes significant. In our proposed work, we have made an attempt to minimize the DIFS overhead by modifying the legacy back-off procedure. The DIFS overhead can be reduced by allowing the stations which are in back-off procedure to decrement their back-off counters, without waiting for the duration of DIFS when channel state changes from busy to idle. Simulation studies show significant performance improvement achieved as a result of modified back-off procedure compared to original back-off procedure, in terms of throughput and delay.

Keywords: IEEE 802.11, MAC, DCF, WLAN, Back-off procedure, Throughput, Delay