

An enhanced A-MSDU frame aggregation scheme for 802.11n wireless networks

Abstract

The main goal of the IEEE 802.11n standard is to achieve a minimum throughput of 100 Mbps at the MAC service access point. This high throughput has been achieved via many enhancements in both the physical and MAC layers. A key enhancement at the MAC layer is frame aggregation in which the timing and headers overheads of the legacy MAC are reduced by aggregating multiple frames into a single large frame before being transmitted. Two aggregation schemes have been defined by the 802.11n standard, aggregate MAC service data unit (A-MSDU) and aggregate MAC protocol data unit (A-MPDU). As a consequence of the aggregation, new aggregation headers are introduced and become parts of the transmitted frame. Even though these headers are small compared to the legacy headers they still have a negative impact on the network performance, especially when aggregating frames of small payload. Moreover, the A-MSDU is highly influenced by the channel condition due mainly to lack of subframes sequence control and retransmission. In this paper, we have proposed an aggregation scheme (mA-MSDU) that reduces the aggregation headers and implements a retransmission control over the individual subframes at the MSDU level. The analysis and simulations results show the significance of the proposed scheme, specifically for applications that have a small frame size such as VoIP.

Keyword: Frame aggregation; Aggregation headers; WLAN; A-MSDU; Next generation networks; 802.11n