

A new access point selection policy for multi-rate IEEE 802.11 WLANs

Murad Abusubaih

murads@ppu.edu

Abstract

In wireless local area networks, often a station can potentially associate with more than one access point (AP). Therefore, a relevant question is which AP to select 'best' from a list of candidate ones. In IEEE 802.11, the user simply associates to the AP with the strongest received signal strength. However, this may result in a significant load imbalance between several APs. Moreover, the multi-rate flexibility provided by several IEEE 802.11 variants can cause low bit rate stations to negatively affect high bit rate ones and consequently degrade the overall network throughput. This paper investigates the various aspects of 'best' AP selection for IEEE 802.11 systems. In detail, we first derive a new decision metric which can be used for AP selection. Using this metric, we propose two new selection mechanisms which are decentralised in the sense that the decision is performed by each station, given appropriate status information of each AP. In fact, only few bytes of status information have to be added to the Beacon and Probe Response frames which does not impose significant overhead. We show that our mechanism improves mean quality of service of all stations and better utilises network resources compared to the conventional one implemented today in IEEE 802.11 devices. Also, the schemes are appealing in terms of stability and provide their performance improvement even for denser or lighter network configurations.