



Hamilton Institute

Surprises in Experimental Assessment of WLAN Systems

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Abstract

Experimental assessment is typically considered as the ultimate validation reference for any theoretical and/or simulation modelling assumptions. However, in the case of Wireless LANs, the situation is not as straightforward as it might seem.

Goal of this talk is to document some unexpected finding concerning experimental WLAN assessment, and to show that measurement result may be highly dependent on the specific vendor equipments deployed.

More specifically, we first provide a detailed analysis of the behavior of several commercial cards, devised to characterize their backoff operation. We show that, for some products, the experimentally observed behavior differs from what expected from the 802.11 standard, e.g., in terms of minimum contention window employed, proper usage of Extended Inter-Frame Spaces (EIFS) after collisions, virtual carrier sensing operation, and so on. Both design choices voluntarily done by vendors as well as potential implementation limits (in either the card hardware/firmware and/or the software driver) appear to be the cause of such unexpected discrepancies.

Second, we show that an even more surprising situation may occur for what concerns the power management of some cards. Motivated by the need to explain counter-intuitive link quality measurement results found for outdoor WLAN links (and especially the poor performance of 802.11g outdoor links when compared with 802.11a/b), we show that a well known card/driver pair, extensively used by the scientific community for experimental purposes, implements a proprietary and undocumented power-saving mechanism. While this mechanism does not lead to notable consequences in a typical low-range WLAN deployment (most likely this being the reason why it was not detected before), conversely it appears to dramatically affect both performance and link quality probing mechanisms in a medium-range WLAN deployment, such as that characteristic of an outdoor WLAN Mesh Network.

Venue: Seminar Room, Hamilton Institute, Rye Hall,
NUI Maynooth

Time: 1.00 - 2.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie



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