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Adaptive interface reconfiguration in low-rate mesh WPANs (Article)

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Abstract

The aggressive deployment of 2.4 GHz unlicensed band in different technologies has introduced the challenge of co-existence of multiple networks in the same vicinity. The CSMA/CA protocol provides protection against co-channel interference by sensing the medium before sending the data. This is available only to the networks that employ CSMA/CA such as IEEE 802.11 and 802.15.4. However, there are other networks (such as IEEE 802.15.1, cordless phones, etc.) and devices that do not make the use of CSMA/CA and cause effects of interference. The paper discusses the denser deployments of IEEE 802.15.4 networks with the goal to achieve high performance under the uneven distribution of traffic load and external interference. Traditional single interface devices restrict the whole network on a single channel and hence the full potential of available multiple channels is not achieved. Therefore multi-interface devices are exploited for developing a mesh WPAN. Bayesian estimation is proposed to infer link capacity and accordingly a reconfiguration algorithm is presented for multi-interface devices. The proposed approach is evaluated through traces on multiple flows, collected from simulation. The performance evaluation demonstrates that link critical reconfigurations significantly improve network capacity in diverse traffic conditions. © 2016 American Scientific Publishers All rights reserved.

Author keywords

Interface Reconfiguration; Low Rate Mesh WPANs; Multi-Interface

Indexed keywords

Engineering controlled terms: Bayesian networks; Carrier sense multiple access; Mesh generation; Packet networks; Reconfigurable hardware; Standards; Wireless local area networks (WLAN)

Adaptive interface; Bayesian estimations; External interference; IEEE 802.15.4 networks; Interface devices; Low rates; Reconfiguration algorithm; Traffic conditions

Engineering main heading: Cochannel interference

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