Exploring control-message quenching in SDN-based management of 6LowPANs

Abu-Mahfouz, Adnan MI
Council for Scientific and Industrial Research
Pretoria, 0001, South Africa
Email: AAbuMahfouz@csir.co.za

Abstract

This paper draws attention to techniques available for the minimization of control overhead in software-defined wireless sensor networks (SDWSNs). Software-defined networking (SDN) promises improved management flexibility and control for inherently resource-constrained and heterogeneous wireless sensor network (WSN) implementations. However, due to the in-band traffic channel available for data and control traffic in SDN-based WSNs, overhead control traffic has been viewed as a bottleneck affecting network performance and controller responsiveness. A discussion on the need for control message quenching (CMQ) and the various categories of CMQ implementations in SDWSN is made in this paper. Furthermore, a CMQ algorithm based on reducing duplicate flow request packets is discussed and demonstrated for implementation in an SDN-based WSN framework. Results show a significant reduction in control overhead traffic and noticeable improvement in energy efficiency. However, trade-offs in terms of packet delivery rate and packet delay are also observed as a result of the CMQ algorithm. A discussion on future work necessary to optimize CMQ algorithms in order to minimize the associated trade-offs is also made.