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SDNMM—A Generic SDN-Based Modular Management System for Wireless Sensor Networks

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ABSTRACT:

Software-defined networking (SDN) promises a wide range of application benefits to the Internet of Things (IoT) including the flexible management of wireless sensor networks (WSNs). While the integration of SDN techniques in WSNs is being extensively investigated, there remains a need for a general SDN-based management system for WSNs. A system that should provide an opportunity for rapid testing and implementation of management modules to the IoT developer community working on taking advantage of the SDN benefits. Therefore, this paper proposes a generic and modular WSN management system based on SDN (SDNMM). SDNMM introduces the concept of management modularity using a management service interface (MSI) that enables management entities to be added as modules. The system leverages the use of SDN in WSNs and by being modular it also allows for rapid development and implementation of IoT applications. The system has been built on an open source platform to support its generic aspect and a sample resource management module implemented and evaluated to support the proposed modular management approach. Results show how adding a resource management module via the MSI improved packet delivery, delay, control traffic, and energy consumption over comparable frameworks.