Data Transmission and Network Architecture in Long Range Low Power Sensor Networks for IoT

Wireless Personal Communications

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- Dae-Young Kim (1) Email author (kimdy@cs.ac.kr)View author's OrcID profile (View OrcID profile)
- Minwoo Jung (2)

1. Department of Software Engineering, Changshin University, , Changwon-si, Korea
2. Smart Sensor Technology Center, Gyeongbuk Institute of IT Convergence Industry Technology, , Gyeongsan-si, Korea

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Abstract

Internet of Things (IoT) becomes an inevitable technology for ICT convergence. It gathers information from various objects and provides intelligent services through analyzing the information. To collect surrounding information, IoT employs a sensor network, which is a low-power wireless communication network with numerous sensor nodes. Sensor nodes in conventional sensor networks have short transmission range. However, it is required a sensor network with long transmission range as well as low transmission power consumption for various IoT services. Long transmission range of IoT devices affects transmission environment. Lots of sensor nodes (i.e., IoT devices) in the long range sensor network transmit data to a given gateway node in order to deliver data to a network server. The gateway node can experience serious traffic load to relay the data. It causes to drop transmission efficiency. Therefore, for efficient data transmission, a network architecture and a data transmission method for long range IoT services are necessary. This paper proposes the network and data transmission architecture for the long range sensor networks. The proposed network architecture is based on oneM2M IoT standard. It has Infrastructure Node (IN), Middle Node (MN) and Application Service Node (ASN) as network elements. In the proposed method, IN employs cloned MNs to reduce the traffic load at the MN, which is the gateway. ASN delivers data through MN or cloned MNs to the IN. Through the load balancing by the proposed method at the MN, the efficient data transmission for IoT services in long range sensor networks can be provided. The performance of the proposed method is validated by the computer simulation.

Keywords

Sensor network IoT Data transmission Network architecture

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