

Abstract: Performance Analysis of RPL over AMI (Advanced Metering Infrastructure)

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Abstract

Advances in telecommunication services and technology have enabled machines to be operated by IP internet. With this, the researchers have come up with M2M communication paradigm to standardize the communication of IP operated machines with end hosts connected via traditional internet infrastructure and 3G/4G access network broadening their reach to distant networks. The traffic pattern in such paradigm needs to be studied and analyzed to ensure high performance. Hence, in this article we have fixed our focus to Smart Grid application which has AMI as one essential component in it that usually gathers data from smart meters (sensors and actuators) and sends it to controller for processing and decision making. Lately, research community has initiated IETF ROLL (Routing over Low power and Lossy network) working group to devise protocols customized to such constrained environment. RPL is one of the protocols that have been lately proposed to suite such environment. We used techniques from network calculus to define performance bounds of RPL flows over a tree based WSN network model. Furthermore, we quantified the routing protocol logic in general for reactive and proactive protocols and compared the logic efficiency for AODV, OLSR with that for RPL protocol. In the end, we performed simulations and got performance bounds on a node and end-to-end level. Moreover, we compared the routing logic efficiency of the protocols.

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