

IoT middleware adaptation in developing interoperable smart meter architecture
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The increased number of Internet of Things (IoT) enabled appliances from vendors having different standards, makes interoperation difficult across advanced metering infrastructure, hence resulting to vendor lock-in situation, and difficulty to develop new applications. Interoperability is the new and important requirement in developing IoT-based smart meter system for ease integrations of devices and applications. This study developed an architecture that adapts IoT middleware layer to a metering system for the aim of bringing in interoperation capability. IoT smart meter requirements were gathered and appropriate Kaa middleware technology was selected for adaptation. Prototype of the proposed architecture was implemented in laboratory as a proof of concept. Three real home-appliances were used in testing scenarios. Furthermore, system data accuracy and power consumption were evaluated to insure the good performance of the developed system. Successful implementation of the proposed architecture designed in this study ensured that any deployment of this smart meter to a real system will provide interoperation across the Advanced Metering Infrastructure (AMI). Laboratory results showed that, the system consumes 35% more power due to extra execution of newly adapted middleware application embedded to it. Moreover, the data received on the middleware server from the appliances are accurate enough by 98%; and therefore they can be trusted to be used by other entities in the infrastructure, including smart meter applications.