A Distributed Graph Database for the Data Management of IoT Systems

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Abstract
The Internet of Things (IoT) has become a popular technology, and various middleware has been proposed and developed for IoT systems. However, there have been few studies on the data management of IoT systems. In this paper, we consider graph database models for the data management of IoT systems because these models can specify relationships in a straightforward manner among entities such as devices, users, and information that constructs IoT systems. However, applying a graph database to the data management of IoT systems raises issues regarding distribution and security. For the former issue, we propose graph database operations integrated with REST APIs. For the latter, we extend a graph edge property by adding access protocol permissions and checking permissions using the APIs with authentication. We present the requirements for a use case scenario in addition to the features of a distributed graph database for IoT data management to solve the aforementioned issues, and implement a prototype of the graph database.

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