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a Lightweight Edge Gateway for the Internet of Things

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Abstract

The stringent latency together with the higher bandwidth requirements of current Internet of Things (IoT) applications, are leading to the definition of new network-infrastructures, such as Multi-access Edge Computing (MEC). This emerging paradigm encompasses the execution of many network tasks at the *edge* and in particular on constrained gateways that have also to deal with the plethora of disparate technologies available in the IoT landscape.

To cope with these issues, we introduce a Lightweight Edge Gateway for the Internet of Things (LEGIoT) architecture. It relies on the modular characteristic of microservices and the flexibility of lightweight virtualization technologies to guarantee an extensible and flexible solution. In particular, by combining the implementation of specific frameworks and the benefits of container-based virtualization, our proposal enhances the suitability of edge gateways towards a wide variety of IoT protocols/applications (for both downlink and uplink) enabling an optimized resource management and taking into account requirements such as energy efficiency, multi-tenancy, and interoperability.

LEGIoT is designed to be hardware agnostic and its implementation has been tested within a real sensor network. Achieved results demonstrate its scalability and suitability to host different applications meant to provide a wide range of IoT services.

Keywords: Internet of Things, Edge Computing, Gateway, Virtualization, Container, Sensor Network

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