

A smart city lighting case study on an OpenStack-powered infrastructure

Merlino G., Bruneo D., Distefano S., Longo F., Puliafito A., Al-Anbuky A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 by the authors; licensee MDPI, Basel, Switzerland. The adoption of embedded systems, mobile devices and other smart devices keeps rising globally, and the scope of their involvement broadens, for instance, in smart city-like scenarios. In light of this, a pressing need emerges to tame such complexity and reuse as much tooling as possible without resorting to vertical ad hoc solutions, while at the same time taking into account valid options with regard to infrastructure management and other more advanced functionalities. Existing solutions mainly focus on core mechanisms and do not allow one to scale by leveraging infrastructure or adapt to a variety of scenarios, especially if actuators are involved in the loop. A new, more flexible, cloud-based approach, able to provide device-focused workflows, is required. In this sense, a widely-used and competitive framework for infrastructure as a service, such as OpenStack, with its breadth in terms of feature coverage and expanded scope, looks to fit the bill, replacing current application-specific approaches with an innovative application-agnostic one. This work thus describes the rationale, efforts and results so far achieved for an integration of IoT paradigms and resource ecosystems with such a kind of cloud-oriented device-centric environment, by focusing on a smart city scenario, namely a park smart lighting example, and featuring data collection, data visualization, event detection and coordinated reaction, as example use cases of such integration.

<http://dx.doi.org/10.3390/s150716314>

Keywords

AMQP, Ceilometer, CEP, Cloud, CoAP, IaaS, IoT, MOM, OpenStack, REST, Smart city