Chapter 3
Sensing as a Service in Cloud–Centric Internet of Things Architecture

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ABSTRACT

Sensing-as-a-Service (S2aaS) is a cloud-inspired service model which enables access to the Internet of Things (IoT) architecture. The IoT denotes virtually interconnected objects that are uniquely identifiable, and are capable of sensing, computing and communicating. Built-in sensors in mobile devices can leverage the performance of IoT applications in terms of energy and communication overhead savings by sending their data to the cloud servers. Sensed data from mobile devices can be accessed by IoT applications on a pay-as-you-go fashion. Efficient sensing service provider search techniques are emerging components of this architecture, and they should be accompanied with effective sensing provider recruitment algorithms. Furthermore, reliability and trustworthiness of participatory sensed data appears as a big challenge. This chapter provides an overview of the state of the art in S2aaS systems, and reports recent proposals to address the most crucial challenges. Furthermore, the chapter points out the open issues and future directions for the researchers in this field.

INTRODUCTION

The Internet of Things (IoT) paradigm denotes the pervasive and ubiquitous interconnection of billions of embedded devices that can be uniquely identified, localized and communicated (Aggarwal, C., Ashish, N. & Sheth, A., 2013). Sensors, RFID tags, smart phones, and various other devices are interconnected in a scalable manner in the IoT architecture. Application areas of IoT are various such as healthcare, smart environments, transportation, social networking, personal safety and several futuristic applications such as robot taxi (Atzori, A., Andlra, L. & Morabito, G., 2010; Miorandi, D., Sicari, S., De Pellegrini, F.

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& Chlamtac, I., 2012). IoT architecture can be implemented as either Internet centric or object-centric. Internet centric architecture of IoT aims at provisioning services within the Internet where data are contributed by the objects. On the other hand, object-centric architecture aims at provisioning services via network of smart objects. Scalability and cost-efficient service provisioning of IoT services can be achieved by the integration of cloud-computing into the IoT architecture, i.e., cloud-centric IoT (Gubbi, J., Buyya, R., Marusic, S. & Palaniswami, M., 2013) as illustrated in Figure 1.

Figure 1. Minimalist illustration of cloud-centric IoT architecture