Chapter 8

Summary:
IoT Service Provisioning With an Illustrative Example

ABSTRACT

In previous chapters, the design of IoT services using the streamlining and integration principle was discussed. In this chapter, a summary is given of how to use these principles to achieve IoT service provisioning, and an example is given. The event streamlining problem is first discussed from an IoT service provisioning perspective, involving how to efficiently disseminate the sensing events among event producers and consumers on demand. The service integration problem is then considered, which requires dynamic coordination of the relevant IoT services based on events occurring in the real world. An EDSOA is abstracted from the perspective of utilizing the advantages of EDA and SOA, and the streamlining and integration principle is viewed from an architectural perspective. A combination of SOA and EDA can easily support the on-demand dissemination of sensing information and event-driven service dynamic coordination. The example used here is a deployed CMCS application.

INTRODUCTION

The IoT (ITU Internet Reports, 2005; Ma, 2011; Atzori et al., 2010; Bandyopadhyay et al., 2011) is driving business transformation by connecting ubiquitous objects and devices, both to each other and to cloud-hosted services.

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Real-time control, low-latency application responses and local data aggregation mean that the current mandatory cloud connectivity is undesirable. To sustain the momentum of the development of IoT, a cloud-to-edge continuum is needed, and this is often referred to as ‘fog computing’ in the literature. In the current work, an EDSOA is defined to address the challenges related to infrastructure and connectivity in IoT scenarios by emphasising information processing and intelligence at the centre-edge continuum. EDSOA represents a shift away from traditional silo systems and a reliance on cloud-only focused paradigms, and is both complementary to, and an extension of, traditional cloud computing. In the proposed EDSOA service platform, computation can be moved from the cloud to the edges of the network, and potentially right up to the IoT sensors and actuators.

An EDSOA IoT service platform to support various industrial applications is an ideal service provisioning mode. This is described in the previous chapters in this book, and offers several unique advantages over other approaches, for example:

- **Knowledge-Based Intelligence:** The physical world and devices are modelled as knowledge on which applications are established.
- **Low Latency:** Real-time processing and cyber-physical system control are achieved by deploying IoT services near to physical systems and devices.
- **Openness:** Heterogeneous sensors and devices are unified as semantic IoT resources for ubiquitous users, and locations are transparent for IoT services and applications in the proposed UMS (a service-oriented wide-area publish/subscribe system over SDN).
- **Agility:** Rapid service development and affordable scaling are available under a common infrastructure.
- **Overlapping Security:** The safety of physical systems and information security overlaps, and the proposed platform supports physical system-oriented security, thus addressing the problem of their interaction.

From the above discussion, it can be seen that a service provisioning approach based on the EDSOA IoT service platform is crucial for current IoT application systems. The question of how to realise this IoT service provisioning has attracted a great deal of attention. Several works (Fok et al., 2009), (Wang et al., 2008) have explored the integration of real-world and enterprise services using mobile agents and middleware methods, although there is a lack of customised platforms and proprietary technologies of
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