Chapter 10

Personalized Web Service Provisioning to Mobile Users USING Policy-Based Profile and QoS Management

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ABSTRACT

In the last few years, a rising proportion of the workforce is becoming more and more mobile, meaning that organizations must consider this new trend in their corporate and IT strategies. The expectation of employees now is that they can retain access to their corporate services as they move to new locations, using various kinds of handheld devices. This chapter describes our proposed broker-based system for Web services provisioning to mobile users with quality of service (QoS) requirements. It describes a set of brokers collaborating to provide tailored services to mobile users while they move from one site to another in their corporate and partners’ networks. Access to QoS-enabled Web services complies with the policies of the user’s home site. Policies are a key component of the system as they are involved at different levels: authorization, QoS specification, QoS service monitoring, and service selection.

INTRODUCTION

With the emergence of service oriented computing and the ubiquitous deployment of enterprise applications on the Web to reach a wide base of customers, many organizations have moved their business online. Service oriented computing aims to promote business collaboration and application integration on a global scale. It is increasingly changing the way designers and architects develop software applications. Furthermore, it is changing the way these applications are delivered and used by consumers. It enables organizations to exhibit their main capabilities programmatically over the Internet and a variety of networks, e.g., cable, Universal Mobile Telecommunications System (UMTS), Digital Subscriber Lines (xDSL), Blue-
tooth, etc., using standard languages and protocols, and implementing self-describing interfaces.

Services are computational elements that can be described, published, and discovered using standard protocols. Providers build their services in a way that is independent of consumers’ context. This means that service providers and consumers are loosely coupled. Web services technology is currently the most promising paradigm relying on the concept of service oriented computing. It provides the foundation for developing and executing business processes that are distributed over the Web and accessible via standard interfaces and protocols. By using Internet-based standards, such as the Business Process Execution Language (BPEL), the Simple Object Access Protocol (SOAP), and the Web Services Description Language (WSDL), it becomes possible to orchestrate Web services into business processes.

Another development in the area of service oriented computing is the unprecedented rise in the number of mobile workers using a variety of devices including laptops and handheld devices, such as PDAs and SmartPhones, to consume online services. Modern mobile devices are often fully equipped with broad capabilities. Most of these devices support several wireless communication options including Wi-Fi, Bluetooth, General Packet Radio Service (GPRS), and Enhanced Data GSM Environment (EDGE). They also come with advanced multimedia capabilities including streaming, and the ability to play several audio and video formats. These devices present now browsing capabilities that go beyond the simple Wireless Application Protocol (WAP), to support HTML-based Web sites.

As a result of this proliferation of mobile devices, wireless enterprise applications, i.e., messaging and voice services, are increasingly built and deployed using Web services technology. Therefore, using the service oriented computing paradigm in mobile environments considerably enlarges the range of accessible business applications and enables delivering integrated services across wireless networks. The current drive towards using mobile devices is due to several factors. First, there are more wireless networks, services, and devices than ever before. Second, consumers are demanding better mobile experiences than ever before. Third, people want ‘anytime, anywhere’ connections more than ever before. Mobile workers are increasingly requiring services tailored to their needs as they move from one site to another in their corporate and partners’ networks. They are also requiring retaining access to their corporate services as they move to new locations.

In this chapter, we describe our broker-based framework, which allows mobile users to use home services as they move to new locations in their corporate or partners’ networks. These networks are divided into several domains; and each domain has a broker, which is the key component for services’ selection and delivery to mobile users. Our framework takes advantage of the World Wide Web Consortium (W3C) and the Open Mobile Alliance (OMA) standards for describing device capabilities (hardware, software, and characteristics of supported networks). Such standards allow providers to tailor service provisioning to mobile devices by adapting content presentation to their capabilities.

**MOTIVATION AND RELATED WORK**

Our motivation in this work is the desire to support mobile users with services tailored to their needs and to their home profiles as they move from one site to another in their corporate or partners’ networks. To attain this goal, three main aspects need to be considered. First, we need to identify the mobile worker’s device in use at any particular time and its capabilities. Second, we need to identify the mobile user preferences and functional and non-functional service requirements, such as the minimum level of QoS he/she is willing to accept. Third, a close cooperation between home and visited locations needs to be
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