Chapter X

Integration of Management of Quality of Web Services in Service Oriented Architecture

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Abstract

With the proliferation of Web services and their wide adoption as a novel technology for business-to-business interactions on the Web, quality of Web services (QoWS) management has witnessed considerable interest in recent years. Most of the existing works regarding this issue do not provide support for the overall QoWS management operations and are very often limited to a subset of these operations. Some of these works propose QoWS solutions for only basic Web services, while others propose solutions for composite Web services. In this chapter, we propose to extend the service-oriented architecture (SOA) with a framework for QoWS management.
in which services may be basic or composite Web services. The framework uses a layered approach to provide support for the most common QoWS management operations, which include QoWS specification, QoWS verification, QoWS negotiation, and QoWS monitoring. These operations are supported at both the design and the development phases of Web services.

Introduction

Web services are increasingly used as a new paradigm for providing and/or consuming service artifacts via the Internet. The Web services approach presents fundamental changes in the way systems are designed, developed, deployed and managed. At the earlier stages of the emergence of Web services as a new paradigm, the focus was on the definition of protocols, standards, development environments and interfaces. A lifecycle of Web services needs to integrate features such as QoWS-driven Web services selection, QoWS management, and QoWS composition enforcement and management. These features need to be addressed in earlier phases of the Web services development process, especially during the design phase, and then ultimately in the implementation phase. QoWS has to be first specified then published so that it can be later discovered by clients through the Web service interface description. QoWS is becoming a key differentiator in Web services competition as it allows for the differentiation between providers of similar services. The provision of QoWS involves a number of QoWS management functions including QoWS specification, QoWS verification, QoWS negotiation, and QoWS monitoring.

Nowadays, QoWS management for Web services is drawing considerable attention in both industry and academia. Most research on Quality of Service (QoS) management has been performed in the context of distributed multimedia systems delivering multimedia documents (e.g., video/audio streaming). QoS management mechanisms were also applied to Web-based applications such as electronic commerce where users have access to online catalogues which may contain multimedia information. In the past recent years, research on Web services focused more on functional and interfacing issues, such as simple object access protocol (SOAP), Web service description language (WSDL), and the universal description, discovery, and integration (UDDI). Most of today’s Web services do not generally consider the level of QoWS they can deliver to their users. QoS support in Web services is still at the earlier stages of maturity as a research area where most of the efforts target the enumeration of QoWS requirements and mechanisms for QoWS management. Only recently, QoS issues have begun attracting more attention from the Web services community. QoS is expected to become a value-added capability of emerging Web services as providers will be able to advertise their Web services in QoWS enabled registries to differentiate themselves from their competitors.

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