Chapter I

Challenges and Opportunities for Web Services Research

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Abstract

Web services are becoming a major research topic for computer scientists, engineers and business consulting professionals. In this preface, I would like to outline the challenges of the current Web services research topics from the modeling, interoperability, and mathematical foundations points of view. Then I will introduce some research opportunities and possible future directions for moving Web services forward via some illustrative ideas such as business semantic computing as well as killer application driven Web services research approaches. For the business semantic computing aspect I will present some example application domains such as federated Web services discovery, dynamic Web services composition and extended business collaboration.

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Introduction

Web services refer to networked and modular applications, as well as a set of enabling technologies, such as simple object access protocol (SOAP), Web services definition language (WSDL), universal description, discovery and integration (UDDI) protocol, and emerging Web services flow specifications like business process execution language for Web services (BPEL4WS) and Web services choreography interface (WSCI). Since business requirements are becoming the major driving force for creating Web services research topics to support business process integration, collaboration, and management, the business context should be captured and transmitted into appropriate partners. Being Web services solution creators and researchers, we would like to start with capturing the business requirements, and then mapping them into a solution skeleton. Afterward, we can realize the skeleton by linking activities to a set of predefined Web services.

I would like to outline some challenges of the current Web services research topics from the modeling, interoperability, and mathematical foundations points of view followed by some observations about the opportunities and possible directions for moving Web services forward via illustrative ideas such as business semantic computing as well as killer application driven Web services research approach.

Challenges and Opportunities for Web Services Research

The basic challenges are still focused on Web services modeling, interoperability and mathematical foundations for supporting federated Web services discovery, dynamic Web services composition, Web services monitoring and management, Web services security (Naedele, 2003) and privacy, and Web services semantic computing.

Web Services Modeling

We always ask ourselves, what kind of information should be used to describe a Web service? Currently, Web services definition language (WSDL) is used to describe the basic static information such as an abstract interface and bindings to particular message formats and protocols as well as location of the service.

Here I would like to present some ideas on what other information should be covered in a Web services model. I suggest that a multidimensional model should be created
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