Approaches for Semantic Web Service: An Overview

Thabet Slimani, College of Computer and Information Technology, Taif University, Taif, Saudi Arabia

ABSTRACT

The main objective of the exploitation of semantic descriptions of services through Semantics is a better support for the life-cycle of Web services. The large number of developed ontologies, languages of representations, and integrated frameworks supporting the discovery, composition and invocation of services are a good indicator that research in the field of semantic web service (SWS) has been considerably active. The authors provide in this paper a detailed overview of the approaches and solutions, indicating their core characteristics and objectives required and provide indicators for the interested reader to follow up further insights and details about these solutions and related software.

Keywords: Bottom-Up Approaches, Representational State Transfer (RESTful) Services, Semantic Web Service (SWS), SWS Description, Top-Down Approaches

INTRODUCTION

Internet and information technology have been considerably affected the practice of science. For example, the large number of genome sequence available online means to several biologists: “data” is something that we can find on the web, but not in the lab.

Service is the application of competences for the benefit of another (Vargo & Lusch 2004) and depends on the division of labor and effective co-creation of value, leading to complementary specialization and comparative advantage among participants (Normann, 2001).

Service system is a value coproduction configuration of people, technology, internal and external service systems connected via value propositions, and shared information (language, laws, measures, methods, etc...). Service systems can be characterized by the value that results from interaction between service systems, whether the interactions are between people, businesses, or nations1.

Service science would combine organization and human understanding with business and technological understanding to (1) explain the origins and growth of service systems; (2) solve fundamental problems such as how to

DOI: 10.4018/ijssmet.2013070102
invest optimally to improve service productivity and quality; and (3) produce unique service professionals and service scientists (Maglio et al., 2006).

Service science can be consulting services, application management, system maintenance, etc. In service science, services can be regarded at a higher level of abstraction than objects in object oriented programming. Service implementation can be realized by an object, a group of objects, or even a business process. Consequently, the system should be analyzed at the service level, instead of the object level. To bridge the gap between business development and IT realization, people also expect to work at the level of service. Though this promise is still to be realized, people have invented many open standards and their implementations around SOA to build real world systems. As example of companies that have been changed their business models from producing hardware and software to providing services we enumerates IBM and SAP.

The Human Services profession is one which promotes improved service delivery systems by addressing not only the quality of direct services, but also by seeking to improve accessibility, accountability, and coordination among professionals and agencies in service delivery.

A service creation involves a conventional description, the operations supported by the service; the protocol definition used to invoke those operations using the internet; and operating a server to process incoming requests. A set of technologies called Web services (Booth et al., 2003) are gaining wider approval for these purposes. Several Web services tools (opensource and commercial) exist for developing, deploying, operating services and developing client applications.

The Semantic Web services vision is to describe the Web services’ capabilities and content in an unambiguous, computer-interpretable language (McIlraith et al., 2001; Ankolekar et al., 2001) and improve the quality and robustness of existing tasks, such as Web service discovery and invocation (Paolucci et al., 2002).

Semantic Web service is a new line of research that extends Web service with semantic annotations in order to enable a broad range of new automation tasks that humans previously performed, including automated composition, interoperation, execution monitoring, and recovery. To support this vision, Semantic Web services will provide more powerful Web service development tools that enable, among other things, automated simulation and verification of Web service properties and consistency-checking and debugging features (Narayanan et al., 2002).

The annotation of services with a description using a formal ontology to express their precise mathematical meaning represents the basic idea of service description in semantic Web service description.

The use of semantics enables rich support for handling services compared to the description such as WSDL. Furthermore, the use of ontologies to annotate services describes the services in more formal detail which allows a higher degree of automation.

The main goal of Semantic Web Services approaches is the automation of service discovery and service composition in SOA (McIlraith et al., 2001).

In the last decade, several approaches have been proposed in the literature and these approaches differ in terms of the formalizations and implementations (Ontology language syntaxes) and in terms of the paradigms proposed for employing these in practice.

This paper is dedicated to provide an overview of these approaches, expressing their classification in terms of commonalities and differences. It provides an understanding of the technical foundation on which they are built. These techniques are classified from a range of research areas including approaches for ws* technology and approaches for Restful technologies.

This paper does also provide some grounding that could help the reader perform a more detailed analysis of the different approaches which relies on the required objectives. We provide a little detailed comparison between
Investigation of Customer Knowledge Management: A Case Study Research
www.igi-global.com/article/investigation-of-customer-knowledge-management/179942?camid=4v1a

Value Creation in Information Business based on the Service Field
www.igi-global.com/chapter/value-creation-in-information-business-based-on-the-service-field/87940?camid=4v1a