Chapter XXXVIII
Towards Process Mediation in Semantic Service Oriented Architecture (SSOA)

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ABSTRACT

Nowadays, it becomes very hard for anybody in the digital world to search and find suitable Web Services fit into his/her needs, since there is a huge amount of data on the Web caused by the enormous increasing of the Web providers and Web Services widespread in this digital community, and one of the most difficulties Web Services have to overcome, in the attempt to use the contents of the World Wide Web, is heterogeneity which is caused by the nature of the Web itself, and has two origins: data or public process heterogeneity. So it is highly required in such environment to have an intelligent mechanism in which every user can search according to his/her needs and later on can fulfill it in a semantic way. The authors will focus in this chapter on the public process heterogeneity which describes the behavior of the participants during a conversation, and propose a solution for dealing with it, explaining the functionality of the process mediator developed as a part of the Web Service Execution Environment (WSMX) and its mediation scenario, and will also apply this proposed solution on Federated Enterprise Resource Planning (FERP) system to get the semantic extension from it.

1. INTRODUCTION

Web Development

The World Wide Web (Web) (Berners-Lee & Calliau, 1990) is a system of interlinked hypertext documents accessed via the internet. With a Web browser, user can view Web pages that may contain text, images, videos, and other multimedia and navigates between them using hyperlinks; the World Wide Web was created in 1989 by Tim Berners-Lee.
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According to the extreme growth of information available over the Web, and the powerful development achieved on the basis of World Wide Web, the Web 2.0 was born.

In this new version of interlinked hypertext network, it becomes possible that somebody can have the benefit from the experiments of the others in the same domain, which means that in such an environment like Web 2.0 there is a huge network of information which has the responsibility of enhancing creativity, information sharing capabilities, and most notably, the collaboration among users. These concepts have led to the development and evolution of Web-based communities and hosted services, such as social-networking sites, wikis, blogs, and folksonomies.

Some technology experts, like Berners-Lee, had a lot of reservations on the phrase Web 2.0; Lee had an interview with IBM developerWorks about the differences between the conventional Web (World Wide Web) and Web 2.0, and the discussion was like follows: “Web 1.0 was about connecting computers and making information available, and Web 2.0 is about connecting people and facilitating new kinds of collaboration. Is that how you see Web 2.0?” his point of view was fairly described as follows: “Web 1.0 was all about connecting people. It was an interactive space, and I think Web 2.0 is of course a piece of jargon, nobody even knows what it means. If Web 2.0 for you is blogs and wikis, then that is people to people. But that was what the Web was supposed to be all along. And in fact this ‘Web 2.0,’ it means using the standards which have been produced by all these people working on Web 1.0” (Berners-Lee, 2006).

And according to that, digital world needs a new way in which the people can interact in a semantic manner, to involve machines support side by side to the human interactions, and this is the main objective of the Semantic Web.

Semantic Web is an evolving extension of the existing Web in a way that the semantics of information and services on the Web must be defined, making it possible for the Web to understand and satisfy the requests of people and machines to use the Web content (Berners-Lee, Hendler, Lassila, 2001).

We are trying to describe in this chapter how we can involve semantic process mediation between machines and humans in order to have benefits from this knowledge in a semantic way by using Semantic Web Services as part of Semantic Web.

The Need of Process Mediation in Semantic Web

If we generally consider that the market is an institution where demands and offerings are coming together, markets also can be seen as a channel to manage the problems of the negotiation between required and available software components (as services) in a very large information system landscapes inside one enterprise or among enterprises.

One of the most significant factors in Enterprise Application Integration (EAI) within the information system world is enterprise integration. This integration can be applied in various management systems like: Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Supply Chain Management (SCM).

Service-Oriented Architecture (SOA) is one of the concepts involved in EAI, and this means that there must be a human interaction in order to use Web Services, whereas, if machines have to be involved in this scenario, Semantic SOA (SSOA) will be one of the best solutions.

SSOA is the concept that supports the use of Semantic Web Services, one of its duties is to overcome Web resources heterogeneity problems, since in such digital environment there is a need to deal with the differences in both ways; the way in which the requester wants to consume the functionality of a Web Service, and the way in which this functionality is made available by the Web Service back to the requester, in this chapter we