

## Chapter 4.8

# Utilizing Semantic Web and Software Agents in a Travel Support System

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### ABSTRACT

The use of Semantic Web technologies in e-business is hampered by the lack of large, publicly-available sources of semantically-demarcated data. In this chapter, we present a number of intermediate steps on the road toward the Semantic Web. Specifically, we discuss how Semantic Web

technologies can be adapted as the centerpiece of an agent-based travel support system. First, we present a complete description of the system under development. Second, we introduce ontologies developed for, and utilized in, our system. Finally, we discuss and illustrate through examples how ontologically demarcated data collected in our system is personalized for individual users.

In particular, we show how the proposed ontologies can be used to create, manage, and deploy functional user profiles.

## INTRODUCTION

Let us consider a business traveler who is about to leave Tulsa, Oklahoma for San Diego, California. Let us say that she went there many times in the past, but this trip is rather unexpected and she does not have time to arrange travel details. She just got a ticket from her boss' secretary and has 45 minutes to pack and catch a taxi to leave for the airport. Obviously, she could make all local arrangements after arrival, but this could mean that her personal preferences could not be observed and also that she would have to spend time at the airport in a rather unpleasant area where the courtesy phones are located or spend a long time talking on the cell phone (and listen to call-waiting music) to find a place to stay, and so forth. Yes, one could assume that she could ask her secretary to make arrangements, but this would assume that she does have a secretary (which is now a rarity in the cost-cutting corporate world) and that her secretary knows her personal preferences well.

Let us now consider another scenario. Here, a father is planning a family vacation. He is not sure where they would like to go, so he spends countless hours on the Web, going over zillions of pages, out of which only few match his preferences. Let us note here, that while he will simply skip pages about the beauty of Ozark Mountains—as his family does not like mountains, but he will “have to” go over a number of pages describing beach resorts. While doing this he is going to find out that many possible locations are too expensive, while others do not have kitchenettes that they like to have—as their daughter has special dietary requirements, and they prefer to cook most of their vacation meals themselves.

What do we learn from these two scenarios? In the first case, we have a traveler who, because of her unexpected travel, cannot engage in e-business as she does not have enough time to do it, while she could definitely utilize it. Yes, when in the near future airplanes will have Internet access, she will possibly be able to make the proper arrangements while traveling, but this is likely going to be an expensive proposition. Furthermore, the situation when a traveler is spending time on the plane to make travel arrangements is extremely similar to the second scenario, where the user is confronted with copious volumes of data within which he has to find few pertinent gems.

What is needed in both cases is the creation of a travel support system that would work as follows. In the first case, it would know personal preferences of the traveler and on their basis, while she is flying and preparing for the unexpected business meeting, would arrange accommodations in one of her preferred hotels, make a dinner reservation in one of her favorite restaurants, and negotiate a “special appetizer promotion” (knowing that she loves the shrimp cocktail that is offered there). Upon her arrival in San Diego, results would be displayed on her personal digital assistant (PDA) (or a smart cell phone) and she could go directly to the taxi or to her preferred car rental company. In the second case, the travel support system would act as an interactive advisor—mimicking the work of a travel agent—and would help select a travel destination by removing from considerations locations and accommodations that do not fit the user profile and personalizing content delivery further—by prioritizing information to be displayed and delivering one that would be predicted to be most pertinent first. Both these scenarios would represent an ideal way in which e-business should be conducted.

The aim of this chapter is to propose a system that, when mature, should be able to support the needs of travelers in exactly the previously described way. We will also argue that, and illustrate how, Semantic Web technologies combined with

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