Chapter 9

A Semantic Web Service Based Middleware for the Tourism Industry

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ABSTRACT

Currently in the travel domain, most of the travel products are sold through global distribution systems (GDSs). Since only major airline companies or hotel chains can afford to join GDSs, it is difficult for small and medium enterprises to market their travel products. In this chapter, we describe a middleware, called SATINE, to address this problem. In the SATINE middleware, existing travel applications are wrapped as Web services. Web services, as such, is of limited use because the service consumer must know all the details of the Web service like the functionality of the Web service (what it does) and the DOI: 10.4018/978-1-60566-804-8.ch009
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INTRODUCTION

The tourism industry today is the second largest economic sector, after manufacturing in the world. Tourism industry embarked on e-Business earlier than in other sectors as evident in several online travel e-Commerce sites.

Currently, travel information services are dominantly provided by Global Distribution Systems (GDSs) such as Galileo (Galileo, 2007), Sabre (Sabre, 2005) and Amadeus (Amadeus, 2007). Major airline companies, many hotel chains and car rental companies list their inventories with major GDSs. A GDS gives its subscribers pricing and availability information for multiple travel products such as flights, hotel rooms and car rentals. Travel agents, corporate travel departments, and even Internet travel services, subscribe to one or more GDSs. However, small and medium sized enterprises cannot participate to GDS-based e-Business activities since selling their products through GDSs is too expensive for them. Furthermore, GDSs are legacy systems that mostly rely on private networks. They are mainly for human use and have limited search capabilities, and are difficult to inter-operate with other systems and data sources.

In order to facilitate eBusiness, the travel industry has formed a consortium called the Open Travel Alliance (OTA) (OTA, 2005), and OTA has produced XML schemas of message specifications to be exchanged between the trading partners, including availability checking, booking, rental, reservation, query services, and insurance. However, not all travel applications can be expected to produce and consume OTA compliant messages.

In this paper, we describe a middleware to facilitate eBusiness for all the involved parties in the travel domain which has been implemented within the scope of the SATINE Project (Satine, 2007). The main idea is to expose existing travel applications as Web services and facilitate the discovery of and execution of Web services through semantic mediation and peer-to-peer (P2P) networks. The use of P2P technology facilitates the discovery of the services of small and medium size enterprises (SMEs) to enable them to easily sell their services over the Internet. Web service technology together with travel domain specific ontologies allow the parties consume heterogeneous messages.

content and the structure of input and output messages. Therefore, we annotate both the service functionality and the service messages with Web ontology language (OWL) ontologies. Service functionality ontology is obtained from the “Open Travel Alliance (OTA)” specifications. Service message ontologies are automatically generated from the XML schema definitions of the messages. These local message ontologies are mapped into one or more global message ontologies through an ontology mapping tool developed, called OWLmt. The mapping definitions thus obtained are used to automatically map heterogeneous message instances used by the Web service provider and the consumer using a global ontology as a common denominator. This architecture is complemented by a peer-to-peer network which uses the introduced semantics for the discovery of Web services. Through the SATINE middleware, the travel parties can expose their existing applications as semantic Web services either to their Web site or to Web service registries they maintain. SATINE middleware facilitates the discovery and execution of these services seamlessly to the user.