Web Service Composition for Tourism Information

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INTRODUCTION

Tourism is one of the important industry which gives lots of incomes in many countries including Thailand. One of the methods to supports tourists to travel in the country is the tourism information that are available on the Internet. In Thailand, the information is scattered around in many websites including the travel agency, the government organizations etc. Tourists need to determine the places to visit in the area, direction to interesting places, the places to stay, where to eat, travel methods etc. They need to search to many places to gather these information before the travel date.

Web service is one of the application or program that provides public services to other Web applications. The service providers would like to give certain information to the Web application without going through their databases and not knowing the real location of the service hosting. This represents as a form of application program interfaces. Examples of the service provides are Crude Oil Price (CrudeOilPrice, 2012) which provides the real-time gas price, XE (Currency Converter Widget, 2012). which provides the currency exchange rate, PayPal (www.paypal.com), which provides the connection to the credit card etc. Web applications can connect to these services according to their purposes. In the tourism application, a user may need to hotel information, the airline information, the car rental information, at the same time. He needs to contact the service agencies in these categories. Also, there are many travel service agencies such as Agoda (Agoda,

2012) Expedia (Expedia.co.th, 2012), etc. The user needs to examine the results returned from these agencies to select the appropriate results.

In this paper, we address the Web service composition techniques to integrate the Web service calls and use the Quality of Service (QoS) to help rank the results of the user query.

BACKGROUNDS

There are many works that explained about Web service composition. Bentallah and Sheng mentioned that the environments for Web services should contain SOAP, WSDL, UDDI based on BPEL4WS, Web Service Choreography (WSCI), WS-Coordination, WS-Transaction and layer functionality etc. (Benatallah, & Sheng, 2003) These need to correspond to the composition and transaction. Srivastava and Koehler addressed the use of Web service composition and the semantic Web service composition (Srivastava B., & Koehler J., 2003). He did not address the issue on the QoS . Chaari Bardr and Biennier proposed the service searching and the composition of the services using QoS (Chaari, Bardr, & Biennier, 2008). They used WS- policy the specify the attributes of services based on XML. Liu , Ngu, and Zeng developed the QoS register to store in the database and rank the services by the quality from best to worst (Liu, Ngu, & Zeng, 2004). The broker is the one who searches for the services where the criteria is cost and quality of service. In a typical travel agency, services that are needed to compose are the bus/

airline reservation, hotel reservation, credit card services for the payment etc. The services needed to be composed and ranked based on the criteria.

Foster, Uchitel, Magee, and Kramer presented the verification approach for Web service composition(Foster, Uchitel, Magee, & Kramer, 2003). Oh, Lee, and Kumara proposed a Web service composition approach for large scale networks Kumara (Oh, Lee, Kumara, 2008). Zeng, Benatallah, Ngu, Dumas, Kalagnanam, Chang proposed a middleware for Web service composition considering QoS (Zeng, Benatallah, Ngu, Dumas, Kalagnanam, & Chang, 2004). The composite services are selected based on the optimization goal. Zhao and Gu used a theory of Situation Calculus and Norms on the semantic Web service composition (Zhao, & Gu, 2010). Bilbao and Herrero presented a platform and tool which combine the Web services and semantic Web for tourism domain. The tool integrates the composition of Web services for Web 2.0 (Bilbao, & Herrero, 2009). Wang, Liao, Yang, and Tan presents a prototype of question answering system for tourism packaging using SHOP2 planner. Their case study uses ontology Ontology via OWL-S and PROLOG for implementation (Wang, Liao, Yang, & Tan, 2013).

One of the famous middleware for the tourism Web service composition is called (Dogac, Kabak, Laleci, Sinir, Yildiz, Kirbas, 2004). With the middleware the existing travel applications are wrapped as a Web service. The exchanges of service messages are by the standards such as OTA (Open Travel Alliance, 2012). When the application does not use the standard, SATINE can still communicate through the semantic notion. The service functionality semantic allows the service to be discovered using the semantics. The service registry enables the searching of related services. Even though the services are not registered, SATINE enables peer-to-peer network and allows the services to be discovered through the peer-to-peer network.

Web Service Composition

It provides an open, standards-based approach for connecting Web services together to create higher-level business processes. Standards are designed to reduce the complexity required to compose Web services, hence reducing time and costs, and increase overall efficiency in businesses and system integration. To compose them together, there are two styles: static composition and dynamic composition. In static composition, the service providers are fixed for each type of requests. This is easy to implement. It is good where there are not many services provider and good for B2B model. However, the services are selected beforehand and cannot be changed. For dynamic composition, the search for services can be done automatically. This has advantages since the search engine can be customized to the users and environments such as mobile devices. However, the implementation may be complex and can lead to the wrong integration. Many styles of compositions are such as using workflow, using rule base, using semantic search engine as in (Rao, & Su, 2004). Jaeger, Rojec-Goldmann, and M¨uhl proposed the composition (Jaeger, Rojec-Goldmann, & M¨uhl, 2005; Jaeger, Rojec-Goldmann, & M¨uhl, 2004). There are 7 styles of compositions in Figure 1.

In their work, the composition is based on the rules. The user request is analyzed into the condition and then the conditions are used together with the association rules for each service domain to filter the service relation according the user request.

Quality of Service (QoS) Consideration

Quality of Service is a collection of aspects which define requirements about the network transmission that should be met. The concept was previously used in the network field to deliver the data in real-time. Nowadays, QoS is used in many other area. To apply in the Web service, criteria needs to

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