

COMPOSITE WEB SERVICES TO SUPPORT TRAVEL INFORMATION SEARCHING

Koo Lee Chun¹, Liew Pui Fong², and Norliza Katuk³

¹Universiti Utara Malaysia (UUM), Malaysia, leechunkoo@yahoo.com

²Universiti Utara Malaysia (UUM), Malaysia, pfong.liew@gmail.com

³Universiti Utara Malaysia (UUM), Malaysia, k.norliza@uum.edu.my

ABSTRACT. This paper explains our preliminary study on a composite web services model for travel-based websites. The aim of the model is to provide a generic design for incorporating travel information in websites to assist travellers in searching relevant information over the Internet. The preliminary study explores generic features of travel-based websites as well as additional information that travellers always looking for such as currency and weather information, and local map. The approach that we used in this model is to merge difference web services into a single service that can be embedded in travel-based websites. We developed a prototype named QUICK Travel Assistant to demonstrate the model.

Keywords: composite web services, web services, country information, travel information extraction, web information searching

INTRODUCTION

The advancement in information technology has encouraged many travel agencies to utilize World Wide Web as a channel for disseminating information to travellers. Many tourism agencies developed websites to allow users searching and purchasing tickets and accommodations over the Internet. They also developed websites for the purpose of providing particular countries' information through the Internet. However, most of these websites are intended to provide information about their respective countries; therefore, travellers need to visit many websites to obtain information on different countries. The profit-oriented websites such as Expedia, Travelocity and Orbitz only focus on information pertaining flights and accommodations. Other basic information such as currency, whether, and local map are not included. Hence, travellers often visit many different websites to get this information which is time consuming.

In order to assist travellers, travel websites should incorporate such information to enable the users to easily seek for information about different countries from a single website. This paper explains a preliminary study to help travellers to obtain basic information about countries around the world from a website. This is mainly achieved through a composite web services (CWS) model that combines a few web services (WS) for travel-based websites. The WS provide information on interactive map, weather forecast, currency exchange rate and international direct dialling (IDD) code. The CWS model was demonstrated in a website known as QUICK Travel Assistant. The remaining of this paper describes the CWS model and QUICK Travel Assistant.

THE COMPOSITE WEB SERVICES MODEL

The Internet plays an important role in the development of businesses related to tourism. This has been proven by many past studies which had reported the importance of the Internet as a sales channel for the travel industry (Laesser, Engeler, & Bieger, 2008). The Internet has also been the cheapest and a quick source for information when it comes to travelling. Other sources such as travel guide book is expensive and very time-consuming to search for the required information (Ishino, Nanba, & Takezawa, 2011; Nanba et al., 2009). More than just a source of information, travellers also use the Internet to search and book flights and accommodations, as well as performing other travel-related transactions online.

Various web-based applications have been developed to assist travellers at various stage of travelling which made the process easier. These web-based applications comprises of either e-commerce applications or information portals. Some examples of well-known web-based applications in this field are Expedia (Law & Chen, 2001), Travelocity (Law & Tong, 2001; Smith et al., 2007), and Orbitz (Law, 2002). They are mainly for searching and purchasing flights and accommodations online as stated in Table 1. The table demonstrates our initial analysis on the services provided by these three websites.

Table 1. Services offered by Expedia, Orbitz, and Travelocity

Travel Information		Expedia	Orbitz	Travelocity
Generic travel information	Flights	√	√	√
	Accommodations	√	√	√
	Transportation	√	√	√
	Holiday packages	√	√	√
	Travel insurance	√	X	X
Supplementary travel information	Currency information	X	X	X
	Whether information	X	X	X
	Local map	X	X	X
	IDD Information	X	X	X

Despite the flights and accommodation information searching, travellers also require other information regarding on the places they will visit. We conducted an informal and unstructured interview with five frequent travellers to identify other information that they require when they travel. From the interview, we found that supplementary information is also needed when it comes to travelling overseas. The travellers always searched for information on currency exchange, whether, map, and IDD information. Hence, we attempt to search the information from the three leading travel websites. As shown in Table 1, the supplementary information was not provided by the three websites.

As this information seems to be important for frequent travellers, it should be made available to them and can be easily accessed, perhaps from a single point of access. Hence, we acknowledge the role of WS in providing specific services that can be delivered through web applications. We investigated free-of-charged WS in designing our CWS model. The following paragraphs explain the basic concepts of WS and CWS model.

WS are application programming interfaces (API) that perform a collection of operations. It is a client-server application that allows different applications to communicate to each other

as well as share services and data among themselves (Gunzer & Engineer, 2002). The communication between the applications is carried out by Extensible Markup Language (XML) and Internet protocol. The simplest web service consists of two participants: a service provider and a service consumer as shown in Figure 1(a). The service provider offers a WS interface and implementation, while the service consumer requests and consumes the services. On the other hand, in a complex WS architecture, a registry serves as the broker of WS as illustrated in Figure 1(b). The web service providers define and publish a service description to the web service registry. The web service consumers search and retrieve the service description, then use the service description to bind with the web service providers to invoke the implementation of WS (Gunzer & Engineer, 2002).

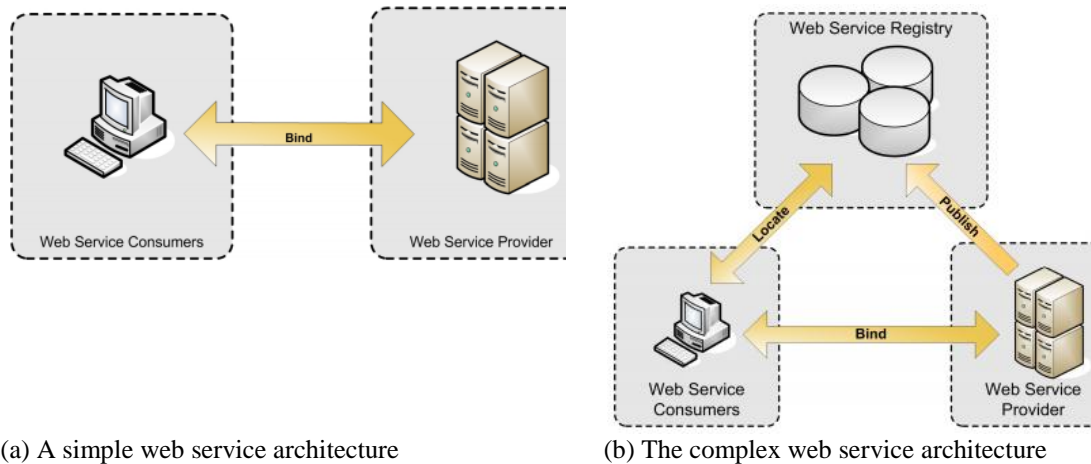


Figure 1. The concept of WS

The 3 fundamental components used in WS communication are as follows:

- Simple Object Access Protocol (SOAP), a communication protocol for XML web service and the format for sending messages. Before the WS request and response messages send over the network, the information in the messages will be encoded into SOAP format (Kreger, 2001).
- Web Service Description Language (WSDL), an XML formatted language for describing WS. WSDL documents act as the contract between the web service consumers and web service providers. A WSDL file enables web service consumers to learn about the type of operations offered by the WS, the format for sending the message to the WS and the location of the WS (Cavanaugh, 2006).
- Universal Description, Discovery and Integration (UDDI), a specification for generating an XML-based registry that provides a searchable directory for WS (Gunzer & Engineer, 2002). Web service consumers can query a WSDL file from the UDDI registry in order to find the WS they wish to utilize.

Apart from SOAP, JavaScript Object Notation (JSON) is a common data interchange format used in WS which is an extension to the JavaScript that is used to represent objects. This format is often applied for serializing and transmitting structured data between a server and web applications (Wikipedia, 2013). Unlike XML web service, JSON supports lightweight data transmission and it enables the WS to be invoked by a standalone URL parameter. Furthermore, the data interchange format of JSON is human readable and writable, and easy for a computer to create and parse (Peng, Cao, & Xu, 2011). Data can be converted to JSON format by using a server-side script that serves as a proxy to external WS (JSON, n.d.).

In CWS model, we attempt to combine a few WS to support searching of supplementary travel information. These WS can be incorporated in travel-related websites so that users can search all the information from a single site. We use free-of-charge WS where developers can use them at no cost.

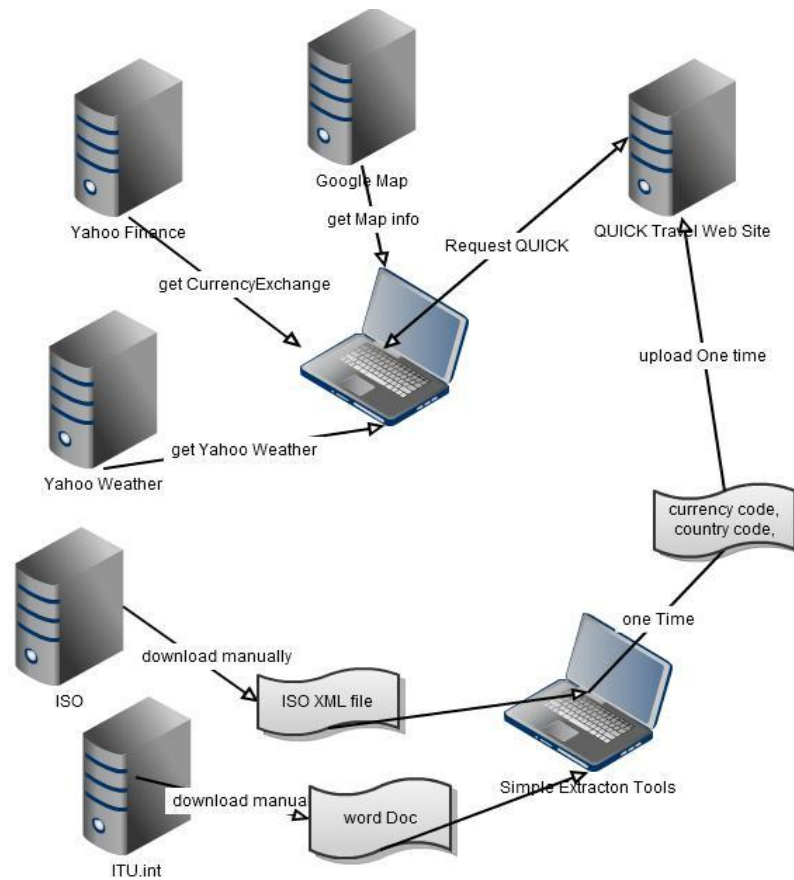


Figure 2. The CWS model

In CWS model, information is extracted from five different WS and a data source including Yahoo!Finance, Yahoo!Weather, Google Maps, International Standard Organisation (ISO) and International Telecommunication Union - Telecommunication (ITU-T). It communicates via Yahoo Query Language (YQL) to obtain currency exchange rate and weather forecast from Yahoo!Finance and Yahoo!Weather respectively. It also integrates Google Map capability via Google Map API to enable travellers to get location map up to street level. Information such as IDD code, currency information (currency name and currency symbol) is obtained from International Standard Organisation (ISO) and International Telecommunication Union - Telecommunication (ITU-T). Most of the information is extracted through WS, except for the IDD and currency codes. Figure 2 visualizes the two main components that are (1) simple extraction tools that extract the country IDD and currency codes, and (2) WS that provide information on maps, currency exchange rate and weather as the major components of CWS model.

- i. Country information service. This service provides information on IDD code, currency name, and currency code that are based on ICU-T E.164 and ISO 4127 standards from ITU (ITU, 2001) and ISO (ISO, 2013) respectively. An offline simple data extraction tool was developed to generate a list of country information in JavaScript array. This array is embedded into a JavaScript file and the script is further enhanced to provide a function to obtain country information in the application. YQL Open Data Table was employed to

extract information from Yahoo!Exchange for a real time currency exchange rate. YQL is SQL-like language provided by Yahoo! That enables developers to query and join information from many WS (Tsai, Chen, Huang, & Hu, 2011).

- ii. Google maps service. The Google mapping service allows users to zoom in the map up to street level. This capability was integrated into this application via the use of Google maps web service. It allows interactive maps to be embedded in a website.
- iii. Weather forecast service. Weather information is extracted from weather.forecast. Since weather.forecast only allows weather information based on location ID, for example, UKXX001 is for UK, therefore other web service, weather.search is required to locate the location ID based on the location description entered by users.

QUICK TRAVEL ASSISTANT

QUICK Travel Assistant is a website that intends to provide information on a particular country of users' choice. Commonly, users have to use search engines such as Google and Yahoo! to get information on a particular country especially on its currency, IDD code, maps and weather. The search engines will display the relevant results and users have to browse a number of website to obtain the information. QUICK Travel Assistant aims to help users by reducing their time and effort taken to search and browse basic information when they want to travel local or abroad. Through a simple application, travellers can get specific information about cities or countries around the world very quickly. QUICK Travel Assistant is available on the Internet for free and users are not required to subscribe to our service. This section explains the design, programming environment and deployment, architecture and user interfaces of QUICK Travel Assistant. The website composed of three main functions. Travellers can:

- i. View information on a particular country. This function provides travellers with country's information such as IDD code, currency name, currency code and the latest currency exchange rate.
- ii. Get a map. QUICK Travel Assistant is embedded with Google web mapping service that allows travellers to view maps of the selected country and city or browse a specific address and building name. This mapping service provides zooming capability to enable travellers to have a closer look for the location.
- iii. Check destination weather. In this function, travellers can obtain real time weather forecast information by entering a country name or a city. The information includes weather condition, temperature, wind velocity and humidity.

QUICK Travel Assistant was developed using Microsoft Visual Web Developer Express 2008 as its IDE. The application runs on .NET platform and written in C# language. Adobe Photoshop CS5 was used as the graphic editing tool. A web server with minimum of 4GB RAM and 10GB of disk space is required to host the application. The web server runs on Windows 2000 Server and ASP.NET 2.0. The application can be accessed via this Internet address <http://socresearch.net/koo5014/>.

The code for user interface is stored in the hosting server and users are required to download the code and execute it in the client through a web browser. They are implemented in several markup and scripting language such as Hypertext Markup Language (HTML), Cascading Styling Sheet (CSS) and JavaScript. Figure 3 shows one of the user interface screenshot.

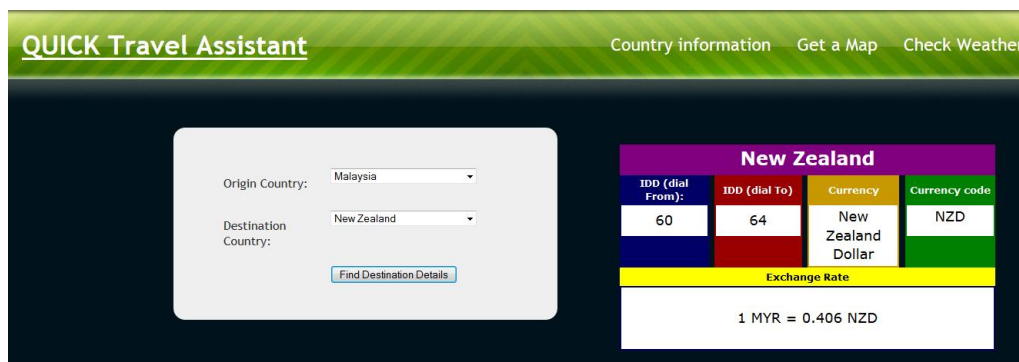


Figure 3. The screenshot of a service in QUICK Travel Assistant

CONCLUSION AND FUTURE WORKS

In this paper, we discussed the CWS model that can be used by web developers so that they can embed the model into their travel-based websites. The model combines a few WS into a single platform that provides supplementary travel information to travellers. The information includes IDD code, currency exchange rate, maps and weather of any country around the world. The model is demonstrated in a website called QUICK Travel Assistant. This website aims to reduce the time that users spend for searching such information from different sources in the Internet. In future, we aim to develop a wrapper that can hide the complexity of multiple WS. We also plan to redesign and run the application on mobile devices to benefit mobile users as well. Travellers with mobile devices will also be able to access the application from anywhere.

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