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Architecture Model for Flight Booking System Based on Web Services

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***Abstract*— Recently, Web services considered to be a new and important approach in the distributing of services/applications. Web services can be defined as internet-based applications achieving a specific job or a set of jobs that can be merged with other Web services to preserve workflow or business dealings. The architecture of web services is collections of conceptual components in which common sets of standard can be defined among interoperating components, working on diversity frameworks and platforms. The Web services reference architecture is revolved around three components: Service provider, Service registry and Service requester, each of these components has its own role in the architecture of web services. Therefore, this paper aims to propose an architecture model for flight booking system depend on Web services, it can serve as a guideline for online flight booking application for end users to book flight tickets. It can be concluded that this model generally has a moderate strength and is seen as a practical guide for researchers.**

Keywords*— Web Services, Flight Booking System, SOAP, Glassfish server, Apache web server.

I. INTRODUCTION

Recently, Web services considered to be a new and important approach in the distributing of services/applications integration over the Internet. Since the Web Services number is rapidly increased, and it will be expected to do so for the next decade, so, there will be a need for classifying and/or categorizing web services [1]. The web services development and wide spread make them convenient for data distribution and storage around the world. As these web services are new service-oriented computing pattern which poses the distinctive security challenges because of its inherent heterogeneity, highly dynamic nature and multi-domain characteristic [2,3]. Since web services considered being an emanating technology, it's still in improvement and development process. Its major task is to make application and computer system shared and interconnected service. As the main standards of stability and maturity, web services application are prevalent, mainly in the enterprises integration has been stabilization increasing numbers of organizations, company and unit began to make use of web services [3].

Flight booking system is an online system for end users to book airline / flight tickets using web services on flight booking system interface, the information for the airline availability and pricing. End user can select the flight and proceed for the booking. Providing an interface for a web service allow its operation to be combined with those of other service to providing the new functionality, the communications protocol that use by web services and their clients is SOAP (Simple Object Access Protocol). It can be used to transmitting the requesting messages and their replies among server and client. Hence the architecture model for Flight booking system will be help the developer and owner to improve business functions of the enterprise.

II. WEB SERVICES

Web services can be defined as internet-based applications achieving a specific job or a set of jobs, that can be merged with other Web services to preserve work flow or business dealings [4]. The main purpose of web service technologies is to allow applications on different platforms to exchange business data [5]. It providing service interface enabling client to interact with servers in a more general way than web browsers do [6]. It is used to build a distributed software applications, services are the building blocks which they are software units that built upon a collection of information and communication standards. One of these standards is the Web Services Description Language (WSDL) which is defined as an XML-based language to describe service descriptions. A service provider defines the (WSDL) document, and service consumers used this document to discover service ability and set interaction between the Web services and consumer-side applications [7].

Web Services consider being the essential element of the service-oriented architectures (SOA) and the main characteristic in managing the integration of the enterprise application. Web services are also a type of commercial commodity can be provided through the Internet with a significant feature that combining them in functional workflow satisfying the user's needed to resolve their serious problem [8]. Web services that carry out useful task would often show the following characteristics:

(1) Discoverable: Providing services to other users are one of the significant requirements for the web-service.
Therefore, it has to be accessed and discover by customers (human user or may be other Web services).

(2) Conversational: A conversation is a process that encompasses both send and receives document in context. The complex interaction is involved among Web services and necessary multiple step for the communications that are regards to each other.

(3) Communicable: This is often asynchronous message property which it opposed to the synchronous message. Manageable and Secure: manageability, Security, fault tolerance and availability, are significant for a commercial web-service [9].

III. Web Services Architecture

The architecture of web service is collection of conceptual components in which a common set of standard can be defined among interoperating components, working on diversity frameworks and platform. The definitions of W3C for the Web services architecture comprise a note that the implementation or the combination of these services for providing more complex compositions has no restriction. The Web services reference architecture is revolved around three components [10,11]:

(1) Service provider: application's manager that working on the servers and the software modules is included and can be accessed by the Web client through the SOAP protocol,

(2) Service registry: index of services that service provider publish them, conducted on a server level application,

(3) Service requester: client application's manager that links to the services and calls its function through the XML message interchanged by the (SOAP) protocol,

SOAP is design to enable each of the client-server and the asynchronous communication across the Internet. It define the scheme for using XML to representing the content of request - reply message also scheme for the communication of documents. SOAP and XML processor are available for widely use the program language and operating system. This allows to web service and their client to publish almost everywhere [6].

The applications or components similar to Web services are run by the service provider which it a server. The WSDL (Web services Description Language) describe their interface. The WSDL description of the services is published by the service provider that provide them to one or more directory service UDDI (Universal Description, Discovery and Integration) in order these services be known. It is possible to make this directory local to an application, to a corporate network or over the Internet. Therefore, when the user applies for services (i.e. the client) he/she uses an UDDI directory which has the knowledge, when the applicant needs to know which servers that provides a service to a particular description. The WSDL file of Web services are referred by the server to the user, since this file supposed to be corresponded to the request. This done by the user then the supplier pleases his choice and call the Web service, which it did not known by the user before [10].

IV. Architecture Model for Flight Booking System Description

Architecture Model for Flight booking system can serve as a guideline for online flight booking application for end users to book flight tickets using web services on flight booking system interface, the information for the airline availability and pricing. The processing of a booking takes a long time to complete and could well be supported by an asynchronous exchange of documents, starting with the details of the dates and destinations, followed by a return of status information from time to time and eventually the details of completion [6]. The following figure illustrates the main component and architecture model for flight booking system and how they interact with each other.

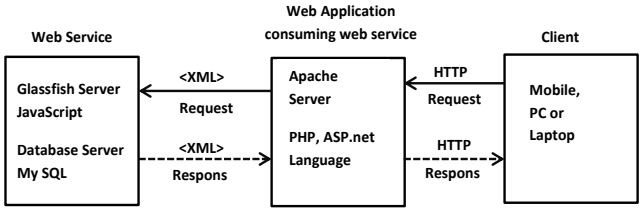

Fig. 1. *Flight booking System Architecture.*

Web Service

The web services was applied in our project as flight booking services that provide the functions of online booking to book a ticket and manipulation the information about passengers and return booking details.

The programming language which has been used to implement the web service concept is JavaScript and running these files on apache server Glassfish (open-source application server) is the reference implementation of JavaScript, this allows developers to create enterprise applications that are portable and scalable, and that integrate with legacy technologies. Optional components can also be installed for additional services. As a booking system network has a relatively large system, we can no longer use access and other small database, the most classic in apache and PHP MySql database, MySql is an upper-scale information systems, high speed, high load, databases, stability and security for booking system.

A. Web Application consuming web Service

The web application was designed to consuming the flight booking web services. It provides user interface to facilitate the using of system's functions.

The programming language which has been used to develop the website PHP, PHP is an open source

web scripting language that is widely used to build dynamic webpages. It running by Apache web server (HTTP server) installed on Windows 64-bit.

The web application starting to consume the web service using SOAP PHP library in PHP, a Windows web development environment, it allows to create web applications with Apache, PHP.

Client

The user can access to the system by using any browser such as Mozilla, Internet Explorer, etc. As well as it can be used from different platforms like Android, Microsoft Windows, Linux, MAC, etc.

Functions of The System

The flight booking system provides several functions and has many files such as WSDL files, JavaScript files, PHP files and user interface.

The system get passenger information such as name, address and passport no., in addition, the booking details like date of travel, city departure and city destination, then the system return flight ticket in details including departure date, arrival date, departure place and destination place with the total price of flight.

V. ISSUES IN WEB SERVICES

There are many issues related to web services and this is some of them:

A. Security

Large number of users can benefit from the technology of Web services which make the applications available through the internet. However, the successful deployment of this technology cannot avoid the security threats and breaches that can threat the Web services. So, strengthen the security of Web services is an important issues, which should be performed by research community. This can be done by improve the design and develop the processes, concepts and tools that help in protecting Web services from harmful users. Examples of these security traits in Web services can be the enforcement of the access control, user confirmation and data secrecy. To enforce the security of Web services, there are several standard languages have been suggested. he most ones than be considered successful are; the WS-Security, WS-XACML , and Security Assertion Markup Language (SAML) [12].

B. Availability

Business applications can be made available through the internet by using Web services technology. The degree of the readiness for the service to be used is measured by availability. Lower values for the availability represent the possibility of the service to be ready for use is low, while larger values mean there is a larger possibility. Several mechanisms are used to improve the web services' availability and ensure that a web service is highly available; these mechanisms are consisting of two broad categories:

1) *The first category concentrates on make the systems that providing the service as flexible as possible.*
2) *The second concentrates on the available features within the architecture of web service.*

Diversity of techniques currently used to make sure that the backend systems that responsible for providing the web service are available highly. They encompasses in the following categories:

B. Infrastructure availability

This concentrates on make sure that the underlying infrastructure necessary to sustain the web is made as available as possible.

C. Middleware availability

This concentrates on make sure that the stack of the middleware is highly available.

D. Application availability

This concentrates on make sure that the web service's application that is built on top of the middleware and infrastructure is as available as possible [12,14].

E. Usability

Currently, the usability studies of Web services are basically concern on personal computing and websites;

The usability of Web service can be divided into 7 categories, which include the following:

1) Content: involving content breadth and depth, related degree of the information, the use of multimedia and timeliness for the content.

2) Ease of use: involving organizational structure of the site, since it's easy to understand the structure of the navigation, the page-level will be clear. The prompt of the operation is convenient and clear, and contributed to the users' goals completion.

3) Interaction: The bidirectional transmission of information between the browsers and the Web, involving the feedback of the users in usability (Feedback) and the response of the sites to the questions of the users.

4) Personalized: the capability to meet the individual users' needs.

5) Fault tolerance: involving the recovery and prevention of error. Error message is warned before IS's releasing, as well as the effect caused by wrong operation is removed.

6) The guide of user: Can the document help the users and easy to find and use by them.

7) The factors and brand of the emotion: It is the outcome of the usability design' overall affect, but it can be considered significant factor of the SI's usability [6].

VI. CONCLUSION

Web services considered to be an important and convenient approach in the distributing of the services/applications integration over the internet. In spite of web services considered to be an emerging modern technology, is still in improving and developing process. Its major mission is to make computer and application systems shared and interconnected services. The web services applications are common, and the number of organizations, companies and units that benefit from web services began to increase rapidly. This paper presents the steps taken to propose an architecture model for flight booking system depend on Web services, it can serve as a guideline for online flight booking application for end users to book flight tickets.

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