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The Utilization of Web Services to Increase the Benefit of E-Business Activity: Case of Online Bookstore

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Abstract: In recent years, Web services have gained speedy development since it has gotten great support from many organizations and enterprises, which proposed and figured out lots of technologies and standards that related to Web services and vigorously promoted them in industry application. Therefore, many terms have been coined to represent the electronic concepts and applications such as e-Business and e-Commerce. This paper is conducted to look into Web services technology can be imported into the e-commercial system to help us design an online bookstore application. The objectives of the study is to modify the Web services to gives the best solution to these issues for its advantages including open standard protocols, high integration, loosely coupled and nice encapsulated. In accordance with a novel e-business application system structure, this study describes the dynamic online bookstore application based on Web services and shows its Web service interfaces and application scheme.

Key words: Internet, E-Business, Online bookstore, Web services.

INTRODUCTION

Nowadays, the e-Business concept is widely adopted by large organizations and gradually followed by small-to medium sized enterprises (Yeung *et al.,* 2003). The development of e-business has gone through three stages which become more and more complicated and mature. Above all, in the nineties of the past century, e-business made a considerable progress in the age of Internet boom. e-Business can be seen as a new way of conducting a business that has changed the traditional buying and selling process into an online-based process. It has also changed the way people perceive their Internet technology investment by focusing on new business models and concepts (Damanpour, 2001). Bateman (2000) states that, the emergence of technology especially the web-based technology has created a new trend in home-based working. Many studies have reported the benefits of implementing e-business strategies to organizations. Initially, the e-Business concept was introduced to address the issue of how the Internet technology can reshape an enterprise and provide competitive advantage. The internet-based tools can only be fully benefited with the right strategy.

In general, e-business will undergo a long term of development which can be composed of the following three durations:

1. Static e-business in which hyper text marking language short as HTML and pictures were dominant and later multimedia technology like flash began to be emerged.
2. Interactive e-business in which customers were able to intercommunicate with the web sites.
3. Dynamic e-business in which application systems are capable of automatically starts an e-business transaction; improve the working efficiency and lowering manual errors.

E-Business Overview:

The e-Business term was first introduced by IBM in 1997 as the transformation of key business processes through the use of Internet technologies. Therefore, e-Business is perceived as a secure, flexible and integrated approach to delivering the business values by combining the systems and processes. It also involves the buy-side and sell-side of e-commerce transactions as well as the effectiveness of servicing the customers, collaborating with business partners and conducting electronic transactions within an enterprise (Gottschalk, 2006; Chaffey and Wood, 2004). Based on the above discussion, this study defines e-Business as: "Business processes that are conducted using Internet technologies that help to improve the quality of services and values in terms of the way people work, collaborate, and communicate with their stakeholders and business partners. It also includes the changes in the company's structures, strategies, procedures and culture". The definition highlights that e-Business can be seen as a new way of handling business and business processes in which people do not have to be in a specific physical place to conduct the business.

However, the implementation of the e-Business concept requires major changes to the company's structure, strategy, procedure and culture. The increasing pace of business changes is often driven by technology and the development of the digital environment is creating a new landscape for companies. Information Technology (IT)

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plays an important role in redesigning the basics of business activities including customer service, internal operations, internal communications, International Journal of Cyber Society and Education.

In the late 1990's, there were many enterprises formed or converted into e-Commerce and a term 'dot.com bubble' was coined to describe this phenomenon. However, due to poor investment and business practices at that time the dot.com bubble 'burst' in 2001, (Samson, 2003) when many 'dot-com' enterprises vanished from the market (Samson, 2003; Pinker *et al.*, 2002). Among the many applications of IT in business activities, Internet-based e-business systems appear to be the most significant. Moreover the e-readiness towards the implementation of the e-Business concept is still at a very early stage such as the eBusiness infrastructure in terms of the Internet coverage, the accessibility of payment method, level of trust and security, etc.

Web Services Outline and its Key Technologies:

Web services as programmable application logic with web protocols, it provides an interface by which the outside applications are able to call it by specific API. Moreover, Web services are a set of criteria which defines the way of implementing interoperation among Web applications and developers can use any programming languages they prefer to create Web service program under any operating system platforms as long as they comply with the Web services related standards when querying and getting acces (I.G. Kim *et al.*, 2007).

The blue giant IBM define it as below: Web services are a new breed of Web application. They are self-contained, self-describing, modular applications that can be published, located, and invoked across the Web. Web services perform functions, which can be anything from simple requests to complicated business processes. W. Tan (2009) clarified that once Web service is deployed, other applications (and other Web services) can discover and invoke the deployed service. Using a group of business logic raised across the Web, Web services allow their e-business application function to be offered to the peer party in a public and consistent way. In addition, Web services are independent modularized and can be described, published, located and invoked.

Figure 1 show the hierarchical structure model of Web services, which includes three roles as service provider, service requestor and service broker and three operations like publish, search and bind.

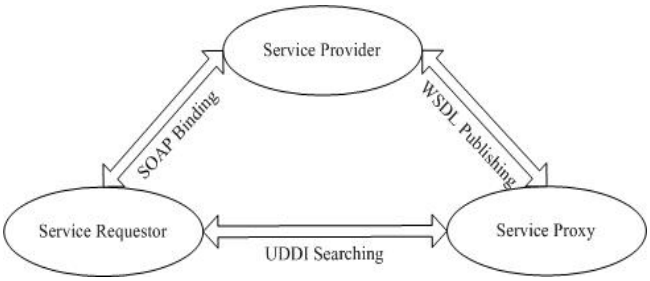

Fig. 1: Structure of Web Services.

In facts, Web services are composed of XML, SOAP, UDDI, WSDL and some other open standards and protocols in the Internet industry. Basically, the relationship is nothing but XML is used to describe data of service, SOAP message to access service, WSDL to interface description and UDDI to service registry and service publishing.

Web Services Registry and Search:

To registry the service, the client packages the service WSDL into SOAP message and sends to the registry node across HTTP protocol, and then HTTP server of the registry node determines and forwards the message to SOAP processor, and next the message is forwarded to UDDI registry server, finally the UDDI registry server puts the message into the type lists the message belongs to. When it comes to Web service search, the client end first sends a SOAP request to the registry node, after the HTTP server of the node receives the request and identifies it as a SOAP request, transmits it to the SOAP processor which sends back the service to the registry server that examines whether there is the requested service or not, if not, it returns error information, else SOAP processor encapsulates the service into SOAP message and sends to the client end through HTTP server.

Figure 2 shows the procedure of how the SOAP client carries out the service registry in UDDI registry node and searches WSDL of the needed service.

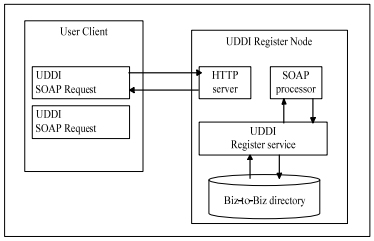

Fig. 2: Web Services Registry and Searching.

MATERIALS AND METHODS

In this study as the instance of the dynamic e-business system, an online bookstore system based on the Web services is implemented to show its advantages over the systems based on the object model.

This online bookstore system is used for the business trading between the book providers and book consumers. Web services as the fundamental integration units to implement the bookstore system, all of relevant services are published in the service registry center by enterprises, other enterprises needing these services are able to search and invoke these services after reaching agreements with the e-business operators.

The method prototype offers the basic functions of an online shopping system, summarizes these functions in the way of Web service into self-described, self-contained modules and makes these modules reusable components.

Other applications are able to establish connection with these Web services by the customized service interface to realize online sale application integration and dynamic e-business. Figure 3 displays the relationships among the service providers, the third party e-business platform and the customers.

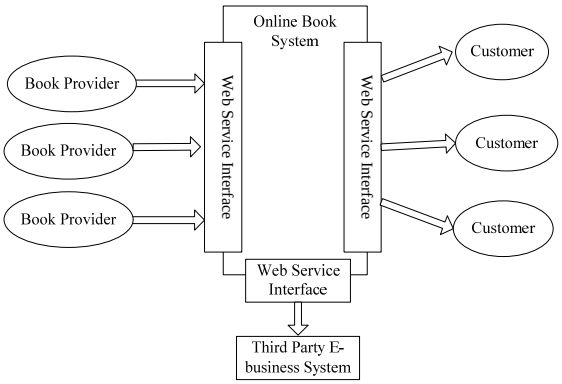

Fig. 3: The relationships among the service providers, the third party e-business platform and the customers.

The book providers get connections with the online bookstore system via the Web service interface. The internal structure of the provider's system does not need to be known by the online system, if the providers want to use the online bookstore system, they can call Web service directly.

The internal functions in the system also can be encapsulated into components by Web services. Among of these functions, some are offered to the customer and published to the UDDI registry center for third party integration. As a result of this, the third party e-business systems are able to conduct operation through the online bookstore system.

RESULTS AND DISCUSSIONS

It is a complex system which faces with how to aggregate the commodity sources from different providers and how to serve the consumers in the most convenient approach. In the meantime, it has to guarantee the security during the business process. Under these situations, the effective requirement analysis can give guarantee to the sales security and convenient services such as fundamental requirements of the online bookstore system and miscellaneous requirements.

The Impact of E-Business Strategy on Onlinebookstore:

The emergence of Internet technology and other ICT applications have created opportunities for small businesses in particular the online book store, to adopt the e-Business concept. Pratt (2002) states the small businesses such as the online bookstore have benefited from the new technology. In the past only large organizations can afford to have computers and other business equipment but it is now affordable and potential for the online book store. The demand from other stakeholders such as suppliers and customers also contribute to these changes and needs. Clegg and Tan (2007) claim that a micro sized enterprise needs to evolve the way it communicates with suppliers and customers as well as to come out with a well designed, well executed plan and strategies to face the challenges of e-Business.

However, the online bookstore's customer are moving forward with the technology and use the Internet as a platform to promote their products and services. Websites are developed to provide further information about the companies. At the same time most of them are registered with yahoo groups or mailing lists for promotion and building relationship with the future clients. But some are still applying the traditional method to keep the business via viral marketing or limit it to a certain area only. For instance, the Internet presence has caused major changes to their business strategy, marketingand other related business processes. However, the transformation is seemed to be in stages which give the online bookstore sufficient time to develop their knowledge and skills in the e-Business implementation.

Conclusion:

With the advancement of Internet technology, the conventional software industry has become service provider from software product producer. Web services as the drive promotes the development of this idea, which leads to the advent of e-commercial application. The dynamic e-commercial with the help of Internet and Web service technology has grown into the dominant application in the real practice.

This dissertation on the basis of the advancement of Web service and Internet technologies carries out the following studies:

1. Proposed a kind of dynamic e-business solution combining Web service and dynamic e-business conceptions and described in detail the e-business development trend.
2. Designed a Web service based e-business case the online book store system, by applying the object-oriented software development method, where the UML is used to create the use case model and activity diagram is used to describe the process.
3. Studied Web services related theories and technologies explored how to import Web services into the e-business application field and gave the solution of new e-business structure and Web service interfaces.
4. Implemented the major function of the online book store system by creating some necessary Web services, introduced the way of publishing, discovering and integrating these Web services.

The online book store system based on the Web services technology is implemented basically and function as a prototype system is provided with some preliminary e-business abilities. Therefore, it has to be improved further in the practical development.

This paper offers some insights into e-Business potential for the online bookstore and it is divided into six sections. Section 1 introduces this paper and Section 2 briefly reviews the concept of e-Business. The study on Web services and its key technologies is discussed in Section 3. the methodology used is described in Section 4. The findings of this research are discussed in Section 5 and Section 6 concludes the paper.

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