The implementation of restful web services into marketplace generator

Y Putra[1], A Hidayati[2]

Department of Informatics and Computer Engineering, PoliteknikNegeri Jakarta, Depok, Jawa Barat, Indonesia

anita.hidayati@tik.pnj.ac.id, yohankinata@gmail.com

Abstract. Along with the development of information technology in the field of sales, there are now many marketplaces as media for selling and buying certain products such as Bukalapak, Tokopedia, and Lazada. Marketplace's being a mediator in the process of buying and selling transactions. In which, the existence of a marketplace makes it easy for resellers and manufacturers to transact. Unfortunately, there is no marketplace that focuses on reseller systems. In designing, this generator marketplace uses website technology with the CodeIgniter framework by providing the RESTful web services. RESTful web service is a method of providing data needs that will be displayed through certain interfaces and provides faster data transfer speeds. The purpose of making this application is to implement general marketplace features to support student business fund activities in increasing product sales and ease of transactions. After going through the application testing phase, it can be concluded that the application has run well with a percentage of 92.74%. Marketplace generators help to solve the problems of business funds of PoliteknikNegeri Jakarta students in developing these activities. This application answers the needs of producers and resellers related to the business fund activity processes such as product management processes, search for producers of business fund products, marketing of business fund products, payment transaction processes, product sales transaction reports to marketing group settings by resellers including sales reporting results item.

Keywords—Marketplace Generator, CodeIgniter, Restful, Angular JS.

1. Introduction

Along with the development of information technology in the field of sales, there are now many marketplace, namely media to sell and buy products online, some marketplaces that have become references for buyers such as Bukalapak, Tokopedia, and Lazada. Most marketplaces choose to sell products that can be marketed widely, in addition to the products offered in the form of clothing, packaging, and electronic goods. Marketplace is being a mediator in the process of buying and selling transactions. So the existence of a marketplace makes it easy for resellers and manufacturers to transact. Unfortunately, there is no marketplace that focuses on snacks with a reseller system.

1

www.manaraa.com

Restful web service is a method of providing data needs that will be displayed through certain interfaces. Currently Restful web service has been widely used by some application development, especially on Back-end parts such as Youtube, Flickr, and Amazon. Restful web service provides benefits such as sending data that can be received by various platforms because it uses JSON format, uses HTML protocol in general and the data transfer speeds are faster than other methods. So this technology supports the creation of a marketplace generator in the provision of web services.

Marketplace generator is an application that implements marketplace features in general, so that it can be used by various institutions. In addition, the generator marketplace is developed for incidental sales activities. In designing, this generator marketplace uses a website platform with CodeIgniter framework as a backend part design with the implementation of Restful web service. While the application development method used is Rapid Application Development.

From the background can be drawn a problem that will be resolved in the thesis, namely identifying and providing features of the marketplace in general into the application marketplace generator on the back-end that is the provision of RESTful web service. The objectives of the system development are as follows:

a. Implementing general marketplace features into the generator marketplace to support student business fund activities in increasing product sales and ease of transactions.

b. Obtaining report on transaction income through response to web service, part of product sales using a marketplace generator that can be accessed periodically.

2. Literature Review

An application that will be made is a marketplace generator where research is needed related to the concept and implementation of the marketplace, so that three studies are obtained in the form of journals. [1] Discussing the basic concept, classification, and development of the marketplace. There are three main functions of a marketplace, namely bringing together sellers and buyers, providing facilities in transactions, and providing institutional infrastructure. Marketplace can be classified into nine types of marketplace, one of which is the classification of marketplace based on vertical/horizontal marketplace type of product/service. Marketplace is differentiated through the types of product/service provision, horizontally means optimizing supply and demand for companies that have collaborated with the marketplace. Whereas vertically means, the marketplace has the aim to optimizes the relationship between sellers and buyers in a specific industry. The future trend of the marketplace will be influenced by two factors: software development and algorithms and wider marketplace implementation and integration [2]. In this study, a vertical marketplace application is provided, which means that the usage of this generator marketplace is specifically for industries that are specific at certain times and places.Besides, the design uses a technology that is easy to implement, and it makes the generator marketplace can be integrated with a wider system.

Discussing the implementation of marketplace in several countries that use different technologies, the results tend to be the same, namely increasing state revenues[2]. Using case studies in the field of agriculture where the role of ICT is needed to support the small farmers such as providing good market facilities. In addition, the farmers are expected to see the stability of market prices and determine the market prices based on demand and supply. As well as the most important thing is to reduce spending on transaction costs through the third person including logistics and transportation costs. Marketplace must be able to ensure the condition of market prices and facilitate supply and demand between sellers and buyers. Marketplace must have features that are directly related to its main function, and can connect all application user stakeholders.

Whereas to support the creation of better applications, Restful Service technology is used, where using REST based architecture provides advantages such as scalability, simplicity, reusability, and good

performance. Restful technology uses HTTP and URIs to access the system in which each access requests can be restricted and allocated correctly. REST technology is resource-oriented, it means that every access to the system is not based on the service but based on data sent or displayed in XML or JSON format [3].

Understanding of an Online Market is any effort which is made to market a product or service through or using the Internet media or the www network, while the place itself in English dictionary means place. Here it can be concluded that the understanding of Online Market Place is a place or container for marketing products or services through or using Internet media.E-Marketplace is an internet-based online media (web based) place to conduct business activities and transaction 3 between buyers and sellers. Buyers can find suppliers as much as possible with the desired criteria, so as to obtain according to the market prices. As for suppliers/ sellers can find out companies that needs their products/services.

2.1. E-Marketplace is developed through four stages of evolution, the four stages of evolution are:

*2.1.1. Commodity Exchanges.*In this initial form, E-Marketplace is an arena in which various parties or entities have the main purpose of trading (buying and selling transactions). The most suitable product or service to be traded in this E-Marketplace is commodity.

2.1.2. Value-Added Services. The next development of E-Marketplace will lead to the formation of an arena in which the creation of new forms of offerings on a method of buying and selling thathave not yet happened in the conventional market (value added services). The main philosophy underlying this type of trade is a view that says that every consumer (or potential buyer) is unique, so they actually expect to obtain or can buy a specific product or service according to the needs or preferences of each individual.

2.1.3. Knowledge Networks. The next development of E-Marketplace is to go to a community based on knowledge.

2.1.4. Value Trust Networks. E-Marketplace is developed into a network that is the center of meeting various individuals, communities, institutions, companies, businesses, governments, countries, and other entities whose presence is an integral part of human life.

In making this application,the evolution of the latest marketplace, namely the existence of Value Trust Networks will be adopted. Integrate the marketplace generator with several trusted applications such as payment gateways and shipping prices.

2.2. The following is the results of a literature study through a review of several journals relating to the needs of making a marketplace generator:

2.2.1. E-Marketplace concept. E-marketplace has three main concepts, namely bringing together sellers and buyers, providing infrastructure that supports transaction, and facilitating the transaction process. In general, the marketplace is divided into several parts, one of which is a vertical marketplace where the transaction process focuses on specific products within the scope of supply and demand. In the future, the development of e-marketplace will be supported by a technology or software perspective and system integration [2]. In addition, according to [1] e-marketplace has three main functions, namely determining the supply and demand between sellers and buyers, providing facilities for exchanging information and payment services, and providing institutional infrastructure (regulation).

2.2.2. E-Marketplace features. E-marketplace has four users, namely admin, seller, buyer, and guest. Where each user has the same or different features, here is an explanation of each user's features:

a. The features in which the guest can do things as follows: Searching for goods, Viewing the list of items sold by various shops on the shop page and seeing the details of the items selected on the item detail page, Viewing the list of sellers selling at the marketplace, Contacting the admin through the contact form provided at contact page, Registering as a member of the seller or buyer.

b. The features that can be accessed by the members of the buyer are as follows: Editing profile on the manage profile page, Me-liking items and seeing history likes on the item history like page, Viewing seller members followed on seller's follow list page, Viewing item categories about what is followed on the category follow list page, Entering items into shopping carts and place orders. Orders that have been successful can be seen again on the purchase history page, Confirming payment made via transfer on the payment confirmation page, Requesting to become a member of the seller on the seller's request member page, Providing a review of the purchased and received items, file a complaint and return to a order.

c. The features that can be accessed by seller members are as follows: Editing the profile and storing description on the manage profile page, Me- liking items and viewing history likes in the history like page, Following fellow seller members and seeing the list that is followed on the seller's follow list page, Viewing the categories of items that are followed on the category follow-list page, Entering items into shopping carts and place orders. Orders that have been successfulcan be seen again on the purchase history page, Confirming payment made via transfer on the payment confirmation page, Providing review of items purchased and received, filing complaints and returning to an order, a notification page that informs new followers, and likes of goods sold, managing items sold on the goods manage page, managing orders received on the manage order page.

d. The features that can be accessed by the admin are as follows: managing admin on manage admin page, managing member buyer on page manage member buyer, managing member seller on page manage member seller, managing category on manage category page, managing items on the item manage page, Managing orders along with invoices on the manage order page, Managing item reviews on the Manage review page, Managing goods complaints on the Manage complaints page.

2.3. RESTful web service application design technology

Cloud Service is currently widely used by companies in business because the cloud offers many advantages such as Software as Service, Platform as Service, and Infrastructure as Service in which the companies are easy to build their infrastructure. Restful is currently widely used in cloud technology replacing SOAP, the REST comes from the word representational state transfer which represents all data on several objects. It's also retrieving the object data using the GET method, and changing the object via the POST, PUT, DELETE methods. The advantages of using REST technology such as light-weight, the results are easy to read, and easy to make services [4].According to [5], the RESTful web service is not a standard that is often used by several companies. REST is a web resource that contains hypertext, allowing the client to receive responses through a different format from the server. RESTful is the best practice that can be implemented for web service development through guidance in designing web services that supports the API and also improves web service consistency.

Restful provides web services that fulfill several important aspects such as No Versioning, Description of Resources, Identification Resources, Error Handling, Documentation of the Web API, Usage of Parameters, Interaction with Resources, and Support of MIME types. One of the problems with RESTful web service is the security concerns, because RESTful does not have its own security model. Security in RESTful web service must protect data confidentiality and integrity, so that every access to the web service must be identified through authentication. The RESTful supports several security models such as authentication via headers, basic authentication, claim based authentication, token based authentication and secure with SSL [6].

3. Development and Results

Marketplace Generator application design uses Rapid Application Development (RAD) software development methods because the applications that are developed require a relatively short time of 30-90 days and use several technologies that have already existed, namely the CodeIgniter framework with the implementation of RESTful web services.Marketplace generator application program is an application that is intended to create a marketplace that can be customized according to the desire of the admin marketplace generator. There are 5 different user roles in the generator marketplace system, namely: Admin, manufacturer, Reseller, Sales or Member of Marketing Group, and Guest.

Planning requirements are carried out by collecting data for application users especially for business fund producers and resellers at Jakarta State Polytechnic through questionnaires and interviews, in addition to conducting literature studies on features that are often used in general marketplaces. Questionnaires are made based on direct observation of the obstacles often faced by the resellers in general, thus the questionnaire is closed with questions that aim to ensure the opinion of each different student. The questionnaire consists of 13 attributes of questions that fall into three types, namely correspondent identification, opinions about danus, and knowledge about the marketplace.

The Data management of the questionnaire's results is divided into several stages, beginning with the identification of correspondents. Through 18 correspondents who filled out the questionnaire consisting of seven students and eleven students, then come from level one (second semester) numbered seven, level two (semester four) numbered eight, level three (semester six) numbered two, and level four (semester eight) numbered one. According to 94% of correspondents consider business funds as an effective way of finding funds for student activities.The next stage identifies constraints and shortcomings in business fund development activities. Ranking in the Table 1 is used to see the most frequently encountered problems based on the results of the questionnaire, the higher the ranking value (close to one), then the main problem in business fund development activities.

Table 1. Ranking of danus problems

No	Problems	Rank
1	Difficulty giving feedback related to danus products	5
2	Poor marketing and team management	4
3	Financial reporting of sales results	3
4	Lack of product variation	1
5	Communication difficulties with danus producers	2
6	More competitors than purchasing power	6
7	Difficulty getting a product sales market	7

Based on the results of collecting system requirements from interviews, questionnaires and literature studies, it can be concluded that the system consists of several modules as follows:

3.1. Installation module

The system must have an installation feature so that it can be applied to a variety of different institutions. In addition, the system can also be arranged through the Content Management System by the admin.

3.2. Manage user modules

Administrators can manage users of all application users including the validation process of the user's bank account. Through this module, the users can register themselves directly (via independent registers) or indirectly (via admin)

3.3. Product management module

This module is used for producers to manage products to be offered besides the system must make it easier for application users to categorize the products.

3.4. Transaction module

The application facilitates the purchase transaction process through the integration of MidTrans payments to facilitate the transaction process and reporting of ongoing transaction activities.

3.5. Management feedback module

All users can interact if they want to provide feedback in the form of suggestions or complaints about transactions that have occurred.

3.6. Marketing group management module

The application must facilitate resellers to create marketing groups to facilitate the sales process. In this module there is also a recording of the reporting of items sold by the reseller.

Marketplace Generator is an application used to create e-marketplaces for each particular institution. Adopting features from e-marketplace in general and in accordance with the main function of the marketplace in general, namely bringing together sellers and buyers, providing infrastructure in the transaction, and providing legality of the institution. This application is integrated with two other systems namely Midtrans and Raja Ongkir to support the transaction process. Stakeholders in this application are divided into five, namely admin, producer, reseller, member of reseller, guest.

Marketplace generator uses a framework that supports Object Oriented Programming (OOP) so that the data modeling process uses the Entity Relationship Diagram. ERD models are used to represent applications more fully and more accurately which contain several object oriented concepts such as inheritance.

To ensure application work properly, all function of application must be tested. The testing procedure based on Blackbox Testing method with some testing scenarios. There are no mistakes on this application and it has appropriated with user needs. In addition, based on the results of usability testing measure that reached 79.13% of the producer side and 69.33% of the reseller side, means the system has provided a good dependence for its users. Measurement of test results based on Guttman scale obtained the following results, of the total 85 questions there were 6 errors that occurred. So it can be concluded that the back-end system has run well with presentation $1 - (6/85) = 92.94\%$.

4. Conclusion

Marketplace Generator already implemented main concept of marketplace that match seller and buyer, provides infrastructure, and facilitating transaction process. After testing process known that application work properly and there are no error. It means the application gives good dependence to all users, and provides web service using RESTful technology helping for fast and powerful implementation to some platform. Marketplace generator also resolves business problems related to transaction process, finding good stuff, marketing the products, payment method, and good transaction report.Finally, this application

can be developed better in future with complete features such application wallet, development of customer relation management, and notification system.

References
[1]   Evans T and Katherine W, "Electronic Marketplaces as an Agricultural Value Chain Development," *Journal of Emerging Trends in Computing and Information Sciences,* 2014.
[2]   B. Movahedi, K. M. Lavassani and V. Kumar 2012 E-Marketplace Emergence: Evolution, Developments and Classification *Journal of Electronic Commerce in Organizations*pp 14–22
[3]   Michael A, Kostas K, Chris B2013 Considerations of Adapting Service-Offering Components to RESTful Architectures *IGI Global*
[4]   Ritesh S, ManishaK, Subhash C G 2014 Design & Development of a REST based Web Service Platform for Applications Integration on Cloud *IJISET - International Journal of Innovative Science, Engineering & Technology* **1** *Issue* 7
[5]   A. Dudhe and P. D. S.S. Sherekar2014 Performance Analysis of SOAP and RESTful Mobile Web Services in Cloud Environment *International Journal of Computer Applications*pp 1–4
[6]   M. I. Hussain and N. Dilber 2014 Restful web services security by using ASP.NET web API MVC based *Journal of Independent Studies and Research – Computing* **12** *Issue 1* pp 4–10