Building Titipmasa.id Application Using Iterative Incremental Method

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ABSTRACT

The development of technology is overgrowing. This will affect human life, especially in the online entrusted service business. An entrusted service is an activity carried out by someone who is travelling to a place and then opens an entrusted service for purchasing goods or sending goods. Currently, entrusted services are usually opened through social media such as Instagram. Unfortunately, the information on Instagram is limited because it is only known by those who follow the account. Based on these problems, it is necessary to build a web-based application to make it easier for everyone to perform entrusted services. This application can bring together people who will be travelling with people who are not travelling. Therefore, people who are not travelling can entrust items to people who are travelling. The method used for the development of this application is the iterative incremental method. The result is a website application called titipmasa.id has been created with flexible and user-friendly features to facilitate the process of entrusting goods. Furthermore, the effectiveness of the application is tested with the blackbox method using three tests, namely unit testing, performance testing, and browser testing. From unit testing, it was proven that all the features work well. Then with performance testing, titipmasa.id application server can receive 500 user requests simultaneously in 1 minute, and 800 users with an error risk of 12% and 1000 requests an error risk of 19.1%. Finally, based on browser testing, the application pages compatible to be accessed by the Chrome, Firefox, Internet Explorer, and Safari browsers with minimum versions are 37, 32, 11, and 13, respectively. Therefore, titipmasa.id application is suitable for carrying out goods entrusting services.

Keywords: Wep Application, Entrusted Service, Iterative Incremental, Blackbox, Travelling.

1. INTRODUCTION

The development of technology is growing rapidly, which certainly affects human life. One technology product that has become everyone's need is the internet. The Internet used to find and obtain information quickly and efficiently. In addition, the internet can also be used to order transportation, buy goods, to do business and work. According to the results of the survey [1], Statistical data shows, internet users in Indonesia in 2018 were 95.2 million, an increase of 13.3% from 2017, which was 84 million users. Then in the following year internet users in Indonesia will increase with an average increase of 10.2% in the period 2018 - 2023. In 2019 internet users in Indonesia increased by 12.6% compared to 2018, which amounted to 107.2 million users [2]. Based on Global Digital Report 2020 by Hootsuite per April 2020, active social media user in the world has reached to 3,81 billion users. In Indonesia, the active social media users per January 2020 are about 175.4 million internet users in Indonesia in January 2020 [3]. Based on the many Instagram users,

especially in Indonesia, this can be used by business people to run their business. Then, one of the businesses that can be run through Instagram is the online entrusted service business. An entrusted service is an activity carried out by someone who is travelling to a place and then opens an entrusted service for purchasing goods or sending goods. This entrusted service business does not require a lot of money, so everyone can do it. However, if the entrusting service uses Instagram the information provided is limited to existing followers, meaning that people who do not follow the account do not know the information about the entrusted service. Therefore, we need a platform that can connect people who are travelling (personal shopper) with non-travellers who want to buy goods and don't want to leave the house (requester). Titipmasa.id can be a solution as an application service to help solve these problems. Titipmasa.id is an application that connects who not travelling people with people travelling at home and abroad. Titipmasa.id is a website-based application; this is because web applications can be used on various devices such as smartphones, iPhones, and laptops

without having to install applications. The web application is also easy to integrate, easy to manage, maintain, and modify [4]. The method used in this research is iterative incremental. This method is used because user needs are always evolving and changing, so this method is suitable because the development system is gradual and iterative.

2. BASIC THEORY

2.1. Software Engineering

Software engineering is a discipline that follows the process of a procedure, device, and the method used to create computer software. IEEE also defines that, software engineering is an application that is systematic, disciplined, developing with a quantitative approach, operating, and maintaining software. Software engineering is a layered technology. Every software engineering approach must be committed to the organization to achieve quality. The software engineering process is the link between technology layers and enables the development of appropriate software [5].

2.2. Iterative Incremental Model

Iterative incremental model is a system development method that develops based on the waterfall model problem. This model combines elements of waterfall model in an iterative condition [6]. The stages of development in this method consist of four main stages [7].

1. The inception phase is the stage that focuses on the beginning of the research process, such as making a background, compiling business problems and identifying risks, defining the scope of research to understand the problem.
2. The elaboration phase is a phase that focuses on analysis and design, publishes the basis of the project architecture, makes construction plans that support research objectives.
3. The construction phase is the stage that focuses on developing software to produce a prototype.
4. The transition phase is the stage that focuses on the introduction of the product produced and testing the user.

2.3. Web Application

Web Application is an application that is accessed by using a web browser via the internet or intranet. Web application is also a computer software where all or part of the software is downloaded from the Web each time it is run. Web application is coded in a programming language that supports web-based software such as HTML, Java, JavaScript, Python, PHP, CSS, Ruby, and other programming languages [4].

The advantages of web application are [8]:

1. Multiple device development
2. More flexibility
3. Standards, consistency and predictability
4. development can be done repeatedly
5. Have a good code structure and architecture

2.4. Software Testing

Software Testing is the process of executing a program or system with the intention of finding or, involving any activity that aims to evaluate the attributes or capabilities of a program or system and determine that it meets the required results [8]. The software testing steps are divided into 4, among others [9]. Unit testing is a testing method where the programmer tests the unit program, whether it is feasible or not to be used.

- Integration testing, namely testing the integration of two or more application units.
- High-order test, namely testing of integrated unit processes.
- Validation test, namely software testing to ensure that the software meets functional requirements.

2.4.1. Blackbox Testing

Blackbox is a testing method where test data comes from specified functional requirements without regard to the final program structure, this test also called functional testing [10]. Because only the function of the software module is of concern, blackbox testing also refers to functional testing, the testing method emphasizes performing functions and checking input and output data [11]. Blackbox testing tries to find errors in several categories, including [7]:
- Functions that are not appropriate or non-exist
- Interface error
- Errors in data structures or database access
- Performance errors
- Error initialization and termination

This test is designed to answer the following questions [12]:
- How are functions tested to be valid?
- What kind of input can be used as a good test case material?
- Is the system sensitive to certain inputs?
- How can a set of data be isolated?

Methods or techniques for carrying out blackbox testing, among others [12]:
- Equivalence Partitioning.
- Boundary Value Analysis / Limit Testing.
- Comparison Testing.
- Sample Testing.
- Robustness Testing.

- Behavior Testing.
- Requirement Testing.
- Performance Testing.
- Endurance Testing.
- Cause-Effect Relationship Testing

3. RESEARCH METHOD

The method used in application development is iterative incremental. The method was chosen because this method can minimize compatibilities in the application. At each stage of development in this methodology, there are inputs and outputs. The output of the increment will be used as input for the next increment.
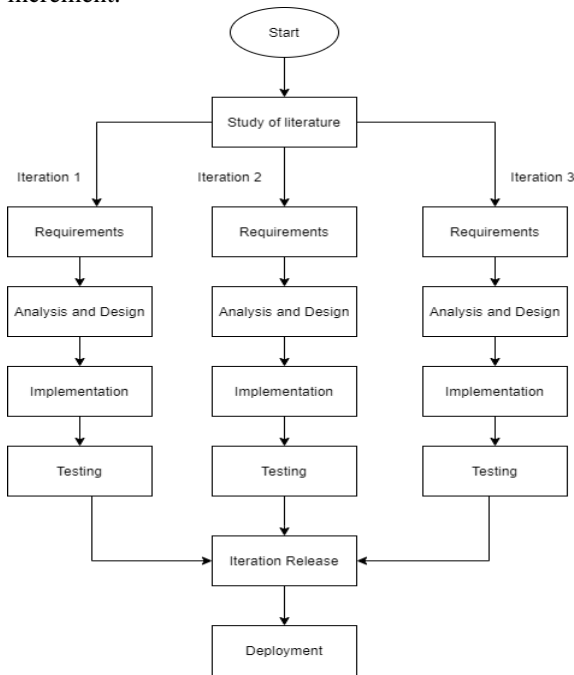

Figure 1. Research methodology

Table 1. Description of research activities

Phase	Activities	Output
Inception	Study of Literature	Background, Problems, and Research objectives
	Requirement	survey results document
Elaboration	Analysis and design	Use case diagram, Activity diagram, class diagram, sequence diagram, deployment diagram
Construction	Implementation	Program code
Transition	Testing	Application features have been tested
	Iteration Release	The application is ready to use
	Deployment	Applications installed on the server and can be used by the user

4. RESULTS AND DISCUSSION

4.1. Analysis and Design

4.1.1. System Functionality

The features available at titipmasa.id consist of several functions, such as account assistance, travel, shopping, delivery of goods, transactions, and admin. Account management features that are used to assist accounts in the application, including login, register, reset passwords and edit profiles. All data is managed with the appropriate features in the titipmasa.id system. The transaction feature is used to make payments, and admin feature is used for account verification, payment, and receipt of goods.

4.1.2. Data Design

The data design used in this study is the entity relationship diagram (ERD). The data for the titipmasa.id application consists of 5 entities, each of which has a different function, including storing user data, transactions, entrusted shopping, entrusting goods and admin. Then every entity in the application store corresponded data.

4.1.3. System Architecture

Figure 4 is a description of the system architecture used in the application titipmasa.id. The components used consist of client, web server, application server, and database server. The client functions as a user who will use the application titipmasa.id, Apache is used as webserver to store the titipmasa.id application. The application server uses PHP and MySQL as the database on the titipmasa.id application. The architecture starts from the client accessing the address of titipmasa.id through the browser and will be directed to the web server using the https protocol. The webserver will transfer data in the form of text, images and files to the client, and the data is taken from the database.
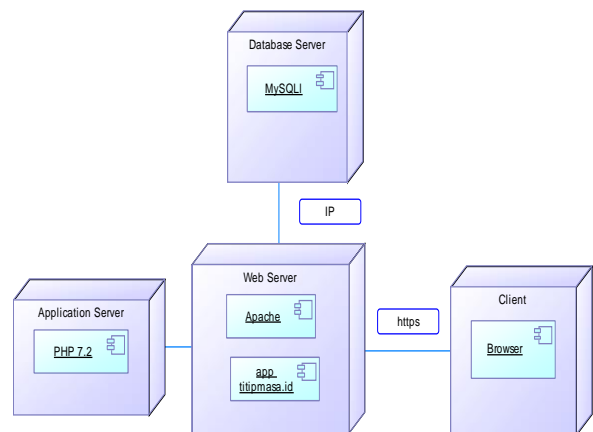

Figure 2. Deployment diagram

4.2. Application Implementation

4.2.1. Manage Account

Manage accounts are features that are used to register, log in, reset passwords, and edit accounts on the application.
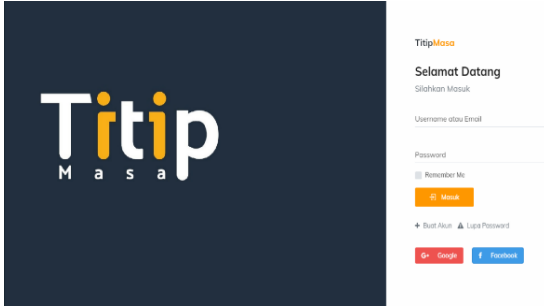

Figure 3. Login page

4.2.2. Manage Trips

The Manage Trip feature is used to create travel information to be carried out. Figure 4 is a display page to create trip information that contains a form. This form consists of several columns, namely the city of origin, the city of destination, the city of origin, the destination of origin, the description of the trip, and the date of departure, this column must be filled in completely, if one is not filled in, the data will not be stored in the application.
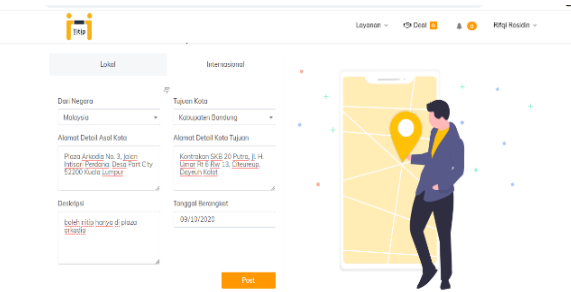

Figure 4. Trip page

4.2.3. Manage Entrust Shopping

Entrust Shopping feature is a feature used to make a purchase request for goods. Figure 5 is a page for shopping. This page contains a form that consists of several columns, name of products, category of products, price of products, the number of goods, service fee, pictures of goods, and descriptions. For data to be stored in an application, this form must be filled in completely.
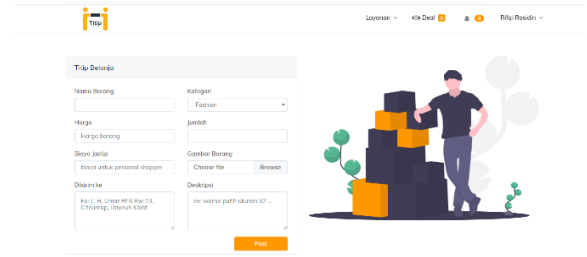

Figure 5. Entrust shopping page

4.2.4. Manage the Delivery of Goods

The item delivery service is a feature that is used to make an item delivery request to be delivered to the destination. This page contains a form that consists of the column name of goods, category of goods, the number of goods, weight of goods, service fee, pictures of goods, and descriptions. This form must be filled to be saved into the application.
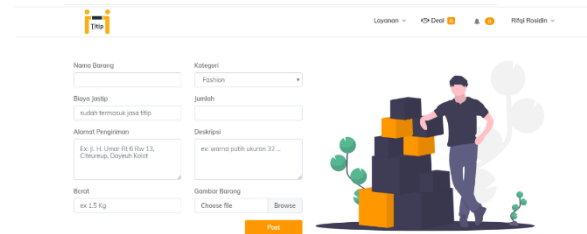

Figure 6. The page manages to deliver goods

4.2.5. Manage Transactions

This transaction feature is used to make payment transactions between the person in charge (requester) and the person who bought the goods (personal shopper). This feature contains a form consisting of name, amount of money, and proof of payment in the form of an image file.
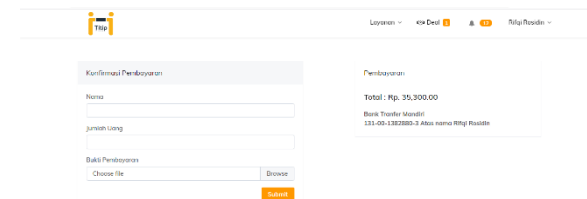

Figure 7. Transaction Page

4.2.6. Manage admins

The admin management feature is used to verify payments, accounts, and receipts. Payment verification serves to ensure that the payment receipt sent is appropriate. Then the account verification function is to ensure that the account matches the

identity of the ID card. Furthermore, verifying receipt of goods ensures that the item has been received by the person who entrusted (requester).
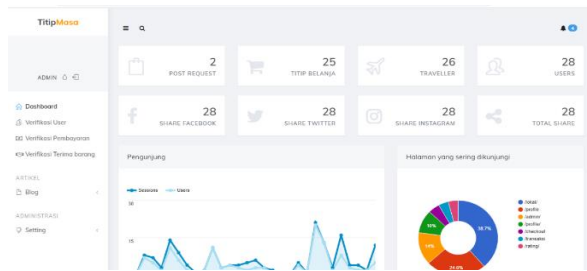
Figure 8. Admin page

4.3. Application Testing

4.3.1. Unit testing

Unit testing is a test that is used to ensure the functionality of each application feature runs well. This testing process will do some input data into the application, and the results issued must be in accordance with those designed. Based on the unit testing that has been done on every titipmasa.id application features, the results obtained are all features can run well, as designed.

4.3.2. Performance Testing

Performance testing is one of the tests used to test the stability and reliability of a system. This test uses the loader.io application. In this test using the client per test parameter, this parameter is used to make requests to the system within 1 minute. This test will produce a successful data request and an error request as shown in table 1.

Table 2. Performance testing result

Request	Average Response Time (ms)	Request success	Timeout Errors	Average Error Rate (%)
250	849	250	0	0
500	1139	495	0	0
800	7415	650	84	12
1000	8459	688	163	19,1

Based on table 2 titipmasa.id application server can receive 500 user requests simultaneously in 1 minute, and 800 users with an error risk of 12%, and 1000 requests an error risk of 19.1%.

4.3.3. Browser Testing

This test serves to ensure that the titipmasa.id application can run well on each existing browser version. This test uses the browserstack.com application, and the type of browser used is chrome, firebox, internet explorer and safari.

Table 3. Browser testing result

No	Browser	Version	Compatible
1	Chrome	22	No
2	Chrome	37	yes
3	Chrome	71	yes
4	Firefox	16	No
5	Firefox	32	Yes
6	Internet Explorer	9	No
7	Internet Explorer	11	Yes
8	Safari	8	No
9	Safari	13	Yes

Table 3 is the result of testing the browser application titipmasa.id, based on the table there are types of browser versions that are compatible and incompatible. A compatible browser means a browser that can run the titipmasa.id application properly, and an unsupported browser indicates a browser that is not recommended for use in accessing the titipmasa.id application page.

Based on the three tests, it can be concluded that with unit testing, it is proven that all features can run well. Then with performance testing, the Titipmasa.id application server can receive 500 user requests simultaneously in 1 minute, and 800 users with an error risk of 12%, and 1000 requests an error risk of 19.1%. Finally, based on browser testing, the application pages compatible to be accessed by the Chrome, Firefox, Internet Explorer, and Safari browsers with minimum versions are 37, 32, 11, and 13, respectively.

5. CONCLUSION

The web-based titipmasa.id application was successfully built using the iterative incremental method with three incremental times. The first increment stage resulted in a titipmasa.id application consisting of user management and trip management features. Then, in the second increment, the application results from the first increment were successfully updated by adding two features, namely managing shopping points and managing goods delivery points. Finally, in the third increment stage, the results of the second increment were successfully updated again by adding features to manage transactions and manage admin. Besides, the effectiveness of this entrusted application has been tested using the blackbox method which consists of unit testing, performance testing, and browser testing. Based on the test results, the titipmasa.id application can run well so that the titipmasa.id application is suitable to be used to carry out goods entrusting services.

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