Complaint Handling Ticketing Application Web Based Using Codeigniter Framework (Case Study at PT Indosat Ooredoo Tbk Jakarta)

Baghaskara Sadewa¹, Suhendra, S.Kom, M.Kom²

¹²Faculty of Computer Science, Mercu Buana University, Indonesia
¹ baghas00742@gmail.com; ² suhendra.mercu@mercubuana.ac.id

Abstract— With the development of fast internet-based technology, cellphones are becoming widely used in everyday life. Short messages also play the most important role in our daily lives, mobile users can get information on time and comfortably via SMS. The SMS Gateway system is utilized by GSM SMS services. The system can be used by SMS from anywhere covered by GSM services. The system can also be programmed to send specific SMS to a predetermined number of conditions. SMS has made a big impact on the way of communication. People prefer SMS for messaging and for information exchange. The purpose of this study is to create a web ticketing based application that is integrated with the SMS Gateway as Indosat customer complaints services, especially the internet or bad signals. CI (CodeIgniter) is a framework that is used to create or develop a web-based application in a more systematic way that is compiled using the PHP language (Hypertext Preprocessor). In the CI there are several types of classes in the form of libraries and helper. Both function to help programmers in developing their applications. The CI work structure starts from the browser that will interact through the controller. By using SMS as a complaint service feature, customers can easily report their complaints regarding network problems because the web ticketing system can be integrated with an SMS Gateway that can transfer SMS to tickets, and can make it easier for CS to respond to complaints tickets.

Keywords— SMS Gateway, GSM, Ticketing, Codeigniter Framework

I. INTRODUCTION

In some Northern European countries, mobile ticketing solutions are available starting from 2009 and are commonly used by users of public transportation. In addition, various types of mobile ticketing and payment solutions have been developed and used in these countries.[1] This mobile ticketing uses the SMS Gateway as its support system. And several types of applications from various needs have been connected with SMS Gateway services, ranging from ticket purchases, file searches, and monitoring.[2][3][4] Due to the exponential increase in information transfer or communication using messages, Short Message Service (SMS) has become an important, efficient and easy use technique being developed for SMS. In recent years, SMS has made a big impact on the way of communication. Instead of communicating via telephone using voice, people prefer SMS to messaging and to exchange information.[3] What is happening now is that customers who service Indosat internet service providers who experience disruptions such as internet services are less stable or weak signals, claiming they have difficulty repairing to Indosat CS (Customer Service). Customers complain in general by calling CS to report complaints related to the service used, but if CS is busy handling other complaints, then the
other customer's telephone queue must wait and need time. In addition to telephone, Indosat also provides complaints services through social media or e-mail, but not all people can operate e-mail or social media properly, and still require a considerable amount of time to handle it. From these problems, we need a system that can make it easier for customers to complain and can be handled with service repair quickly by the authorized team. With this system the customer complains by sending a complaint SMS and will receive an SMS reply to monitor the complaint. With the existence of a complaint via SMS system, it is expected that the customer complaint process will be more effective and efficient to do, as well as in terms of handling the problem.

A. Research Problems
Based on the background described above, then the outline of the problem is:

1) How to simplify customer complaints related to network service problems?
2) How to design a Complaint Handling Application?
3) How to build the Complaint Handling Application?
4) How can the NOC (Network Operation Center) & CS (Customer Service) report tickets through the application to be built?

B. Limitation of Research
In order for the research to be conducted is not too widespread, there are limits to this research:

1) This system uses the SMS Gateway as a service to complain of network interference (internet / weak signals).
2) Complaint data via SMS still does not use the text filtering feature
3) Due to the IM3 simcard registration process that requires time, this SMS Gateway uses the Simpati service provider number.
4) This type of complaint is only for handling Indosat Ooredoo network users (internet / weak signals).
5) Checking can be said to be appropriate if it has been checked by the NOC (Network Operation Center).
6) This system is used as an additional service related to customer complaint responses other than using the telephone.
7) The Onsite Team will launch to the site if the NOC (Network Operation Center) escalation results do require onsite support.
8) CS (Customer Service) sends ticket status to customers via the SMS Gateway.
9) Customers get SMS in the form of notes / problem solving methods, from CS (Customer Service).
10) The customer receives Ticket Closed status from the SMS Gateway when the Ticket status becomes Solved / Closed.
11) Scope of data used is dummy data.
12) This application does not discuss the SLA (Service Level Agreement).

C. Objectives and Benefits
The expected goal and the benefits of this research are:

1) To create a ticketing application that is integrated with the SMS Gateway.
2) Providing additional services used for customer complaints.
3) To facilitate customer complaints and responses from CS
4) Using one application for follow-up complaint process by CS and NOC can be recorded.

II. STUDY OF LITERATURE

A. Previous Research
Smart vending machine based on SMS gateway for general transactions By S. M. S. Arifin et al. 2017[2]. study of vending machines for office stationery transactions. The advantage of the proposed vending machine is that Transactions can be carried out using a short message system (SMS), all transactions can be monitored online by the owner using Android, machine sellers have the Early Warning System (EWS) feature when the system is in trouble, and also equipped with battery backup when the electricity goes out, there is no need to make special agreements with banks or telecommunications providers. The Smart Seller Machine is built using common hardware components such as Arduino as a controller, Wavecome as an SMS Gateway module, Servos, Power Supply, Battery as backup power, Keypad and buttons as input, LCD 16x2 as a display.

Remote file search using SMS By A. K. Morey and K. H. Morey. 2013[3]. a long-term generic application used to search remote desktop files and send them to users. Cellular users send information needed via SMS to cellular gateways which then forward it to generic applications. By using information sent by users, such as file names, folder names or drives, user e-mail addresses, generic applications will automatically search for files requested by the user on the remote machine and send them to the user's e-mail address.
SMS ticketing system for local trains By Bilal Khan, Sushil Moray, and Sukruti Kaulgud. 2016[4]. This research reveals that cellular SMS can be used for purchasing city transportation tickets, where customers can bring city transportation train tickets with a quick response code that is stored in the customer's cellphone message inbox. For example, customers want to order tickets without having to queue for long queues, this system becomes very useful where customers can access ticket reservations by simply sending messages via cell phone.

Codeigniter Performance Analysis Framework and CakePHP in Website Creation By A. K. Himawan. 2014[5]. In this paper, to perform performance testing on the performance of the local web server (localhost) that has been made is to use Apache Benchmark Software. First request testing (Stress Testing Request) to the web using the Codeigniter and CakePHP Framework. In terms of features, PHP Cake provides more features than CodeIgniter. However, after a comparative analysis of the two frameworks in creating a website, the author prefers to use Codeigniter because it is lighter and easier to learn, modify, and integrate Library and Helper. However, everything returns to any PHP framework user, what is suitable for use in each development based on the results of the analysis that has been done.

Development And Functional Testing On CodeIgniter Framework Based Academic System By M. T. Muslihi. 2017[6]. In this paper, researchers use a framework that is widely used in building web-based applications namely CodeIgniter. This is because the framework supports php4 and php5 and has many good communities and forums (Wiswakarma, 2009). In addition, the CodeIgniter technology in the development of information systems built has become more organized due to orderly structures and arrangements (Koespradono, Suraya, Rachmawati, 2013). In making the academic system in the Sleman area using CodeIgniter states that the use of CodeIgniter in making academic systems shows results that are tested both in terms of efficiency, reliability and usability (Sari, 2016).

B. E-Ticketing

Electronic tickets abbreviated as E-Ticket, is a digital form of paper tickets. The e-ticket system is a more efficient and reliable method of entering, processing, and ticket marketing that is used for companies[7].

C. Waterfall Development

Waterfall Development is the original structured design methodology. The analysts and users proceed in sequence from one phase to the next. This methodology is referred to as waterfall development because it moves forward from phase to phase in the same manner as a waterfall. Although it is possible to go backward in the SDLC (e.g., from design back to analysis), it is extremely difficult[8].

![Figure 1 Waterfall Development](image-url)

1. Planning
   Planning Phase is a fundamental process for understanding why a system must be built and determining how the project team will build it.

2. Analysis
   During this phase, the project team analyzes the current system, identifies opportunities for improvement, and develops concepts for the new system.

3. Design
   This phase decides how the system will operate, in terms of hardware, software, network infrastructure, user interfaces, forms, reports, program specifics, databases, and files that will be needed. Although most
strategic decisions about systems are made in developing system concepts during the analysis phase, the steps in the design phase determine exactly how the system will operate.

4. Implementation
The final phase in waterfall development is the implementation phase, where the system is built. This is the phase that usually gets the most attention, because for most systems it is the single most expensive part of the development process.

D. SWOT Analysis
SWOT Analysis, which stands for Strengths, Weaknesses, Opportunities and Threats analysis, is a system or process of considering the internal and external factors affecting the performance of an organization in relation to competitor or market situation[9].

E. UML
UML (Unified Modelling Language) is one of the most widely used to define needs, create analysis & design, as well as describe the architecture in object-oriented programming.[10] UML can be used to visualize, determine, build, and document artifacts from incentive software systems. Software architecture makes UML diagrams to help develop software [11].

F. MVC (Model View Controller)
MVC is used to separate data access and business logic from presenting data and user interactions. The separation was made so that any changes in the logic of presentation or business logic did not have a complicated effect on each other. MVC separation solutions are expected to increase the flexibility and reusability of the application[5].

G. Framework
Framework is a set of libraries set in architectural design to provide speed, accuracy, comfort, and consistency in application development. Framework contains the following element elements[5].

III. RESEARCH METHODS
A. Research Flow

![Figure 2 Research Flow](image)
Based on figure 2 there are 10 core stages that will be carried out in this study. Starting from problem identification, literature study, goal setting, data collection, etc.

1. Problem Identification, is to find out the problems regarding the process complaint from user.
2. Literature Study, is to find references that will later be used to solve existing problems.
3. Goal Setting, is to determines what will be done next to solve existing problems.
4. Data Collection, is collect data from observations and interviews at the research case study site.
5. Current System Analysis, in which the current system is analyzed can identify problems that arise in more detail.
6. User Requirements Analysis, is to adjust from the stage of determining the goal is in accordance with what the user wants.
7. System Development, is where you start to design the system and start making applications.
8. System Testing, is where the system tested, before it can be used live.
9. Implementation, if the system has been tested and can be used immediately by the user.
10. Conclusion, when the system has been successfully implemented, then concluded whether the application is as expected or not.

B. Analysis Method

<table>
<thead>
<tr>
<th>Table 1 Swot Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current System</strong></td>
</tr>
<tr>
<td><strong>Strengths</strong></td>
</tr>
<tr>
<td>The Results of checking for the NOC (Network Operation Center) is always right, because there are some details for checking it.</td>
</tr>
<tr>
<td>Administratively, every activity that occurs can be documented.</td>
</tr>
<tr>
<td><strong>Weakness</strong></td>
</tr>
<tr>
<td>The current system is less effective at handling customer complaints</td>
</tr>
<tr>
<td>The number of CS (Customer Service) workers is currently limited when using the existing system.</td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
</tr>
<tr>
<td>Devices / infrastructure that are constantly being upgraded to support the system that will be updated.</td>
</tr>
<tr>
<td><strong>Threats</strong></td>
</tr>
<tr>
<td>There are telephone complaints that are missed causing complaints not to be responded.</td>
</tr>
</tbody>
</table>
C. Use Case Diagram

The results of this study are described in the form of Unified Modelling Language (UML) and User Interface (UI) design. Use case diagrams describe the main functions of a system and the various types of users that interact with it. The use case is used to identify and communicate the requirements for the system to programmers who must create a system.

![Use Case Diagram]

Figure 3 Use Case Diagram
D. Class Diagram

![Class Diagram](image)

Figure 4 Class Diagram
### System Testing

<table>
<thead>
<tr>
<th>No.</th>
<th>Tested Interface</th>
<th>Testing Scenario</th>
<th>Expected results</th>
<th>Test result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The customer sends a message to the SMS gateway</td>
<td>The customer writes a message, then enters the destination SMS Gateway number and presses the send / send button</td>
<td>The SMS gateway will send an auto reply message to the customer</td>
<td>Success</td>
</tr>
<tr>
<td>2.</td>
<td>The customer sends a message to the SMS gateway</td>
<td>The customer writes a message, then enters the destination SMS Gateway number and presses the send / send button</td>
<td>The ticket will enter the web ticket and can be monitored</td>
<td>Success</td>
</tr>
<tr>
<td>3.</td>
<td>Login CS, NOC &amp; Manager</td>
<td>Enter the appropriate username &amp; password on the web ticket login page and press the Sign In button</td>
<td>The web ticket will direct to each page according to its role</td>
<td>Success</td>
</tr>
<tr>
<td>4.</td>
<td>Login CS, NOC &amp; Manager</td>
<td>Enter an invalid username &amp; password on the web ticket login page and press the Sign In button</td>
<td>The web ticket will display the message &quot;username or password is not appropriate&quot;</td>
<td>Success</td>
</tr>
<tr>
<td>5.</td>
<td>Login CS, NOC &amp; Manager</td>
<td>Empty condition username &amp; password on the web ticket login page and press the Sign In button</td>
<td>The web ticket will display a message &quot;please enter your username and password&quot;</td>
<td>Success</td>
</tr>
<tr>
<td>6.</td>
<td>Select the Inbox by CS menu</td>
<td>Select the Inbox CS menu</td>
<td>The page will direct to the Inbox CS menu and display the new ticket or ticket that has been followed up to the NOC</td>
<td>Success</td>
</tr>
<tr>
<td>7.</td>
<td>Proceed by CS</td>
<td>Select the Inbox menu on the CS side and choose the ticket to select the Proceed menu</td>
<td>After the proceed menu is selected, the proceed button cannot be clicked back</td>
<td>Success</td>
</tr>
<tr>
<td>8.</td>
<td>Proceed by CS</td>
<td>Select the Inbox menu on the CS side and choose the ticket to select the Proceed menu</td>
<td>The SMS &amp; Solve Send menu cannot be clicked</td>
<td>Success</td>
</tr>
<tr>
<td>9.</td>
<td>Select the Open Ticket by NOC menu</td>
<td>Select the Open Ticket NOC menu</td>
<td>The page will direct to the Open Ticket NOC menu and display the tickets obtained from CS or tickets that are being troubleshooting</td>
<td>Success</td>
</tr>
<tr>
<td>10.</td>
<td>Troubleshoot by NOC</td>
<td>Select the Open ticket menu on the NOC side and choose the ticket to select the Troubleshoot menu</td>
<td>After the troubleshoot menu is selected, the NOC must troubleshoot the complaint</td>
<td>Success</td>
</tr>
<tr>
<td>11.</td>
<td>Troubleshoot by NOC</td>
<td>Select the Open ticket menu on the NOC side and choose the ticket to select the Troubleshoot menu</td>
<td>After the troubleshoot menu is selected, the menu solved on the ticket will be active, and the troubleshoot cannot be clicked again</td>
<td>Success</td>
</tr>
<tr>
<td>12.</td>
<td>Solved by NOC</td>
<td>Select the Open ticket menu on the NOC side and choose the ticket to select the Solved menu.</td>
<td>A send solution pop-up will appear to CS, to inform the customer.</td>
<td>Success</td>
</tr>
<tr>
<td>13.</td>
<td>Solved - Submit solution by NOC</td>
<td>Select the submit solution menu in the pop up that appears</td>
<td>After selecting the solution solution menu, the ticket will send to CS.</td>
<td>Success</td>
</tr>
<tr>
<td>14.</td>
<td>Menu Report NOC</td>
<td>Select the Report menu on the NOC side</td>
<td>The page will display the ticket whose status has been solved.</td>
<td>Success</td>
</tr>
<tr>
<td>15.</td>
<td>Menu Inbox CS - Send SMS</td>
<td>Select the Send SMS menu on the CS side</td>
<td>A send SMS pop-up will appear to the customer.</td>
<td>Success</td>
</tr>
<tr>
<td>16.</td>
<td>Menu Inbox CS - Send SMS</td>
<td>Select the Send SMS menu on the CS side</td>
<td>Select the send SMS menu after the pop up appears, which means sending the solution to the customer, and the send SMS menu cannot be clicked back.</td>
<td>Success</td>
</tr>
<tr>
<td>17.</td>
<td>Customers receive SMS solutions</td>
<td>When CS has done the Send SMS action and filled out the solution to the customer.</td>
<td>Get notifications from the SMS gateway.</td>
<td>Success</td>
</tr>
<tr>
<td>18.</td>
<td>CS Inbox Menu - Close Issue</td>
<td>Select the Report CS menu on the CS side</td>
<td>Select the Close Issue menu on the CS side.</td>
<td>Success</td>
</tr>
<tr>
<td>19.</td>
<td>Menu Report CS</td>
<td>Select the Report CS menu on the CS side</td>
<td>The page will display a ticket whose status has been solved and closed by the NOC or CS.</td>
<td>Success</td>
</tr>
<tr>
<td>20.</td>
<td>All Report Manager menu</td>
<td>Select the All Report menu on the Manager side</td>
<td>The page will display all tickets and their respective status.</td>
<td>Success</td>
</tr>
<tr>
<td>21.</td>
<td>Menu Manage CS</td>
<td>Select the Manage CS menu</td>
<td>The page will display all CS data.</td>
<td>Success</td>
</tr>
<tr>
<td>22.</td>
<td>Menu Manage CS - Add New CS</td>
<td>Select the Add New CS menu</td>
<td>Will display a page for new CS add.</td>
<td>Success</td>
</tr>
<tr>
<td>23.</td>
<td>Menu Manage CS - Edit Data CS</td>
<td>Choose a menu with a pencil logo</td>
<td>Will display a page for editing selected CS data.</td>
<td>Success</td>
</tr>
<tr>
<td>24.</td>
<td>Menu Manage CS - Delete Data CS</td>
<td>Select the menu with the bin logo</td>
<td>Will display a page for deleting selected CS data.</td>
<td>Success</td>
</tr>
<tr>
<td>25.</td>
<td>Menu Manage NOC</td>
<td>Select the Manage NOC menu</td>
<td>The page will display all NOC data.</td>
<td>Success</td>
</tr>
<tr>
<td>26.</td>
<td>Menu Manage NOC - Add New NOC</td>
<td>Select the Add New NOC menu</td>
<td>Will display a page for adding new NOC.</td>
<td>Success</td>
</tr>
<tr>
<td>27.</td>
<td>Menu Manage NOC - Edit Data NOC</td>
<td>Choose a menu with a pencil logo</td>
<td>Will display the page to edit the selected NOC data.</td>
<td>Success</td>
</tr>
<tr>
<td>28.</td>
<td>Menu Manage NOC - Delete Data NOC</td>
<td>Select the menu with the bin logo</td>
<td>Will display a page for deleting selected NOC data.</td>
<td>Success</td>
</tr>
<tr>
<td>29.</td>
<td>Manage Customer (Pelanggan)</td>
<td>When Open link (/pelanggan)</td>
<td>Will display all Customer (Pelanggan) data.</td>
<td>Success</td>
</tr>
</tbody>
</table>
30. Menu Manage Manage Customer (Pelanggan) - Add New Pelanggan  
   Select the Add New Customer menu  
   Will display a page for adding new customers  
   Success

31. Menu Manage Manage Customer (Pelanggan) - Edit Data Pelanggan  
   Choose a menu with a pencil logo  
   Will display a page for editing selected Customer data  
   Success

32. Menu Manage Manage Customer (Pelanggan) - Delete Data Pelanggan  
   Pilih menu dengan logo bin  
   Select the menu with the bin logo  
   Success

F. System Implementation

Figure 5 Screenshot Login

Figure 6 Screenshot Inbox (CS Webpage)
Figure 7 Screenshot Pop-Up Send SMS (CS Webpage)

Figure 8 Screenshot Report CS (CS Webpage)
Figure 9: Screenshot Open Ticket (NOC Webpage)

Figure 10: Screenshot Solved Pop-Up (NOC Webpage)
Figure 11 Screenshot Report NOC (NOC Webpage)

Figure 12 Screenshot All Report (Manager Webpage)
Figure 13 Screenshot Manage CS (Manager Webpage)

Figure 14 Screenshot Manage NOC (Manager Webpage)
IV. CONCLUSIONS

After being described application, the application for borrowing inventory items can be concluded:

1. By using SMS as a service feature of this complaint, customers can easily report their complaints regarding network problems because the web ticketing system can be integrated with an SMS Gateway that can transfer SMS to tickets, and can minimize CS time to respond to complaints tickets.

2. Using UML as a design can describe the whole of the system.

3. Using the SWOT Method as an analysis, it will be easier for the development of the previous system.

4. This application is an application that combines the escalation process between CS and NOC, so that after CS escalates to the NOC, the NOC will solve the problem related to customer complaints, and provide the results of improvements to CS, and after checking from the NOC, CS will inform the solution to customers, so they can display ticket report data that has been processed by CS and NOC.

REFERENCES