



Article

Development of Information System at Network Operation Center (NOC)

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A B S T R A C T

Enterprise Service is a division that functions to monitor and supervise Telkom network devices located at Plaza Indonesia. Customer satisfaction in serving customers, by carrying out network equipment maintenance activities, and implementing solutions when problems occur to customers are expected to run efficiently and effectively. Service quality standard. This study wants to know that the construction of a monitoring system for NOC work activities can improve service quality. The quality of this system can be measured using the ISO9126 model, by adapting four characteristics of software quality: functionality, reliability, usability, and efficiency, then for maintainability and portability it is used during system implementation. The system development model uses the Rapid Application Development (RAD) and Joint Application Development (JAD) models. Researchers will analyze and design the system using with use case, activity diagram dan ER-Diagram, then by coding with PHP programming and MySQL databases, and Data collection using a questionnaire, at Telkom Plaza Indonesia with 10 respondent and system testing using the Blackbox Testing model. Based on software quality testing by adapting the 4 characteristics of ISO 9126, the results are functionality (80%), reliability (79%), usability 86%), and efficiency (79%). Overall the result was 81% (Accepted).

INTRODUCTION

The role of information technology is very important, due to the development of information technology, it can simplify a job, and as a basis for decision making. The use of information technology is also supported by the development of telecommunications network infrastructure, which can affect improvements in terms of information technology services and infrastructure,

creating various lifestyle changes in society. Changes occur in various sectors, from the number of new business models to changes in the demand for the ability of workers. The problem that often occurs in every telecommunication service company is customer satisfaction. Network Operation Central (NOC), an Enterprise Service Division which functions to carry out monitoring and supervision activities of

Telkom network devices located at Plaza Indonesia in improving services to customer satisfaction.

I. LITERATURES REVIEW

The information system is a series of procedures, where the data collected is grouped into information and distributed to users[1]. Information systems provide added value to a production process, quality, management, decision making and problem solving to achieve a goal in an organization. According to [2] there are several achievements in the application of Customer Relationship Management including:

1. Improve existing relationships by providing services to products and services
2. Using information in providing good service, so companies and consumers save time and can reduce dissatisfaction.
3. Identify procedures and processes that are consistent and can be applied repeatedly

By implementing Customer relationship management, the benefits obtained are the ease in accessing the process and the existence of new innovations, so that customers are interested and can encourage new customers to be able to buy products / services. providing good service will increase harmonious relationships, retaining customers is an effort to gain loyalty by fulfilling all customer needs.

According to [3], Rapid Application Development (RAD) is a software development process model that is incremental, especially for short operations. If the software requirements are well understood and the scope of the software is well defined, the team can complete the software development in a short time.

Joint Application Development is an interactive system design concept that involves discussion groups that are brought together in a productive and creative workshop to obtain quality requirements and specifications (functional and technical specs) (Chuck Morris and Tony Crawford,

1977) [4]. The JAD method is a structured collaboration between information system users, managers and information system experts to determine and describe user requests.

According to [5], testing in the context of software engineering is a series of four steps implemented sequentially:

1. Unit Testing can be a collection of functions or procedures that have relevance to structured programming. Focus testing on each component individually, to ensure that component functions appropriately as a unit.
2. Integration Testing, integration testing is a systematic technique for constructing program structures along with combining program functions and interfaces. Integration testing is related to the problem of verification and program development that focuses on input and output, based on the design of the use case interface, class diagrams, sequence diagrams and communication diagrams.
3. Validation Testing, focuses on the success of the software according to customer requirements. Validation testing ensures that the software can meet the required information, functional, behavioral and performance requirements.
4. System Testing, system testing aims to verify that all system elements have been properly integrated and carry out the assigned functions

Based on the perspectives in the process of object-oriented analysis and planning with UML, there are several key diagrams in UML that can be used, namely[6]:

1. Use Case is a description of the interactions that occur in the system. actors associated with the system.
2. Activity Diagram is an overview of an activity process, this diagram can be used for various process models.
3. Sequence diagrams describe objects that are in a use case and message runs that run in a use case.

4. Class diagrams describe a number of classes and the relationships between them in the system.

According to [7], there are several definitions of Focus Group Discussion, which is one of the in-depth interviews conducted by researchers with a group of people at a time. The main objective of the FGD method is to obtain interaction data resulting from a group discussion of participants / respondents in terms of increasing the depth of information, exposing various aspects of a life phenomenon, so that these phenomena can be defined and explained.

Testing that focuses on the functional specifications of the software, the tester can define a set of input conditions, and perform tests on the functional specifications of the program. Black box testing is done to find errors from each functional program. Black box testing is also designed to validate functional requirements without needing to know the internal workings of a program.[5] According to [8], to define a quality, many definitions have been known, The International Standard Organization (ISO) defines quality as “*the totality of future and characteristic of a product or service that bears on its ability to satisfy specified or implied needs*” which means the totality of the features and characteristics of a product or service depending on the ability to satisfy needs. The ISO9126 model is part of the ISO 1900 standard which is the most important standard in the field of quality assurance.

II. FRAMEWORK

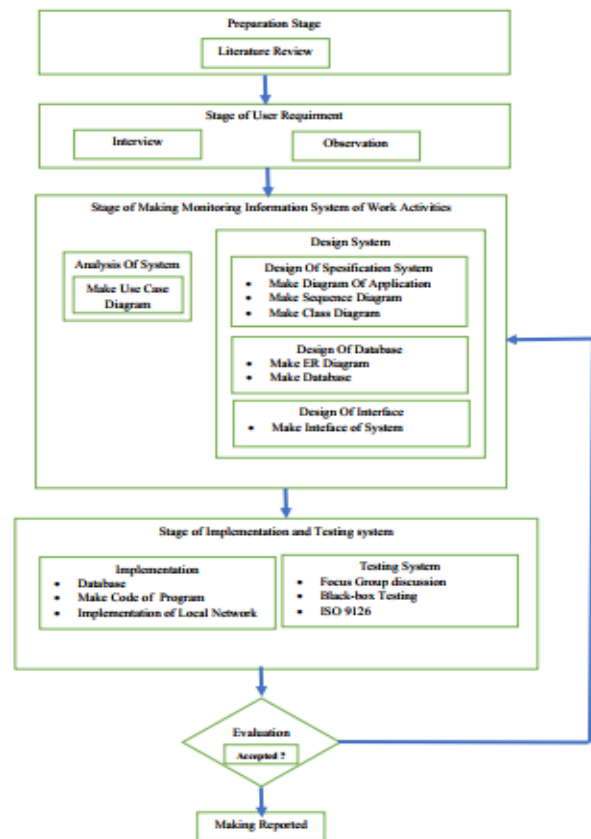


Figure 1: Conceptual Framework

1. Researchers conducted a technology study in terms of current problems, as well as reviewed aspects of information technology by conducting interviews and observations.
2. With the Rapid Application Development (RAD) and Joint Application Development (JAD) system development methods. Researchers will analyze and design the system using UML, then by coding in the PHP programming language and MySQL database, and testing the system using FGD, questionnaires, blackbox testing.
3. The application interface is built so that users can input data to be stored into the MySQL database and one time the data can be displayed in the form of information with a more user friendly visual appearance and good user experience. This application can be accessed by system users with user level restrictions.

- Testing with several methods that have been carried out then it is concluded whether the system has met the requirements to pass the test based on software adapting ISO 9126 with Four Characteristic functionality, reliability, usability, and efficiency. for maintablity and probability used during system implementation.

III. METHODS

This research will use the Rapid Application Development (RAD) methodology theory and JAD Joint Application Development. *System analysis and design with an object-oriented approach with the Unified Modeling Language (UML)*, implementation of analysis and design results using PHP programming and MYSQL database, validation testing adopts the Focus Group Discussion method, as well as testing the quality of the software which results using the ISO 9126 model of adapting four characteristic are functionality, reliability, usability, and efficiency. for maintablity and probability used during system implementation.

The results of the research are the results of reporting work activities carried out in the NOC division which are poured into software applications as a solution to the problems faced. Data collection methods include the method of observation by making direct observations of organizational profiles and research objects, interview methods by conducting interviews with related parties, and method of literature study by studying books, journals and others as related to information systems.

The measurement scale used in this research is the likert scale. The Likert scale is designed to assess the attitudes, opinions and perceptions of the subject or respondent whether or not they agree with the statement on a 5-point scale with the following arrangement [9]:

Table 1. measurement scale

Answer	Score
strongly agree	5
agree	4
doubtful	3
disagree	2
totally disagree	1

Descriptive statistics are used to describe respondents' answers, such as frequency distribution and tables in tabular or graphical form and used the research criteria range as follows:

$$Total\ score = \frac{Score\ Actual}{Score\ Ideal} \times 100\%$$

The actual score is the answer of all respondents to the questionnaire that has been submitted. The ideal score is the highest score or weight or all respondents are assumed to choose the answer with the highest score. An explanation of the weight of the actual score can be seen in the following table:

Table 2. Respondent Response Percentage Criteria

% Total Score	Criteria
20,00 % - 36,00 %	Very Not Good
36,01 % - 52,00 %	Not Good
52,01 % - 68,00 %	Enough
68,01 % - 84,00 %	Good
84,01 % - 100 %	Very Good

IV. RESULT

In understanding the current situation, by analyzing the system by describing the system in order to meet user needs, and be able to answer questions about what the system is doing, who uses the system, where and when it can be used. Researchers carry out the elicitation process, there are functional and non-functional needs in order to obtain the actual needs needed by the user.

User needs in system analysis activities will be designed using an object-oriented analysis approach and visualized and documented

using UML techniques. The following system activity diagram was developed:

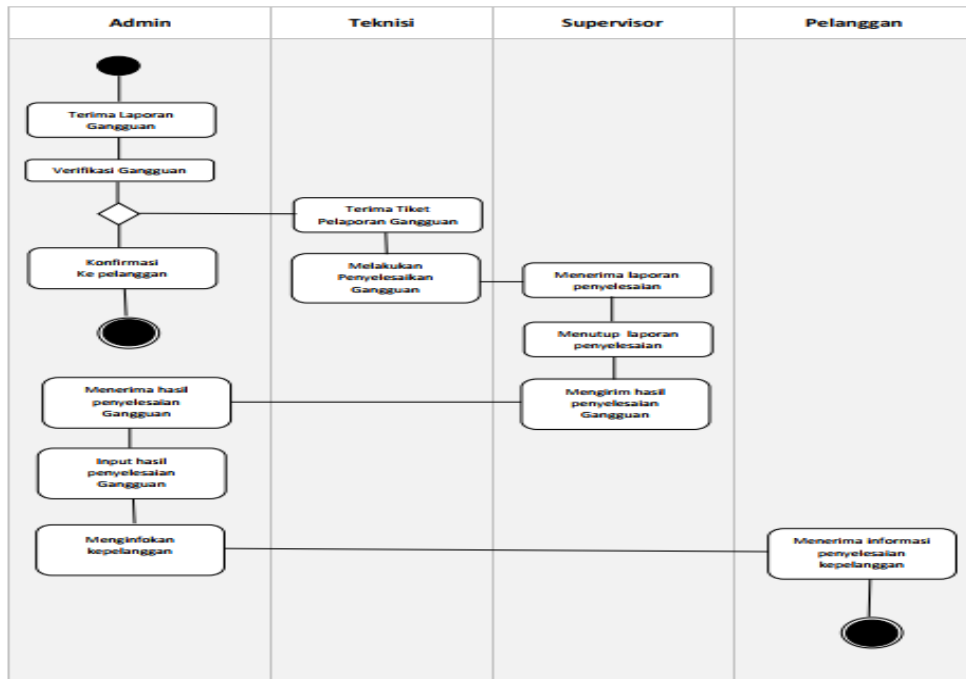


Figure 2: Activity Diagram

In the picture above explains that the admin receives service interruption report from customer than verify customer service data. If data that is verified invalid, it will be

returned. If the data is valid, I will be sent to the supervisor, dan will be resolved by the technician.

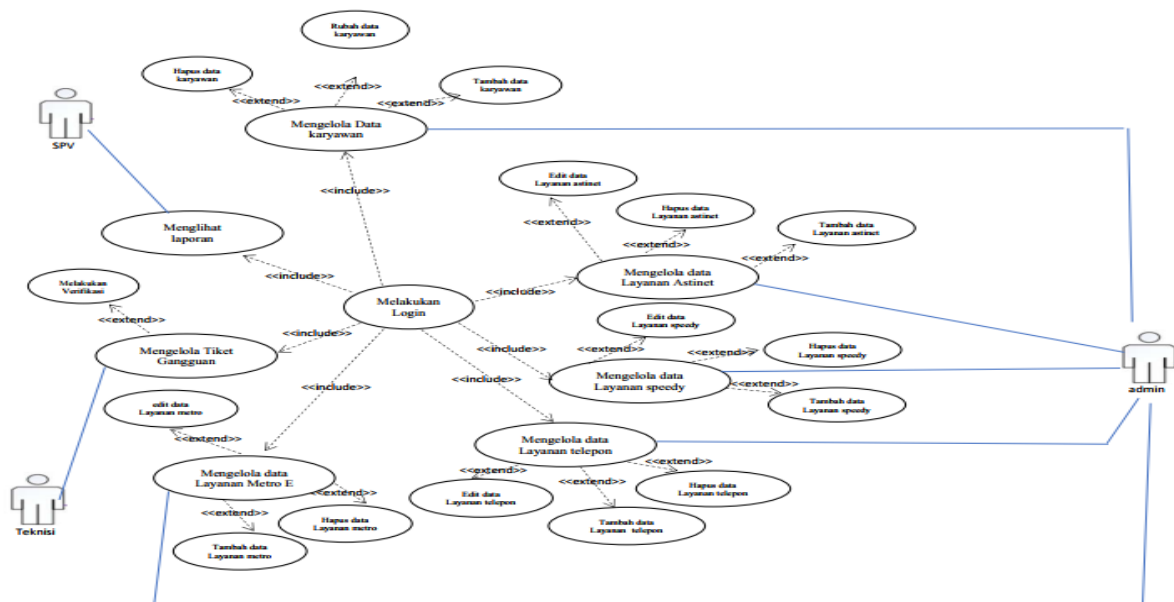


Figure 3: Use Case Diagram

1. In the picture above it, can be explained that the activities out as a whole include: The admin inputs the disturbance reports received from customer and verify the reports received.
2. The supervisor receives interference from the admin staff. And coordinating with technicians in resolving disturbances then following progress in resolving problems.
3. Technicians performs trouble resolution and generate report.

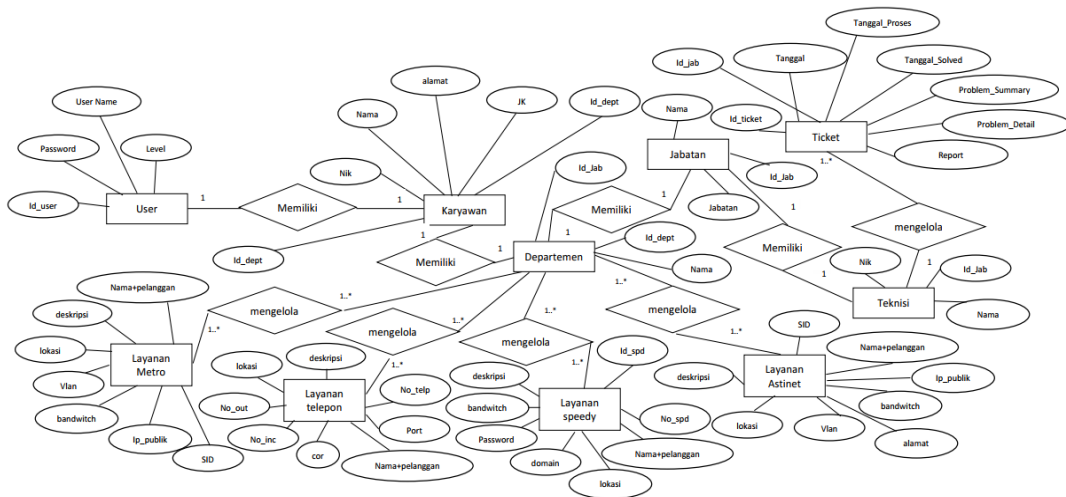


Figure 4: ER Diagram

The figure above illustrates the relationship between the entities which will later be converted into database tables. The results of these techniques can be implemented into a system design, namely.

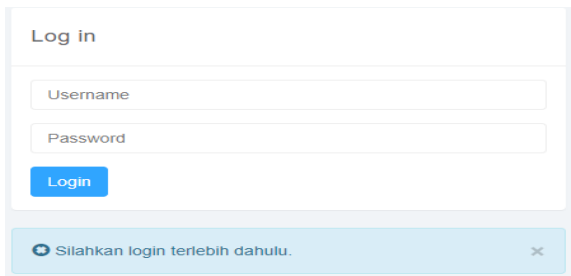


Figure 5: Login Menu

The login menu design is a menu display that provides access rights to user in using the application

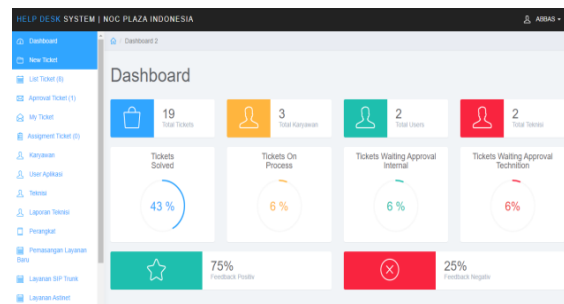


Figure 6: Main Menu

The design of main menu, contains a series of work activity, including :

1. Menu of disturbance reported
2. Menu Of approve Ticket, it all data that has been verified by the supervisor
3. Menu of list ticket, display disturbance of data, whether it has been completed or is in progress.

The results of the research on the quality of software based on ISO 9126 by adapting the four characteristics carried out by giving a questionnaire to 10 respondents and measuring it using the Likert scale measurement method are as follows:

Table 3. Quality Testing

Aspect	Actual Score	Ideal Score	% Actual Score	Criteria
<i>Functionality</i>	359	450	80%	Good
<i>Reliability</i>	197	250	79%	Good
<i>Usability</i>	343	400	86%	Good
<i>Efficiency</i>	118	150	79%	Good
Total	1017	1250	81%	Good

Based on the table above and through data collection using a questionnaire to 10 responden, it can be concluded that the overall quality level of the Work Activity Monitoring system at NOC is in good criteria, with a percentage of 81%. The test results using the black-box technique are :

Table 4. Black-Box Testing

No.	Interface	Test Way	Expected Result	Causen	
				Ok	Nok
1	Main Menu	Login User Name dan Password	The Main menu appears	10	
2	Menu Distraction Ticket	ClickMenu Distraction of Ticket	The menu ticket of distraction appear	9	1
3	Menu approve a Distraction ticket	Click menu approve	Display menu approvemnt	8	2
4	Distraction Resolution Menu	Click Distraction Of Menu	Display Interruption Finish Of Menu	10	
5	Service Data Menu	Click Menu Of service Data	Can Input, Edit, Add and delete	10	
6	Menu employee of Data	ClickMenu Of employee data	Can Input, Edit, Add and delete	7	3

Based on the results of the BlackBox test above, it can be concluded that the majority of respondents agreed that the monitoring system of work activities at the NOC was in accordance with the functions owned with a percentage of 90% accepting and 10% declaring reject.

V. DISCUSSION

From several tests carried out, the results obtained can be seen in the following table:

Table 5. Overall Test Results

No.	Technical of Testing	Success	Criteria
1	ISO 9126	81%	Good
2	Black-Box Testing	90%	Accepted

Based on the results of the questionnaire to be able to answer the hypothesis regarding the work activity monitoring system at the Network Operation Center in the Plaza Indonesia area, it can be accepted and approved. The test results for the hypothesis in this study are that the quality of the monitoring system of work activities at the Network Operation Center is produced if measured based on the quality of the software by adapting the ISO 9126 model with a percentage of the results of the questionnaire stated 81% with good criteria, while testing using Black-Box testing is accepted by presentation 90%. Researchers suggest that further research be carried out in other interrelated sections, so that the performance and quality of telecommunication services can be maintained properly. This system is developed and is expected to become the basis for further development in the world of telecommunications services.

VI. CONCLUSION

Researchers conducted research aimed at developing a monitoring system using the RAD and JAD methods. System analysis is carried out by using an object-oriented approach using the Unified Model Language (UML), while the development application uses PHP. The database used in the development of this system uses MySQL. The implementation of this system is carried out on a local network, while for validation testing using a Focus Group Discussion (FGD). Software quality testing is carried out by adapting the four characteristics of the ISO9126 software quality model.

VII. ACKNOWLEDGEMENT

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BIOGRAPHY

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