Unified Modelling Language for Design Multi RDBMS Monitoring Application

ESA DEWA DALLA KHARISMA[1], INDRA RANGGADARA[2]
[1, 2] *Faculty of Computer Science, Mercu Buana University, Indonesia*

Abstract- ***Database is a crucial thing for a company to run its business, because the database is used to store important data such as customer data, transaction data, and other important data, databases that are not handled properly can later result in problems that can cause harm to the company if there is a problem with the database that causes business processes to stop. The number of databases handled by the Database Administrator makes it difficult to determine which database should be managed first when there is information from the server. Therefore, an application that is needed can later be used to speed up handling if a problem on the database. In this case, we will try to solve the problems that occur using monitoring applications, especially used to determine which database must be handled first by the database administrator, and process making that application will be designed using Unified Modelling Language.***

Indexed Terms- ***Data, Database, Monitoring, RDBMS, UML.***

I. INTRODUCTION

The information system is a system that is interconnected and integrated with each other and aims to provide information to support operations, management and decision-making functions within an organization [1], [2]. Utilization of it will facilitate a job such as faster data management and as decisions maker to solve several problems [3], [4], and a valuable asset for decision making is the database [5]. The development of information technology has an impact on specialized science [6], Web-based project monitoring information service is one way for a company to control the entry and exit of projects, and in conveying project information to divisions that play a role in the company quickly and easily [7]. This is reinforced by the opinion that reveals that for more than four decades, DBMS has become an important part of data-intensive applications that exist in all aspects of society, science, and business [8]. One problem that occurs at this time is because of the many databases that must be handled by the database administrator at a company, so it is difficult to determine which database should be handled first.

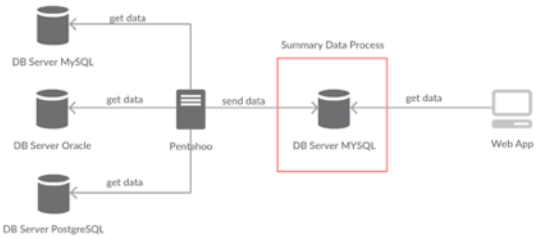

Figure 1: Flow Data Architecture

Therefore we need an application that can later be used to speed up handling databases, and Figure 1 explain flow processing data from several RBMS to a decision making an application to solve the problem. The current trend in the analysis and design modeling is object-oriented. Unlike the structured modeling, object-oriented modeling situates objects as the main viewpoints [9], [10]. Many studies have proven that UML is very effective to be used as system design, even UML can be used to produce programming code that is ready to use on the system [11]–[16]. Therefore this application will be designed using the UML method to ensure that the application design is made correctly.

II. MATERIALS AND METHOD

2.1 Problem Analisys Method

Before solving a problem, we need to identify and find the cause of the problem so that the problem can be solved more easily. Fishbone Diagram is a Root Cause Analysis (RCA) tool to help the process of identifying the cause of a particular problem [17]. The Fishbone Diagram - known as the Cause and Effect or Ishikawa

Diagram - was first introduced by Kaoru Ishikawa, a Japanese scientist. Fishbone Diagrams are analytical tools for systematically finding out the cause of a problem [18]. Referring to [19], Fishbone Diagrams are diagrams used to investigate the true cause or potential of a problem. From the fishbone analysis that has been done related to the root problem that occurs is the problem in making repairs and reporting to management, so it can be concluded that an application is needed to facilitate monitoring of the existing database.

2.2 Research Method

In conducting this research, systematic steps are taken so that what is desired can be achieved. Following are the proposed research steps:

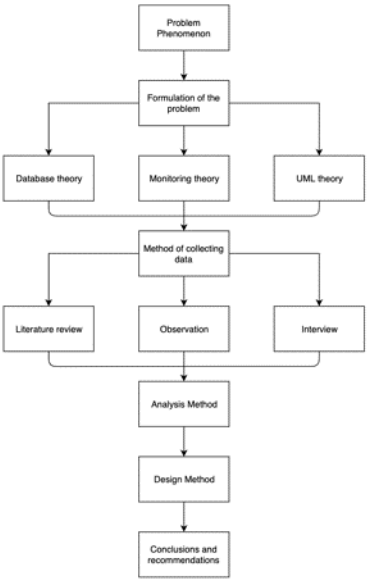

Figure 2: Flow Research Flow

In Figure 2 explained that the authors conducted a study by doing the steps below:

1. Determine the topic you want to do research by looking for the phenomenon of problems that exist in the field that have not been resolved.
2. Determine the formulation of the problem of the selected topic.
3. Conducting literature reviews obtained through books and research journals that have been carried out previously.
4. Study the research that has been done before and then compare it with the research that we do.
5. Interview directly with the database team how the process is currently running in the field.
6. Analyzing data obtained by the Fishbone method.
7. Designing and proposing information systems based on existing problems based on the results of Fishbone analysis with the aim of resolving these problems.
8. Perform system design using the UML (Unified Modeling Language) method.
9. Make conclusions and suggestions from the results of research conducted.

2.3 Data Collection Technique

The data collection methods used in this study are:

1. Conducting literature studies related to research to understand the basic theories and also concepts that support this research.
2. Conduct interviews directly with the database team manager.

2.4 Data Collection Technique

Unified Modeling Language, or UML, is a set of standards diagramming techniques used to make graphical representations for the illustration design of a model in a system development project [20].

2.5 Agile Developments Method

According to Pressman, Scrum is a method of developing software quickly (agile). The Scrum principle is in accordance with the principles contained in the device development method that is rapidly used to guide software development activities, such as meeting needs, analysis, design, and delivery (delivery). According to Pressman, at every stage of development, work activities are enclosed in a process pattern called a sprint [21]. Each process pattern that occurs, there will be a set of the following activities:

1. Backlog
   A priority detail on the features that will be built on a project. Content on features can be added at any time.
2. Sprints
   A collection of work activities carried out to meet the needs specified in the backlog and must be completed at the specified time (usually 30 days). Changes cannot be made to the sprint process so that each team will work in a stable environment.
3. Scrum Meeting

Meetings are held every day by the Scrum Team to discuss what has been done since the last meeting, plan and discuss existing problems (usually 15 minutes).

4. Demos
   Address the results of functionality that has been implemented so that it can be evaluated by the user. Demo must be features that have been completed in accordance with a predetermined time. At the system analysis stage.

III. RESULTS

3.1 System Design With UML

Based on the analysis, a system design analysis will be made using the UML (Unified Modeling Language) method. In this design analysis through several stages of design with Use Case Diagrams, Sequence Diagrams, Activity Diagrams, and Class Diagrams. The purpose of this UML implementation is to detail the step by step process that will be run by the system later, besides using this UML designer method the programmer can more easily do the code writing process.

3.1.1 Use Case Diagram

Figure 3: Use Case Diagram

Figure 3 is the use case design in the multi RDBMS monitoring and recording application wherein usecase there are 2 actors, namely admin and user who are interrelated with the use case, and for usecase pentaho, has a relationship extend because pentaho is a data provider from outside the system.

3.1.2 Activity Diagram

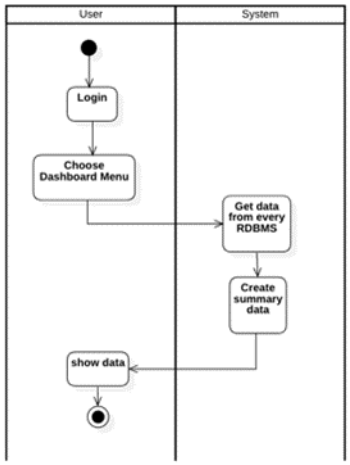

Figure 4: Activity Diagram

In Figure 4 there are several states that are described based on the initial stages of the process up to the final stages of the process as for the explanation as follows:

1. The user selects a menu of data to be monitored.
2. Data will be made every day by the system, this data is taken from various sources of rdbms and then summarized to be displayed as data that can be monitored by the user.

3.1.3 Sequence Diagram

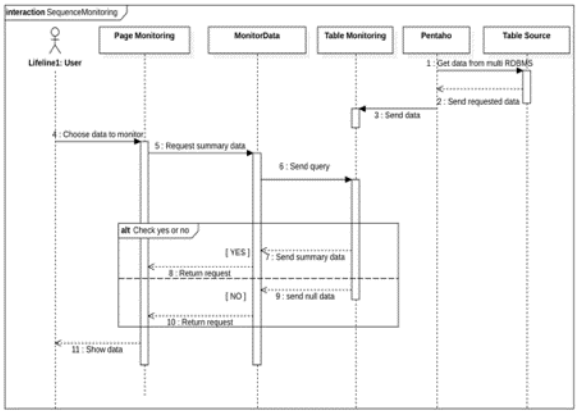

Figure 5: Sequence Diagram

Explanation of the process from Figure 5:

1. Pentahoo will make periodic data retrieval to several RDBMS.
2. Pentaho then sends the data obtained to the database system.
3. The user chooses the type of monitoring he wants.
4. A request will be made to the database system to display the data as requested by the user.

5. If the desired data exists the database will send data to display.
6. If it fails then the database will send null data.
7. The system displays the data requested by the user.

3.1.4 Class Diagram

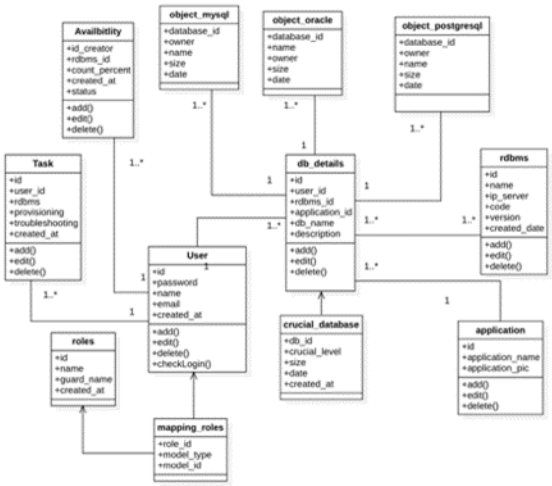

Figure 6: Class Diagram

Figure 6 is a design diagram of a class diagram of a multi RDBMS monitoring application, where there are ten classes each connected to each other, and for the curcial_database class is a class derived from db_details.

3.2 Implementation User Interface

User interface created to display the results of the application made by using a dashboard display will make it easier for users to see the summary results that have been processed by the system.

3.2.1 Implementation User Interface Login

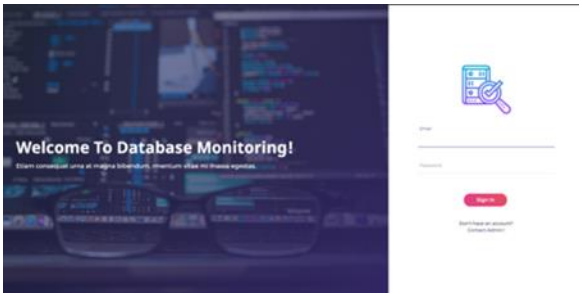

Figure 7: User Interface Login

Figure 7 is a picture of the implementation of the login page, where on this page, the user is asked to enter an email and password for entry requirements to the application.

3.2.2 Implementation User Interface Dashboard

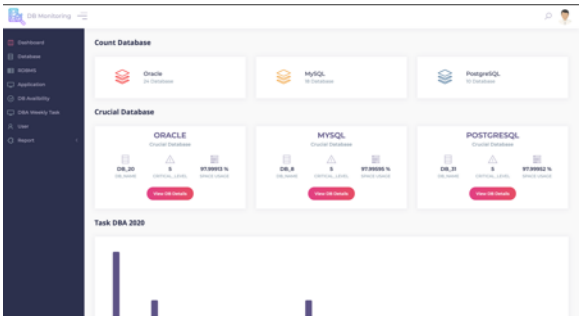

Figure 8: User Interface Dashboard

Figure 8 is a dashboard page implementation, where on this page, the user can see a summary of the data from each module that can be used as a decision-making tool.

IV. CONCLUSION

Based on the results of research conducted by the author and then formulated using the FishBone analysis method of existing problems and proposals which are then carried out application design using the UML (Unified Modeling Language) design method contained in the diagrams described above with the aim of simplifying and explaining detailed characteristics and processes in making this application, and are continued with the development process using the agile method. With a combination of several methods carried out in this study it was concluded that the design using UML was proven to facilitate the process of making an application, and from the application made it was expected to facilitate the work of the database team so that the work carried out could be more effective.

REFERENCES

[1] M. Dharma Tuah Putra Nasution et al., “Decision Support Rating System with Analytical Hierarchy Process Method,” Int. J. Eng. Technol., 2018.

[2] T. Suryanto, R. Rahim, and A. S. Ahmar, “Employee Recruitment Fraud Prevention with the Implementation of Decision Support System,” in Journal of Physics: Conference Series, 2018.

[3] Y. S. Sari, "Analisys and Design of Monitoring and Recommedations Obstetrician System Mobile Based," pp. 7–12, 2019.

[4] I. Ranggadara and R. Sahara, "Analytical Hierarchy Process Algorithm Approach for Determining Best Employee (Case Study IT Company in Jakarta)," Int. J. Comput. Sci. Mob. Comput., 2017.

[5] C. Coronel, S. Morris, and P. Rob, "Database Systems: Design, Implementation, and Management," Management. 2009.

[6] M. Computing, I. Prihandi, I. Ranggadara, and B. Yuliandi, "Development of Text Recognition Prototype with Classification of Neural Networks AND Text-To-Speech in Javanese Scripts Using Incremental Methods," vol. 8, no. 7, pp. 1–6, 2019.

[7] N. R. Kurnianda and A. Kusdaryono, "Decision Support Model for User Submission Approval Energy Partners Candidate Using Profile Matching Method and Analytical Hierarchy Process," vol. 3, no. 2, pp. 99–108, 2016.

[8] A. Pavlo et al., "Self-Driving Database Management Systems," Cidr2017, 2017.

[9] R. S. Pressman, Software Engineering: A Practitioner's Approach (7 ed). 2010.

[10] Ian Sommerville, Software Engineering (Ninth Edition). 2010.

[11] G. Booch, J. Rumbaugh, and I. Jacobson, the Unified Modeling Language User Guide (Addison-Wesley Object Technology Series). 1999.

[12] F. Schneider, B. Bruegge, and B. Berenbach, "The unified requirements modeling language: Shifting the focus to early requirements elicitation," in 2013 3rd International Workshop on Comparing Requirements Modeling Approaches, CMA@RE 2013 - Proceedings, 2013.

[13] P. Fitsilis, V. C. Gerogiannis, and L. Anthopoulos, "Role of unified modelling language in software development in Greece - Results from an exploratory study," IET Softw., 2014.

[14] D. Kundu, D. Samanta, and R. Mall, "Automatic code generation from unified modelling language sequence diagrams," IET Softw., 2013.

[15] V. S. W. Lam, "Theory for classifying equivalences of unified modelling language activity diagrams," IET Softw., 2008.

[16] C. Canevet, S. Gilmore, J. Hillston, M. Prowse, and P. Stevens, "Performance modelling with the unified modelling language and stochastic process algebras," in IEE Proceedings: Computers and Digital Techniques, 2003.

[17] A. M. Doggett, "A statistical comparison of three root cause analysis tools," J. Ind. Technol., 2004.

[18] G. Watson, "The Legacy Of Ishikawa," Quality Progress. 2004.

[19] C. W. Kang and P. H. Kvam, Basic Statistical Tools for Improving Quality. 2012.

[20] D. Alan, B. Haley, and D. Wixom, Systems Analysis Design with UML Version 2.0: An Object-Oriented Approach. 2015.

[21] R. S. Pressman, Software Engineering A Practitioner's Approach 7th Ed - Roger S. Pressman. 2008.