Design of Remote Desktop Invocation Based Middleware for Logistic Application

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Abstrak

Makalah ini menyajikan sebuah Aplikasi Desktop berbasis Java untuk Logistik Perlengkapan Kantor, dengan menggunakan arsitektur Client-Server-Middleware. Tujuan dari penelitian ini adalah untuk memberikan gambaran umum yang komprehensif dan penjelasan rinci tentang perangkat lunak yang sedang dikembangkan. Penelitian ini dimaksudkan untuk digunakan oleh para pengembang perangkat lunak yang terlibat dalam pembuatan aplikasi logistik perlengkapan kantor berbasis Java dan para penggunanya, serta pemangku kepentingan lainnya yang terlibat dalam sistem. Penelitian ini akan menjadi acuan selama proses pengembangan dan sebagai alat evaluasi selama dan setelah pengembangan perangkat lunak. Dengan memberikan panduan yang jelas dan terfokus, Software Requirement Spesification (SRS) ini bertujuan untuk memastikan bahwa proses pengembangan perangkat lunak terarah dengan baik dan bebas dari ambiguitas, terutama bagi para pengembang.

Kata kunci: *Aplikasi Desktop Berbasis Java, Arsitektur Klien-Server-Tengah, Aplikasi Logistik, Spesifikasi Kebutuhan Perangkat Lunak*

Abstract

This paper presents a Java-based Desktop Application for Office Supplies Logistics, utilizing a Client-Server-Middleware architecture. The purpose of this research is to provide a comprehensive overview and detailed explanation of the software being developed. It is intended for use by software developers involved in the creation of the Java-based office supplies logistics application and its users, as well as other stakeholders involved in the system. This research will serve as a reference throughout the development process and as a tool for evaluation during and after the software development. By providing clear and focused guidance, this Software Requirement Spesification (SRS) aims to ensure that the software development process is well-directed and free of ambiguity, especially for the developers.

Keywords : *Java-Based Desktop Application, Client-Server-Middle Architecture, Logistic Application, Software Requirements Specification*

1. Introduction

1.1. Objective

This research is the Software Requirement Specification (SRS) for the Java-Based Desktop Application [1][2][3][4] for Office Supplies Logistics (Client - Server - Middleware). The purpose of this research is to provide an explanation of the software to be developed, both in general overview and in detailed and comprehensive descriptions [7][8].

The users of this research are the developers of the Java-based office supplies logistics application [9][10][11] and the users of this software or those involved in the system [3]. This research will be used as a reference in the development process and as an evaluation tool during the software development process as well as at the end of its development [4][12][13]. With the existence of this SRS research [1][2][3], it is expected that the software development

will be more directed, focused, and free of ambiguity, especially for the developers of this software.

2. Functional Requirements Description

This section describes the functional requirements of the software to be built. It includes features, user characteristics, hardware and software requirements, and user documentation.

2.1. Features

The system's features are organized using UML and functional hierarchy so that the main functions of the system can be understood. This application functions to manage office supplies logistics affairs so that the logistics process can run smoothly. The features include:

- Client-server login between admin (logistics division) and cashier (non-logistics division), either using multiple computers via network or on a single computer.
- Input, delete, and edit office supplies data.
- Input, delete, and edit employee data.
- Ordering office supplies (input, delete, and approve orders).

2.2. User Characteristics

The system's features are organized using UML and functional hierarchy so that the main functions of the system can be understood. This application functions to manage office supplies logistics affairs so that the logistics process can run smoothly. The features include:

Table 1. Karakteristik mesin uji

Mesin	Jumlah tabel
Admin (Logistics Division)	Can perform insert, delete, edit, and search office supplies Can perform insert, delete, edit, and search employees Can delete and approve orders
Cashier (Non-Logistics Division)	Can order office supplies Can search for items

2.3. Hardware and Software Requirements

For the user interface, the Java-based office supplies logistics application uses a GUI (Graphic User Interface) interface, and users can operate it using a keyboard and mouse with any operating system (Windows, GNU/Linux, Mac OS) as long as it supports Java J2SE, whether on multiple computers connected in a network or on a single computer. For hardware requirements, this Java-based office supplies logistics application runs on Personal Computers/Netbooks/Notebooks with specifications of a 1.1 GHz processor, 256 MB RAM, 80 GB hard disk, network card, keyboard, and mouse.

For the software interface, this application is built using the Java programming language with the Netbeans 6.5 IDE tool on the GNU/Linux Ubuntu 9.04 operating system. The database used is MySQL with the help of JDBC and the Apache server.

2.4. User Documentation

User documentation will be included with this software, so it is expected to help users in using this application.

3. System Design Planning

3.1. Database

The data processed in this application is stored in the Logistics Database, which consists of 4 tables: Items, Orders, OrderDetails, and Employees. The Items table contains the fields ItemCode, ItemName, and Stock. The Employees table contains the fields Username, Password, and Division. The Orders table contains the fields OrderNo, Orderer, Division, and Status. The OrderDetails table contains the fields OrderNo, ItemCode, ItemName, and

ItemQuantity. An ERD (Entity Relationship Diagram) has been created for this database as follows:

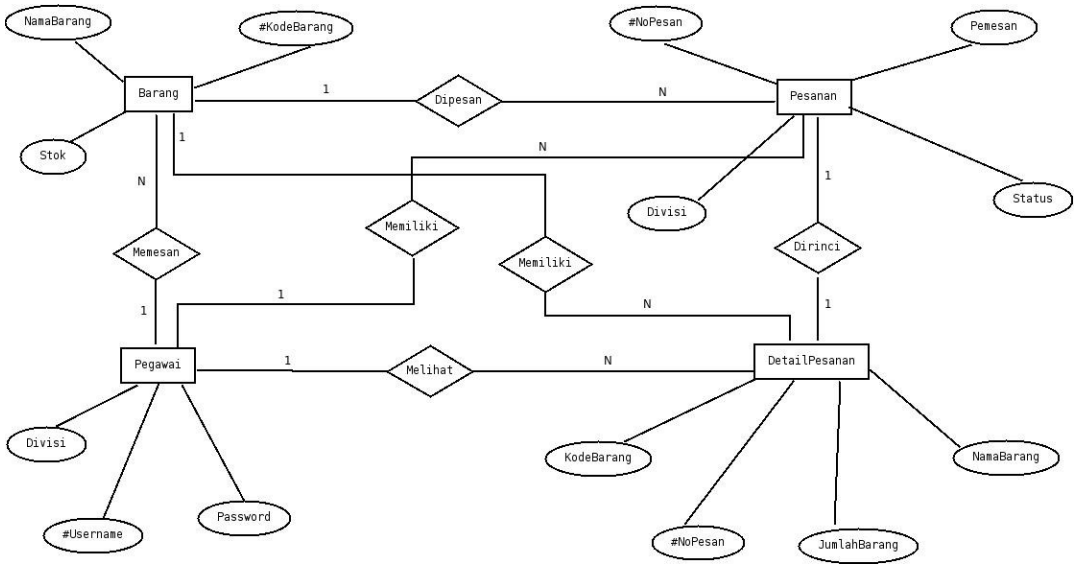

Figure 1. Entity Relationship Diagram

From the ERD in Figure 1, the relationships between tables and their fields can be seen, both 1 to N, N to N, and 1 to 1. It can be observed that a Primary Key in one table can become a Foreign Key in another table. The diagram of the Logistics database can be seen in Figure 2 as follows:

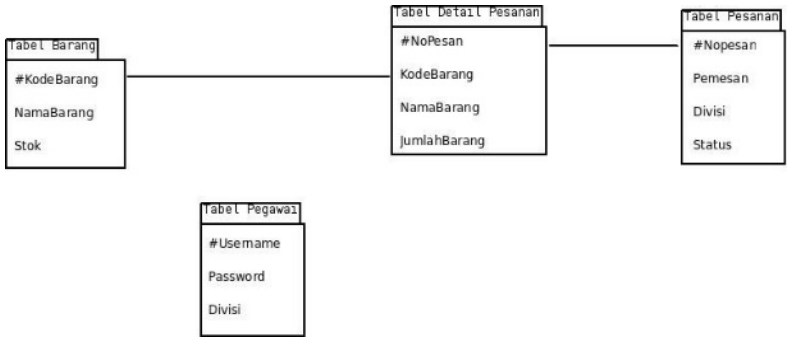

Figure 2. Logistics Database Diagram

3.2. UML (Unified Modelling Languege)

The UML provided includes a Use Case Diagram, a Class Diagram (distinguished between the Class Diagram for Logistics and LogisticsClient)[5][6], and a Sequence Diagram. These can be seen in Figure 3.

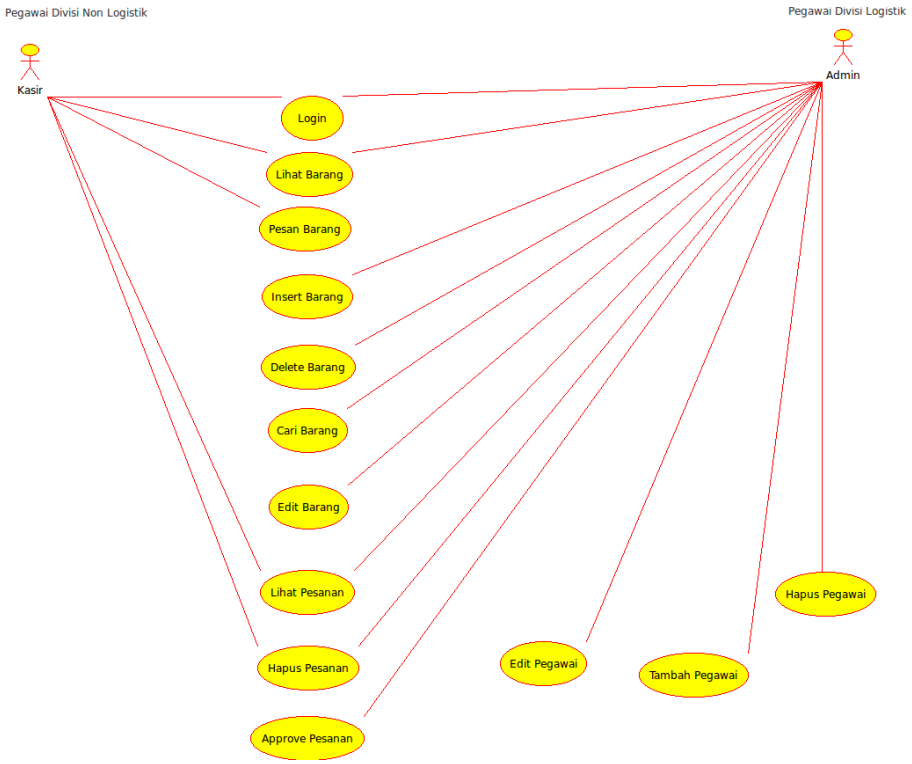

Figure 3. Use Case Diagram

Use Case Diagram Explanation:

- Use Case Login: Contains the login process performed by the user, whether it is the admin (logistics) or cashier (non-logistics).
- Use Case Insert Item: Contains the process of inserting items performed by the admin into the system, in this case into the Logistics database in the Items table.
- Use Case View Item: Contains the process of viewing items performed by the user, whether it is the admin (logistics) or cashier (non-logistics). Data is displayed from the Logistics database in the Items table.
- Use Case Delete Item: Contains the process of deleting items performed by the admin into the system, in this case into the Logistics database in the Items table.
- Use Case Search Item: Contains the process of searching for items performed by the user, whether it is the admin (logistics) or cashier (non-logistics). Data is displayed from the Logistics database in the Items table.
- Use Case Edit Item: Contains the process of editing items performed by the admin into the system, in this case into the Logistics database in the Items table.
- Use Case Order Item: Contains the process of ordering items performed by the cashier into the system, in this case into the Logistics database in the Items table (to view the list of items to be ordered) and the Orders table (to store the order).
- Use Case View Orders: Contains the process of viewing the list of ordered items performed by the user, whether it is the admin (logistics) or cashier (non-logistics), into the system. In this case, data is taken from the Logistics database in the Order Details table.
- Use Case Delete Order: Contains the process performed by the admin in deleting the list of ordered items (ordered by the cashier). Data is taken from the Logistics database in the Orders table.
- Use Case Approve Order: Contains the process performed by the admin in approving the ordered items (ordered by the cashier). Data is taken from the Logistics database in the Orders table.

- Use Case Add Employee: Contains the process of inserting employees performed by the admin into the system, in this case into the Logistics database in the Employees table.
- Use Case Delete Employee: Contains the process of deleting employees performed by the admin into the system, in this case into the Logistics database in the Employees table.
- Use Case Edit Employee: Contains the process of editing employees performed by the admin into the system, in this case into the Logistics database in the Employees table.
- To perform each activity in the Use Case, the user (admin and cashier) must first log into the system.

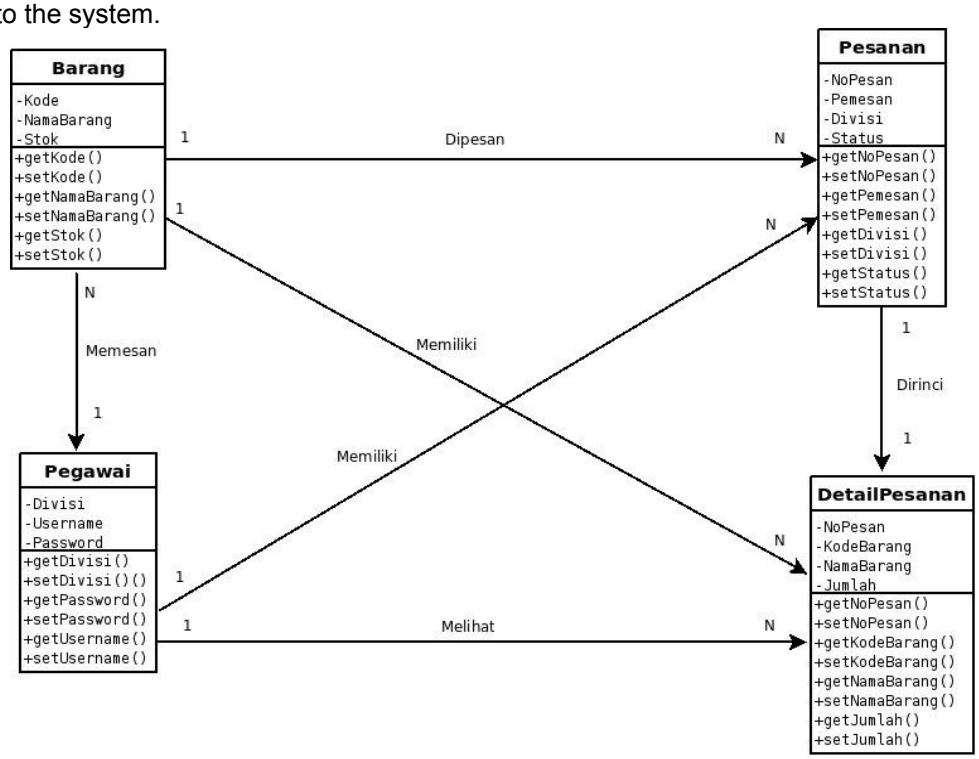

Figure 4. Class Diagram

4. External Interface Requirements

External interface requirements include user interfaces and communication interfaces, as listed in sub-section A and B below.

4.1. User Interface

The user interface includes forms and desktop GUIs. The database contains the Items, Employees, Orders, and OrderDetails tables. The Items table contains the fields code (primary key), item name, and stock. The Employees table contains the fields Username, Password, and Division. The Customers table contains the customer code (primary key), customer name, customer address, and customer phone number.

4.2. Communication Interface

This Java-based office supplies logistics application uses a desktop GUI interface for standalone computers (not connected to a network) as well as multiple computers using a network.

5. Non-Functional Requirements

Non-functional requirements are several requirements that need to be considered by the user, as listed in sub-section A and B below.

5.1. Performance Requirements

To be used properly, the software built must be supported by a computer with minimum specifications as described in bab 2 sub-bab C above.

5.2. Security Requirements

The Java-based office supplies logistics application is designed with two types of user levels: division) with different access rights. Attention should be given to who is authorized to use one of the two user levels and access rights. Also, regular database backup processes through the PHPMyAdmin interface should be considered for data security.

5.3. Other Considerations

The Java-based office supplies logistics application generally does not require special maintenance on either the hardware or software side. Data maintenance is performed by the Administrator as the data server database handler or by the employee entrusted with that role.

The Java-based office supplies logistics application is specifically designed for office logistics only. However, this software is released under GNU/GPL so it can be modified for other purposes and can run on various platforms that support Java J2SE and have the DB MySQL and Apache server applications as well as computer networks (optional).

6. Conclusion

The development of a desktop application for Office Supplies Logistics based on Java with a Client-Server-Middleware architecture has been completed to meet the operational logistics needs of the Kantor network. This application offers primary features such as data transfer from an office to a data guard, as well as the process of ordering and approving office supplies, all of which are automated through user-friendly interfaces that are protected by robust security measures.

Through this documentation, both the developer and the user will receive comprehensive and structured training to ensure that the development process proceeds smoothly and in accordance with the specified specifications. It is anticipated that this application will increase operational efficiency in the office supplies logistics management system and facilitate users in carrying out related tasks.

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