Development of Order Fulfillment Using Use Case Diagrams

Kevin Christianto[1], Honni[2], Julia Loisa[3], Henny Hartono[4]

[1,2,3,4]Faculty of Technology and Design, Universitas Bunda Mulia, Jakarta, Indonesia
e-mail: l1591@bundamulia.ac.id, honni2482@gmail.com[2], jloisa@bundamulia.ac.id[3],
hhartono@bundamulia.ac.id[4]

Abstract: In this study we want to represent business processes in one of the modeling languages. The representative model in this paper is focused on the process of fulfilling orders from XYZ Companies. in this system design problem now appears in the field of system design as the modeling language we use in this study cases is one of the UML diagrams, a diagram is a familiar Use Case Diagram used in the field of system modeling in business processes. The process that we represent in Use Case This diagram is an event or activity that will be carried out by actors in the system to identify a design and analyses a problem that is in a business process that is running or not running. For example, in the warehousing department, the actor will deal with warehousing activities such as entering goods that go into the warehouse, reporting goods out of the warehouse. Research is expected to provide references in designing order fulfillment systems that specialize in the oil industry. The authors specifically analyzed the order fulfillment process. The results of the development and design of the UML Use Case Diagrams will be presented in this journal.

Keywords— Order Fulfillment; Use Case Diagram; UML Diagram

1. INTRODUCTION

All inventory activities of raw materials and goods that are everywhere in the warehouse are used to store processed products that have not yet become goods, speed in processing data exchanges that are very necessary to improve the productivity of the company's business processes. Updates are very important because there is one reason: products must be made to benefit from existing sales. Therefore, the company will be able to accept orders as a planning system [1].

Use case diagram intends to visualize system requirements, also determine the relationship between actors with a process [2]. UML Use Case Diagrams represent relationships between actors and use cases, Use Case Diagrams also explain the limitations of the system [3]. Using letter diagrams is easy to understand for people even if they are not familiar with IT. Use Case Diagrams are very descriptive than UML Diagrams, it requires more details to describe behavior [4]. So we can conclude that, Use Case diagrams are one diagram of UML. It describes and visualizes system requirements, as well as the relationships between actors and processes so that people can understand how the system works.

PT. XYZ is one of the factories that produce brake fluid in Tangerang, PT. XYZ markets brake fluid to several automotive companies in many regions. As one of the oil and gas companies, PT. XYZ always wants to be the best for its customers and strives to make progress in information technology so that it can compete with existing competitors, but in some business processes it is still done manually by using and using Microsoft Office Word and Excel such as making reports, recording finished goods and recording raw materials. From these problems, the system observed and analyzed at PT. XYZ, in order to be able to provide advice and improve the current system.

In this study discuss the role of application fulfillment. This research was conducted at a company engaged in an oil factory. Strategies to make the corporate sector more visible to consumers, if needed. Quality and quality of service is work that helps workers to receive information about goods, transactions, and processes in the system. It cannot be denied that this is a unity in the Supply Chain Management (SCM) process that has been widely recognized by the organization's operational business network. Provided that SCM seeks to improve competitive performance with the environment and prioritize external interests to be successful [5]. The level of difficulty in the group will have an impact on: determining the cycle time, determining the current status, the size is given, the ability of the supplier to deliver, and the production capacity, product quality, responsibility and services provided [1].

The problem faced by PT. XYZ in the oil distribution process is that the data exchange process is slow so it is not effective, because the data exchange process is still manual. Often the occurrence of errors in making reports because the report making process is still done manually which allows data loss.

2. LITERATURE

2.1 Order Fulfillment

Many industrial and business companies to get quickly and efficiently for customers. If prices are very low and large customer demand is predictable, then supply from stock may not produce significant results. The results of the benefits of the system can be reset. Application of open concepts for domains produced and used through computer servers, telecommunications and other electronic equipment [6]. Many companies must rely on mid-service supplier needs. In

the manufacturing sector is very comprehensive a delivery of the latest information and the right information. Many companies are now more focused on promos. Supplier pay management is an important factor for one reason: products must come to take advantage of existing sales opportunities. This research was conducted in companies that are self-directed in the oil industry [7].

In the study a uniform interconnection solution allows access to various special projects and services. So, the distribution of modern systems is e-fulfillment presented in this paper. In the first part of the paper by presenting we have highlighted some of the classifications. The biggest part of the main operations carried out in e-Fulfillment operators, from taking products from suppliers, management, logistics information needed to store electronic transactions for customers using courier companies, settlements and billing services, forms of promotion, etc. This paper concludes with several aspects of profit using this system, the costs involved and examples for Romania [8]. Research made [9] the order fulfillment process (OFP) begins with receiving orders from customers and terminating finished goods. The order fulfillment process is very complicated because it consists of several factors, initiated by complex functions, and very influential on the process. Supply chain networks (SCNs) are autonomous business networks or semi-autonomous entities involved, through different processes and functions, and processes. As manufacturing practices shift towards the outsourcing paradigm, OFP is more likely to be executed throughout the SCN. This is the focus for integrating OFP into SCN to improve OFP. The generalization of the variety and complexity of SCN, this study marks several main types of SCN structures and overcomes OFP problems based on them [9].

2.2 Unified Modeling Language

The UML is a system modeling that is used as a standard for software model systems and an activity [10], but it is widely used to visualize and document software system design. UML used object-oriented design concepts, but it independent of certain programming languages and can be used to describe business processes and general requirements each UML diagram is designed to let developers and customers view a software system from a different perspective and in varying degrees of abstraction [11].

2.3 Use Case Diagram

Use case diagrams are used to describe interactions between actors and systems. Use case also can describe the system's functionality. The emphasis on the use case is "What" the system can do, not "how". Use case states an activity for certain activities, for example: log in to the system, create sales data, etc. Actor an entity can be a human, machine, department (part) that interacts with a system that describes certain jobs. A use case can also include another use case, where the case use is included is part of the use case that includes. Each use case that includes run then the use

case that is included is also executed. The use case can also do extend. If a use case has an extend, the use case has an extend not required to extend it (it is optional) if it meets the requirements to be in run it then the use case extend will run [11]. The most important concept in defining a use case diagram is:

• Actor: An actor is a representation of someone, from a system or machine that interacts with a system that is being implemented into software.

• Use Case: a task that must be done with support through the system being developed. The use case represents a function that will be run from the system.

• Relationship: It is a dependency between the relations of use or between actors and dependency cases, so we can regulate the behavior of the system or application by integrating each feature of the actors. Usefulness of case diagrams in partnership support, involvement, extension, and generalization of UML relationships [8].

3. METHOD

In this study case we use one of SDLC (Software Development Life Cycle) method; the method is a Waterfall model. Waterfall model are designing things that is related to developing software before the coding phase begins. The function of the waterfall model is to guarantee the success of the project. Waterfall model consists of some phase that is related to the software development process, the phases are requirement analysis, design, implementation, testing and last maintenance [12]. Because it is a waterfall model from the top and bottom of each ongoing process because it is called a waterfall model:

An advantage of this model is easy to understand.

• It was easy to explain.

• Testing is inherent in every phase.

• The cost that used is less than others.

 Disadvantages

• In this model user training is less important.

• Before system testing, problems are not discovered.

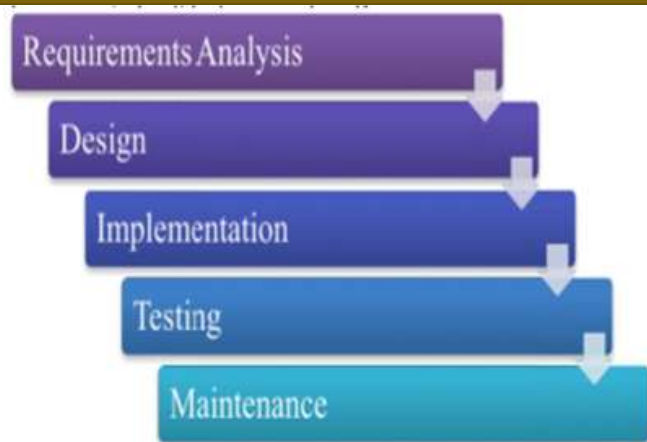• It is not effective to use it for big projects.

Figure 1 SDLC [10]

Based on figure 1, there are various phase in the waterfall model, they are:

1.   Requirement Analysis

2.   Design

3.   Implementation

4.   Testing

5.   Maintenance

3.1 Requirement Analysis

The business requirement will be collected during this phase. In this phase, the project manager will hold a meeting with the leader, the stakeholder of the project and also the user of the system, to specify the requirement that they need in the system. The main focus from this phase is to collecting the detail of the requirement that they need in the system that are built later. After that, a requirement specification document will be created for a guideline or a basic to the next phase of the model [13].

Requirement Analysis phase is called as Software Required Specification (SRS). The main focus is a complete description of the software that is going to be developed. The project manager must discuss with the users of the system to analyze the requirement for the completion of this stage. The requirement that being analyzed can be functional and nonfunctional requirements. Functional requirement include the purpose, scope, perspective, function, user characteristics, interface, database. Meanwhile the nonfunctional referring to criteria, constraint, limitation, and software performance [12].

3.2 Design

In this phase, the designing include interface design, algorithm design, software architectural design, database design, concept design, and structural design. The design is made based on the requirement specification during the first phase. The system will help to determine hardware and define the overall system of architecture [12].

During this phase, the system and software design is prepared from the requirement specifications that are defined during the first phase or requirement analysis phase. System design help to specify hardware and system requirement and also helping to define overall system architecture [13]. This is the process of planning and solving problems for software solutions that will be developed. This involves in the division to design and develop a software and designer to determine plans for solutions that include program flow design, software architecture design, database conceptual schemes and logical diagram design, concept design, graphical user interface design, and structure definition data [4].

3.3 Implementation

This phase is an implement of business requirement and system design into the application. Database starts with coding and deploys it. During this phase the code was written and arranged into an application, meanwhile the database and other need were learned during the previous phase. The main focus of this phase are the development of the software [2], the implementation phase must have a wide range of all possible trial cases during the testing phase. To answer all the obstacles in the next phase, a simulation for SDLC is needed so that it can estimate the right amount of resources for the needs of fulfilling certain projects on a certain scale [4].

3.4 Testing

In this phase, testing is implemented to verify and validate that the software meets the requirement and complete the objectives that have been set before. Also testing is an outlet for debugging where the bugs have been found and system disorder discovered, corrected, and improved [2].

After the code is being developed, it must be tested against the requirement to make sure the product is actually solving the needs that are defined during the requirement phase [9].

3.5 Maintenance

In this phase, software that was created and deployed can be modified, correcting errors, and improve the quality and the performance [2].

4. RESULT AND DISCUSSION

The analysis phase, in this study case we use one of UML Diagram. The diagram is Use Case diagram. UML is a tool that used to represent what user needs or request and inflate it into a developed model system. Meanwhile use case diagram is used to analyze the behavior and flow of a system and do the design validation of the proposed. The objective of research is to find the answer for question through the application of scientific procedures.

Use Case Diagrams provides effective method to present analysis system analysis information. Use case diagram are a type of UML Diagram, use case used to determine behavior and requirement of a system. Use case diagram is one of subclass in behavioral diagram in UML. Use case diagram is used to identify and organize system requirements and show the interaction between the system and the other entities.

Use case diagram represent the interaction one of an actor with the system. Use case diagram also used to collect system requirement from internal or external users.

The use of case diagrams then provides an opportunity to have defined a formal activity and functional requirements that are validated by the system into previously designed software and thus can use the system as often as necessary in a new software project. In addition, reuse can be applied at higher abstract stages, to avoid limitations in terms of technological changes and digital platforms. But that is not enough with initiative and process definition if we do not have the tools needed to operationalize the reuse of specifications into requirements that meet operational standards. UML can also help reduce the coding workload in large projects through an activity that is interconnected to one entity to another. For larger projects, especially order fulfillment, which is related to "use cases" activities and designing interfaces that allow the system to be connected via design in UML. Then the task coding feature can be distributed to other developers.
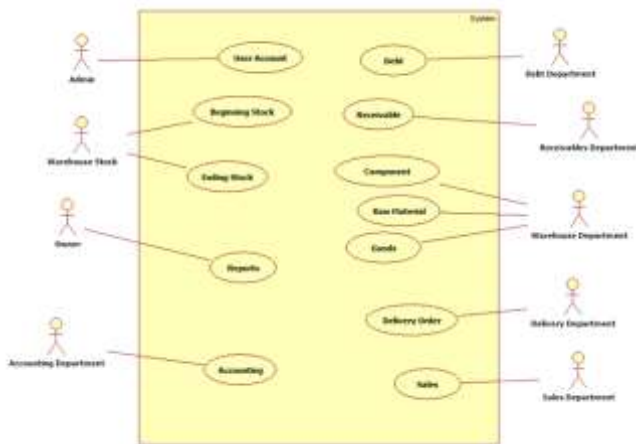

Figure 2 Use Case Order Fulfillment Systems

Based on Figure 2, there are 9 actors in the Use Case Diagram of order fulfillment system, they are:

1. Warehouse Department
2. Warehouse Stock Department
3. Sales Department
4. Receivable Department
5. Debt Department
6. Accounting Department
7. Owner
8. Super Admin
9. Delivery Department

In the picture, it also explains what user does in the system, example: warehouse department can access warehouse function in the system.

• The delivery department is the part that deals with the delivery of goods, starting from inputting the initial balance of finished goods, making travel documents and also recalculating the stock of goods.

• The debt department is the part that takes care of the debt portion of the company, such as making invoices from suppliers, paying invoices, making debt cards and also making company debt reports.

• The receivable department is the part that takes care of the accounts receivable from the company, such as making a receivable card, making payment receipts from each customer who has made payments, making a report from the company's accounts receivable.

• The accounting department is the part that manages to account from the company, such as making financial statements for companies, checking every transaction made by the company.

• The warehouse stock department is the part that takes care of the stock contained in the warehouse, including recording each item that comes out.

• The warehouse department is the part that manages the warehouse section, such as inputting the initial balance of each raw material, auxiliary material and finished goods. In addition, the warehouse section can also make reports on auxiliary materials or raw materials entering the warehouse.

• The owner is an actor that who own the company. Owner can see reports from sales carried out by the company and turn off the business process as it should.

• The sales department is the part that manages sales transactions from the company, starting from making sales orders (SO), making sales invoices, making sales reports based on customer, transaction time, goods sold.

• Super admin is the part that manages the administration of the application, such as identifying and defining access rights of each user who will use the application, besides that the admin can configure the application to be ready for use by the user such as inputting users who will use the application, inputting functions that will be used by the user.

In developing the UML architecture, can develop diagrams with designs in their code. Activity in order fulfillment may need to validate whether the code developed is in accordance with the original design. Likewise, when developers continue the design that has long been made in their business processes, they need to see that internal factors

do not violate architectural decomposition. Structural Classification in this view looks at various kinds of important objects or components between relations and connects their relationships with each other to consider the actors to be interconnected. At this stage represents a static view of the system through class diagrams, using a view through a use case diagram, displaying implementation through inter-architectural components.

In this proposed model. The Unified Modeling Language (UML) has become a standard requirement in the design for the development of object-oriented systems, but a collection of various types of diagrams when used into a particular methodology, this can also help to increase system acceptance to users to use a system that is running. The Unified Modeling Language (UML) contains special diagrams and this diagram uses include and extend symbols to describe software system modeling proposed in object-oriented system planning.

The use case diagram that already made, it can be a basic or guide for making the order fulfillment system for PT. XYZ. It also can still be developed such as the actor or the activity.

5. CONCLUSION

This paper has represented the analysis and requirement of order fulfillment application using one of UML Diagram method. The diagram that we used in this paper is Use case diagram. This diagram will be used for developing order fulfillment software for PT. XYZ and hopefully it can help PT.XYZ business process that is currently running and solve the entire problem that PT. XYZ faced.

The use case is also can still be developed in the future by others and it also can be used as a basic for another same research.

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