

Implementation Of Single Sign-On Method in E-Inventory System of Harapan Medan University

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Abstract— Maintenance of lecturing instruments is very important to ensure that every inventory works well to support the continuity of the teaching and learning process. Control activities must be carried out at any time so that it can speed up the handling process to improve inventory services. The purpose of this study was to utilize the lecture instrument inventory data to make an electronic inventory system application (e-inventory) of the lecture instruments that would be used to record the inventory of lecture instruments by applying the multi-user concept using the Single Sign On method. Implementation of Single Sign On in application development is intended to maximize performance because each job will be carried out by multi-users, easily controlled because each user has different access rights and is more efficient in terms of accountability. This study will produce a Lecture Instrument E-Inventory System equipped with Single Sign On facilities so that it will be easier to apply. The results of this study can be developed by adding supporting facilities to applications that have been made in accordance with the standard procedure for recording lecture instruments so that they can be applied in many universities.

Index Terms— e-inventory, Single Sign-On, UML, Code Igniter.

1. PRELIMINARY

Inventory management has an important role in a company's organizational system. A well-controlled and efficient inventory can contribute to the company's operations that are more effective and will increase the company's overall profits. Inventory management plays the main task in activating other operations such as production, purchasing, sales, marketing and financial management to be driven more smoothly. The basic challenge of inventory management is how to determine the level of inventory that works most effectively with the operating system or system owned by the company.

Asset inventory is a series of activities to carry out data collection, recording, reporting the results of asset data collection, and documenting both tangible assets and intangible assets at any given time. An asset inventory is carried out to obtain data on all assets owned, controlled by a company organization or government agency. All assets need to be inventoried both those obtained based on their own funds (investment), grants or other means.[1]

Engineering Faculty of Harapan Medan University is one of the colleges located on Jl. H.M. Joni No.70, Medan. Nowadays, the system for recording inventory of lecture instruments is still in the form of a control card that is only available in the laboratory room, so checking the condition of the inventory must still be done by visiting each room and checking manually. The inventory list has not been entered into the database system, so that reporting and inventory audits must be carried out by collecting control cards and re-typing in word /

excel documents. Based on this case, Harapan Medan University has urgently needed a system that can manage inventory of lecture instruments to improve the quality of lectures and provide the best service in the teaching and learning process based on web application.

In the present era of Internet, Application Service Provider (ASP) provides a standard interface to a countless number of users and also a standard connection point to various application providers. As almost each application has its own authentication mechanism, users need to go through multiple login steps. The user information and security are not correlated making the user management complicated and unsafe. In order to address the issues related to the user convenience and security, the commonly used technique is Single Sign-On (SSO). SSO is an access control method which asks a user to login once and without any further login criteria, he/she is allowed to access the resources of multiple software systems securely. SSO helps in the integration of the security policy and user information.

Prior to SSO, a user was supposed to login with a new account each time a new application was opened. Hence, was supposed to memorize numerous passwords which is really a difficult task to perform. To deal with this, users usually preferred to go for simple and almost same passwords. This approach is easy but has a potential threat. Choosing simple passwords made a cracker's job easy. An attacker can guess the password and gain access to all of the confidential information. With the introduction of SSO, users are being freed from this menace. They just need to authenticate themselves once and then can easily access the multiple

applications running on various domains securely. [2]

Tayibia Bazaz and Aqeel Khalique in their research “A Review on Single Sign on Enabling Technologies and Protocols” using the combination of SSO and MFA may allow a user to not worry about the negative consequences of losing his/her master key. Due to second step authentication, an intruder cannot access a user’s confidential data by acquiring just a key. [2]

Mohamed Watfa, Shakir Khan and Ali Radmehr in their research “Implications of SSO Solutions on Cloud Applications explores the effects and implications of SSO solutions on cloud applications. They utilize a new framework of different attributes developed by acquiring IT experts’ opinions through extensive interviews to expand significant strategic parameters at the workplace. [3]

This study discusses the use of Single Sign On for the development of e-inventory applications for web-based lecture instruments using the CodeIgniter Framework. This study is expected to produce e-inventory applications that are superior in performance, safe, have economic value, easy to control and help facilitate the academic and computer laboratory administrators in conducting inventory of lecture instruments so that lectures will be more effective and efficient, so they can be applied at Harapan Medan University and other universities.

1.1. Problem Identification

- a. How to create a UML model in analyzing the use of Single Sign On the design of e-inventory application for lecturing instruments at Harapan Medan University
- b. How to develop the design of e-inventory application for lecture instruments at Harapan Medan University

1.2. Research Purposes

- a. Creating a UML model to design a prototype e-inventory system for lecturing instruments at Harapan Medan University.
- b. Implementing the Single Sign On method in designing the design of e-inventory application for lecturing instruments at Harapan Medan University.

1.3. References

a. E-Inventory

Inventory is a list that contains all the property belonging to the office (school, company, ship, etc.) used in carrying out the tasks [4]

Inventory is an activity / action to do calculations, management, implementation of

regulations, recording data and reporting of regional property in the unit of use.[5]

Meanwhile, the E-inventory is a computerized system that allows companies to record, secure, document and report on the inventory they have through an integrated software.

Asset Inventory is in the third stage after the asset requirements planning stage and asset procurement. The main objectives of the Asset Inventory are three:

1. Creating orderly administration;
2. Securing assets;
3. Control and control of assets.[1]

b. Unified Modeling Language (UML)

The Unified Modeling Language (UML) issued by the Object Management Group (OMG), is a graphic language and has been widely accepted as a standard method for modeling object-oriented software systems. This can also be applied to modeling business process and system architecture and hardware design [6]

UML is applied for certain purposes, usually among others:

- 1) Designing software
- 2) Means of communication between software and business processes.
- 3) Describe the system in detail for analysis and look for what the system needs.
- 4) Document existing systems, processes and organizations.

c. Single Sign On

Single sign-on (SSO) is a session or user authentication process that permits a user to enter one name and password in order to access multiple applications. To verify that the users for all applications, they have been given the rights and eliminate further prompts when they are in a particular session during the process of switching applications.

The benefits of SSO apply to many areas:

- 1) User experience: the most obvious benefit is that users can move between services securely and continuously without having to specify their credentials every time.
- 2) Security: provide the user credentials directly to the central SSO server, not the actual service that the user attempts to access and save,
- 3) Resource savings: IT administrators can save their time and resources with a central web access management services.[7]

2. DEVELOPMENT SYSTEM

2.1. System Architecture

The stages of this research are outlined in the form of a research framework drawing that can be seen in Figure 1.

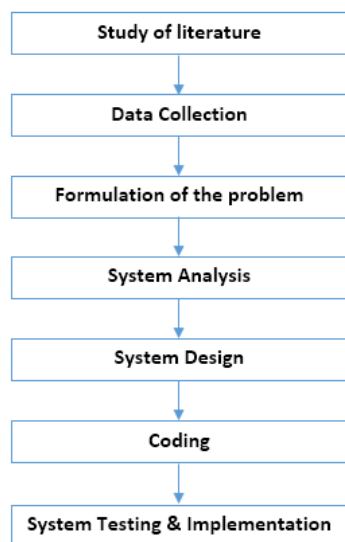


Figure 1. Research Framework

Each step in figure 1 can be described as follows:

a. Study of literature

Studying the literature relating to the theory of Single Sign On, UML and inventory management, literature sources are taken from journals, textbooks, papers, scientific papers, and other supporting sites.

b. Data collection

At this stage data collection is done by direct observation and collecting inventory data of lecture instruments owned by Harapan Medan University and then studied, the next action taken is to find and decide on the problems to be solved, what problems to find solutions to, problems -problems that are of particular concern, of course, the problem is taken based on the scope of the study, where the problems faced relate to the design of e-inventory application of lecture instruments at Harapan Medan University.

c. Formulation of the problem

After the data collection stage is done, the next step is to formulate a problem related to the problem at hand. How to create a UML model in analyzing the use of Single Sign On the design of e-inventory application for lecture instruments at Harapan Medan University.

d. System Analysis and Design

At this stage, the analyzes in the design process of the e-inventory application of the lecture instruments at Harapan Medan University are conducted, how is the testing carried out on the analysis that will be used, why Single Sign On is

able to be used for development of existing problems, up to the implementation stage After these problems can be defined, approaches are chosen based on literature from various sources such as textbooks and the internet about the methods currently in use that will be used and selected to solve the problem.

e. Coding

At this stage the coding process will be carried out after going through the system analysis and design stages.

f. Testing and Implementation

At this stage the testing process of the design that has been made is displayed in the form of a web application, which will later describe the results of the overall application design.

2.2. Inventory Procedure

The case study of inventory recording of lecture instruments was carried out at Harapan Medan University. Inventory recording is handled by the general section and head of the laboratory at Harapan Medan University. The procedure for recording inventory of lecture instruments is shown in Figure 2.

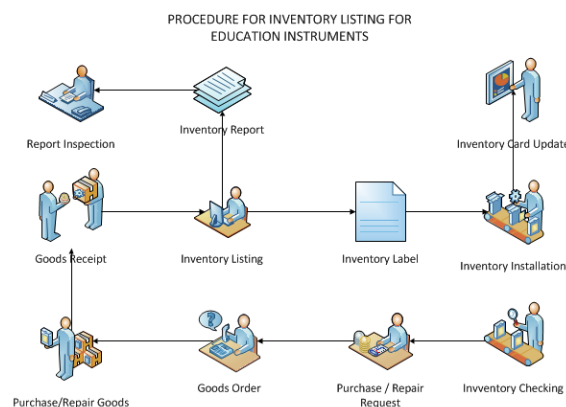


Figure 2. Procedure for recording inventory

2.3. System Modelling

In this web-based e-inventory system, each user will have a username and password, so that each user can only see the information presented.

The username and password for the user are only valid if used in this system and the designated system administrator can have the authority to make changes or management in the e-inventory system data of this lecture instrument.

2.3.1. Use Case Diagram

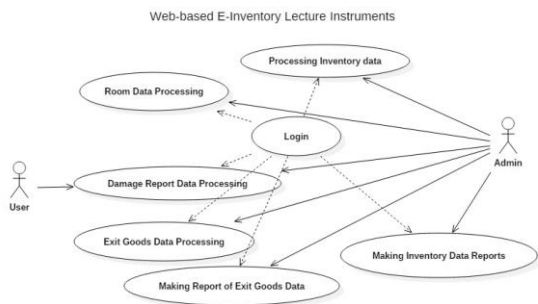


Figure 3. Use Case Diagram

On the Use Case diagram above illustrates that the e-inventory system of web-based lecturing instruments that will be formed will be able to handle several processes such as:

- 1) Processing of inventory data for lecture instruments conducted by the admin includes the entry of inventory data and changes in inventory data.
- 2) User data processing performed by the admin includes the process of processing user identity data and access rights granted to users in using this system.
- 3) Processing reports on damage to the lecture instrument inventory is carried out by the user, then the admin can check and respond to the inventory status of the lecture instruments that reported damage.
- 4) In this use case diagram only the processes performed by the system are displayed globally..

2.3.2. Sequence Diagram

The design of sequence diagrams is formed in 2 work separations:

1) Sequence diagram for User Authentication.

Sequence Diagram is intended for users who have certain rights, for example: there are user rights as the head of the laboratory and there are user rights as head of study programs and deans. Every user who wants to access this system will be checked for feasibility.

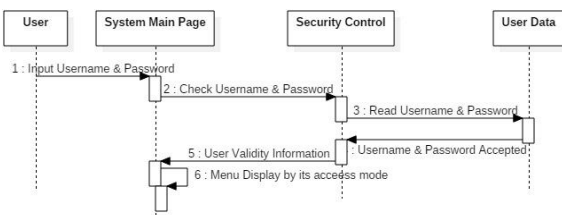


Figure 4. Sequence Diagram for User Authentication

2) Sequence diagram based on Use case

In this sequence diagram it is seen to clarify the exposure in the previous use case diagram

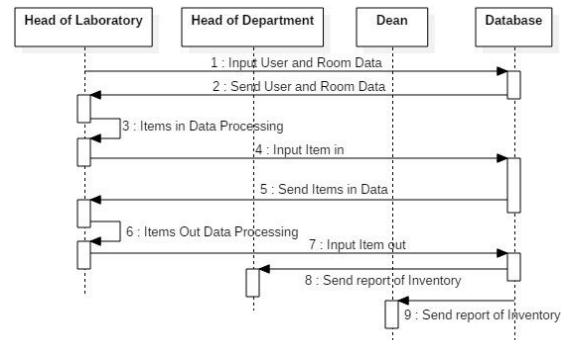


Figure 5. Sequence Diagram based on Use-case

2.3.3. Activity Diagram

There are several activities that are carried out in the use case of the e-inventory system, the web-based lecture instrument.

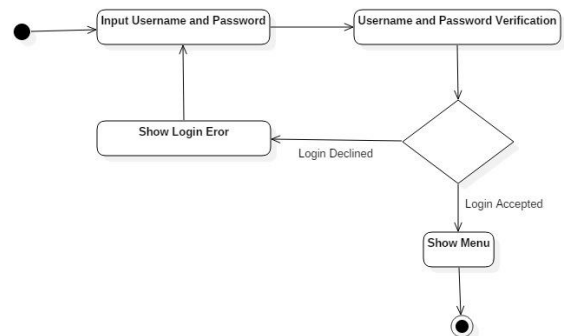


Figure 6. Activity Diagram – Login

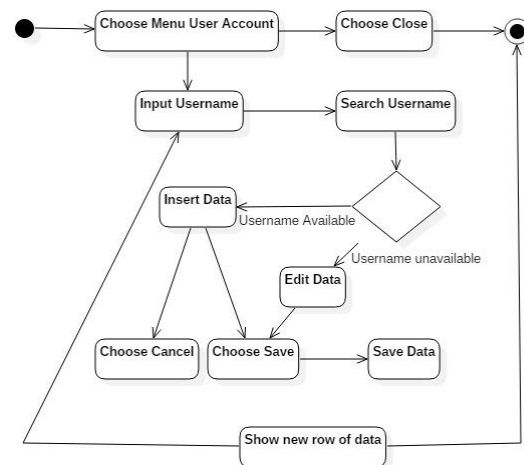


Figure 7. Activity Diagram – User Account

3. RESULT AND ANALYSIS

To clarify the interface implementation, here are some of the main form views of the programs that have been made.

a. Login Form

To be able to enter the system, the user must fill in the appropriate username and password to determine the access rights of the user.

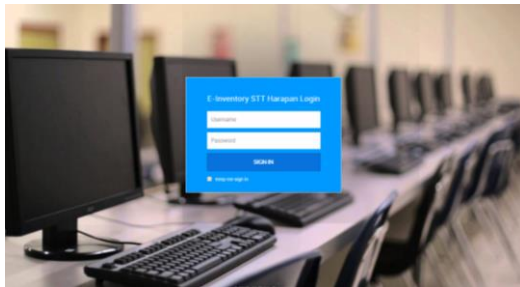


Figure 8. Login Form

b. Dashboard page

The Dashboard display will be adjusted to the user who logged in. In the implementation of this program, system users are differentiated into 2 access rights namely administrator and user

1) Administrator Dashboard Form

The admin dashboard form is a form that will connect users with other forms that have to do with accessing the system. On this form a user can access other forms by selecting the menu options available to the user. Users who have previously registered have access to use this form.

Figure 9 shows the administrator's dashboard form image. In the picture it can be seen that at the top and the left there are several menu buttons that can be accessed based on their respective rights. This menu button will later bring the user to work in this system. Meanwhile in the middle section there are inventory statistics in and out and recapitulation of inventory held.

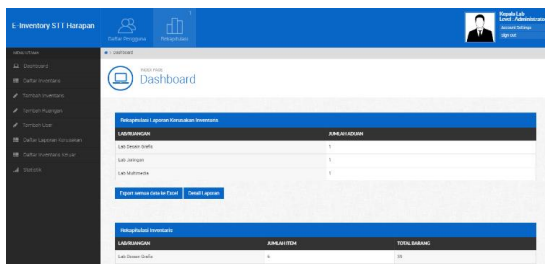


Figure 9. Administrator Dashboard Form

2) User Dashboard Form

The user dashboard form is a form that will connect users with other forms that have to do with accessing the system. On this form a user can access other forms by selecting the menu options available to the user. Users who have previously registered have access to use this form.

Figure 10 shows the user dashboard form image. In the picture it can be seen that at the top and the left there are several menu buttons that can be accessed based on their respective rights. This menu button will later bring the user to work in this system. Meanwhile in the middle section there are inventory statistics in and out and recapitulation of inventory held.

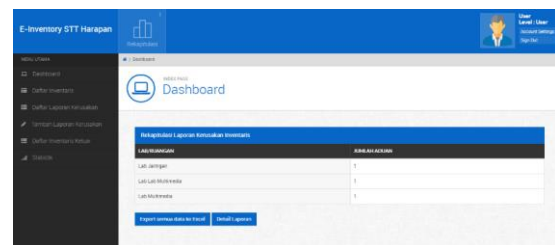


Figure 10. User Dashboard Form

4. CONCLUSION

This research has produced a UML model and prototype e-inventory application for web-based lecture instruments based on sample data from Harapan Medan University and has been tested for its use.

Based on this research, the following can be concluded:

- The UML model can be used to provide a description of the system to analyze the use of Single Sign On the design of e-inventory lecture instruments so that the resulting process can be read easily with the help of using Use Case Diagrams, Sequence Diagrams and Activity Diagrams
- The Single Sign On method can be used to simplify the process of logging into the e-inventory system with several access rights at once without having to make repeated logins so as to reduce errors and save login time.

References

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