

## A Novel Database System Model Design for Tender Management System

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**Abstract:** This research focus on the software design and database system model for Tender Management System (TMS) in Kadastra. TMS in Kadastra is an automated system that can calculates tender payment claims for the land surveyor company. The calculation is based on the Vide Federal Government Gazette PU (A) 169 Thirteenth Schedule (Regulation 99) Scale of Fees for Title Surveys given by Land Surveyors Board in Malaysia. Based on the system, it provides data availability for read and writes operations while supporting fault-tolerance and fast data transformation. Accurate, relevant and timely information required the use of sophisticated system called TMS in Kadastra with the database management system, MySQL.

**Key word:** Automated system, TMS, kadastra, MySQL, software

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### INTRODUCTION

In order for land Surveyor Companies to survive and prosper in today's competitive environments, it is essential that they govern the efficiency and effectiveness in providing services<sup>[1]</sup>. To assist in the process, the utilization of information technology and automated software can provide efficiency and effective solutions to the problems of mass data and information handling<sup>[2,3]</sup>. Object-oriented software engineering methodology the idea object model for the business relates to the use case model of the supporting information system<sup>[2]</sup>. Meanwhile, a practical model and procedure on how to tender products based on new, emerging technologies had been proposed by A.P. Hameri *et al.*<sup>[4]</sup>. In particular, estimating and tendering represent important processes for organization involved in land surveyor<sup>[1]</sup>. In Malaysia, the calculation of tender payment claims for the land surveyor company is based on the Vide Federal Government Gazette PU (A) 169 Thirteenth Schedule (Regulation 99) Scale of Fees for Title Surveys given by Land Surveyors Board. In addition, the traditional or former practice of tender management process and calculation of tender payment claims through the manual system is complex and very difficult<sup>[1]</sup>. Before the advent of system, organization kept all their data in manual or conventional files. Basically, the manual system workflow is very

inefficient and ineffective. Data processing in organizations tended to be largely departmental in nature. To manage the tender information, many staffs are involved and the processes need to be completed in several stages. The file-based system was helpful, however this conventional system wouldn't produce the kind of information that needed by the management. Inevitable, the manual system is exposed to the risk of data loss, delayed and data integrity concern, which reduce the company's operation performance.

Tender Management System in Kadastra with the database technology, is capable to manage the tender information. The software design consists the modules of the customer account details, information of separating process for division or boundary, temporary properties and survey of land. Briefly, PHP language and MySQL were used to develop the Tender Management System in Kadastra and its database system respectively. Other software had been used include My SQL Client Server GUI, PHP Editor, Microsoft Front Page and Apache Web Server.

**System description:** Tender Management System in Kadastra supports the sharing information. All information will be control in a centralize database. TMS in Kadastra will manage all information that relevant to Measurement System for the purpose to make ease of information access by the users. Besides,

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managing the tender information through fully computerized is better than manual system. For example, by implementing the computerized system, customer details can be easily accessed in short period time. User can refer to file transaction details specifically with fast and accurate. The Measurement System is developed to help the user to calculate the tender payment claim that includes two type statues, either transaction claims or quotations. The Land Surveyor Board fixes the standard matrixes rate for survey of land fees.

Tender Management System in Kadastra also supports the automatical reports generated. The facilities that supported by the system has become the powerful stimulus for increasing works quality. Through the computerized system, users need not to worry about the miscalculation of tender payment tender claims. Tender Management System in Kadastra is developed based on the manual system and existing computerized system, Sistem Kadastra Jurukur Jitu Runding Kuala Terengganu, Malaysia.

In addition, this official offer will provide the particulars on services or items including the fixed amount prices. This system also offers the opportunity to any interested party to submit a tender for the works. It can take the form of an advertisement in the local press or in national trade journals, inviting a response from suitably qualified companies. It is not a particularly satisfactory proposition for the design team because supplying the necessary information to a potentially high number of applicants will involve considerable time and effort and may yield responses from organizations about who little is known<sup>[2]</sup>. Shahron conducted a questionnaire survey to determine the degree of the difficulty of choosing contractor and it was found that five percent of the respondent stated that choosing the contractor are very difficult thus the required to manage the adequacy of specification and design information during the tender<sup>[5]</sup>. In particular, the implementation of the project must be completed within a given preset duration. This formal offer is usually written to ensure that the required services or items can be prepared.

Kadastra is a discipline that closely related to all of the land works survey including:

- Permit for land separations
- Survey of land
- Application of land
- Forest preservation

This dicipline is related to industry, agriculture, forestry and mining fields, which include all of the

management element that subjected to Land Surveyors Board.

## MATERIALS AND METHODS

**System analysis:** Over the last decade, project management information systems have become comprehensive systems that support the entire life-cycle of projects, project programs and project portfolios. System development starts from early to end of each System Development Life Cycle phases. The main objective of system analysis phase is to study the system that is using nowadays. Therefore, the problems were identified and the problem solution alternatives have been studying for the purpose of learning the tender management procedures. In the analysis phase, the requirements of the system are analyzed, reviewed and documented. The requirements include both functional and non-functional requirements. Analysis methods consider with the system necessity and the information structure. This sub-phase involve careful studying of the manual system and the computer system that is currently use by the managers and the staffs at the company. The design phase includes specifying the data model by using Entity Relationship Diagrams and the process model by using Data Flow Diagrams. After that, gathered information is restructured again based on the relational with each other while the useless data will be isolated. System input and output design are generated roughly before comparing with the real system that needed. Business process modelling is the important aspects in software system design<sup>[6]</sup>. On the other hand, the cost of operation, time consuming and technical level for the development can be fixed.

Computerize system is more reliable and accurate. Data analysis will be process very fast and safe. But most software is delicate: even the slightest error, such as changing a single bit, can make it crash .Thus, development techniques emphasis on design should be managed correctly to overcome this fragility.

**Logical design:** Database management system helps organizations to organize or structure their data in a logical way. In designing the relational database, there are three major database models, which are, the conceptual database, the logical database and the physical database.

The emphasis of logical database model is on logic, which is a readable method and useful for representing the knowledge<sup>[7]</sup>. This database design is most frequently used because it establishes a simple data form for each relation and for many-to-many relationships<sup>[10]</sup>. The core of logical database design is

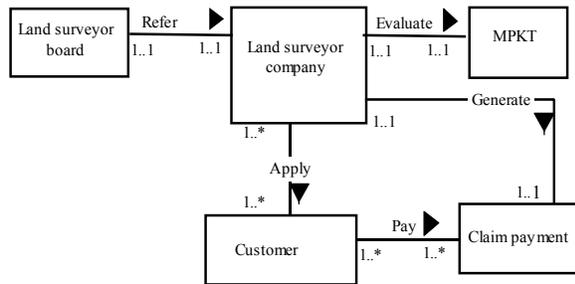


Fig. 1: Entity relationship diagram

Entity Relationship (E-R) models<sup>[8]</sup>. Figure 1 is the E-R diagram for Tender Management System in Kadastra.

The concept database management system is applied in Tender Management System for data accessibility. For example, users in Administrator Department may need to access customers details by using keywords such as name, Customer No, IC No and etc. A database management system allows an organization to structure its information so those users can retrieve data in a flexible manner as well as to prevent users against unauthorized access.

From the research, we know the inputs that needed for the system development have related with particular entity. Files and processes involve in company operation is specified by using Data Flow Diagrams and Data Dictionary. TMS is examined at the top level, ignoring any dependencies that may exist in the system objects.

**Tender payment claim calculation:** Tender payment claim is based on the fees transaction from process, A which is the fees for the separating of boundary or division, process B that calculate the fees for temporary property either HSD or HSM, while the process C is the fees for survey of land. In process C, survey fees for title surveys shall be classified in accordance with the categories of land use such as building, subdivision of building, agriculture, aquaculture, mining, residential, commercial, industry and other purposes. For the purpose of the fees calculation, survey work has been split into separate items with different rates for each item. The survey fee chargeable for each job is the total sum of all the separate chargeable items.

## RESULTS

TMS is developed using several software such as PHP Editor, Microsoft Front Page, CoffeeCup HTML, MySQL Client GUI and etc. The system development was fully implemented through PHP with the combination of HTML. Using MySQL Client

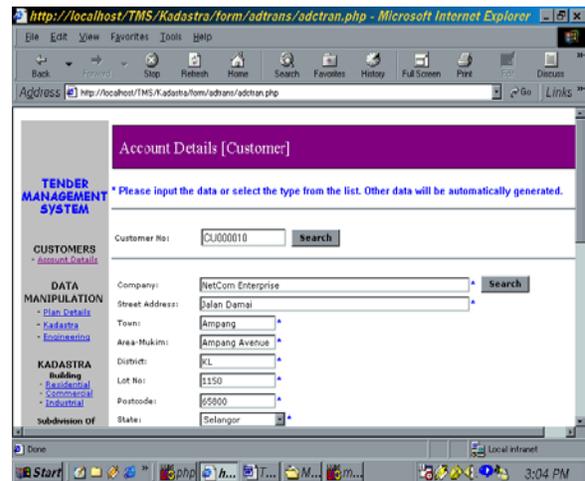


Fig. 2: Interface of TMS in kadastra for account details customers module

Server is an efficient and effective solution to manage the data. This DBMS support timely data transformation and it also have big capacity storage. MySQL database thus emphasizes the integration of all data is one of the world's most popular database management software and very powerful.

## DISCUSSION

**Account details customers:** Account Details Customers modules support users to add new records, edit, delete or search the customer's details. Through this module, user can also search specifically the customer's account details even there were different customers with the same name. The delete conformation will alert user before any record are deleted (Fig. 2).

**Kadastra measurement system:** Kadastra Measurement System module provides the facilities for user to add new record, edit, delete, data search and user-friendly printed report. There three different processes relate with the tender payment claims:

**Process A:** Fees for the separating of boundary or division.

**Process B:** Fees for temporary property (HSD/HSM).

**Process C:** Fees for survey of land.

Under the Process C, there are five categories include building, subdivision of building, agriculture,

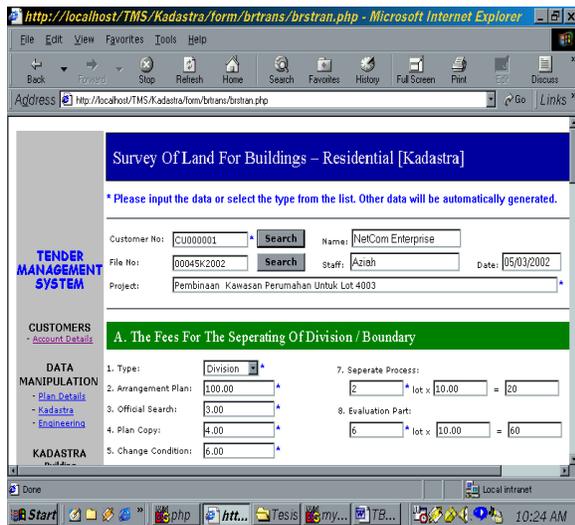


Fig.3: Interface of TMS in kadastra for kadastra measurement system module

aquaculture and mining. The building category is split into three types: residential, commercial and industrial, while the subdivision of building category is split into two different types: residential other purpose.

Fig.3 shows an interface of Tender Management System in Kadstra for the Kadastro Measurement System which is survey of land for buildings with residential category. At the top side of the form, the banner displays the title of tender payment claim type. User need to scroll down the form to complete the tender information.

### CONCLUSION

In this study, we present the new novel contribution in software architecture and design of Tender Management Systems (TMS) in Kadastro. We have elaborates on the system analysis and design, software and logical database design, tender payment claim calculation and the software implementation. Through this proper design and development of the system, TMS in Kadastro able to calculate automatically and generate the tender payment claim

report. Thus, it helps to overcomes most of the problems encountered in the manual system. In addition, the software enables to manage information that based on user-friendly feature, effective data control and support files sharing in network. This system approach allows users to access data in a flexible manner. For the future work, we decided to wider TMS through the development of new various types in Kadstra Measurement System module.

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