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Communications and Interfaces in Implementation of e-Bid System: A Case Study for Governmental Procurement in EC⁺

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ABSTRACT

While the computer network is very popular in many applications, anything is always electronically rebuilt to pursue higher value. This is an era of information technology, computers and networks are linked together to reform the society, all fields of business administration are generally reengineering through the adoption of information and technology. One of the new requirements is the bid system operated in Internets. Because the huge cost and inconvenience in managing paper-based bid system, e-bid system is then required. A research team of professors is formed and get the grant from National Science Council (NSC) to design and implement the e-bid system for three years. The objective is to develop an e-bid system with features of fairness, justice and opening. This paper explains overall design of the e-bid system; all tasks in development of e-bid system are partitioned to five subprojects. The functions of interfaces and communications are in charge by us, we have the primary concern to design and implement an easy and friendly operational interfaces and secure communications for external users. With three basic characteristics of the proposed e-bid system, we hope that the proposed e-bid system may be applicable for all governmental procurements.

1. Introduction

While the computer network is very popular in the current society, anything is always electronically rebuilt to pursue higher value. So, a term of "light, thin, shortened and small" is the best slogan to highlight the particular

characteristics of nowadays products. This is an era of information technology, computers and networks are linked together to reform the society, all fields of business administration are generally reengineering through the adoption of information and technology. Both government and civilian organizations would make use of computers and networks to improve the performance and look for the new goal of automation. In all new developed business modes, electronic commerce (EC)[1] is the most attractive business mode now. We may see the EC as a new challenge to the modern people since the operation in EC is much different from the conventional form we met before. EC is also the new source of competitive advantage, Callon[2] explained that the competitive advantage of current business is also gained by using information technology smoothly. The new development of EC is particularly meaningful to the government. From the view of EC, all services provided by government will be reformable. Governmental procurement is a primary factor to the national economy, appropriate handle of governmental procurement will help the increase of social welfare. However, the use of information technology to the governmental procurement may induce many problems. Because the announcement of civil engineering and purchase would concern of many lawful regulations in which the goals of fairness, justice and opening have to be satisfied, it would make obstacles to develop new operational mode of governmental procurement. Therefore, a good operational mechanism under the electronic environment should be designed and put into practice. The connection of governmental procurement with the

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information technology is the new trend today. When the high efficiency of adoption of information technology is believable, the influence of EC to the governmental procurement is a natural conjecture. The government should link the EC mode to the governmental procurement in order to make procurement efficient and effective. Therefore, a committee named Public Construction Commission (PCC)[3] firstly establishes the Government Procurement Information System in 1998, this system provides a rule to guide the governmental procurement. The important issue is to decide that all purchase cases with budget over 100,000 NT dollars have to announce the purchase news in computer network. This is the first action the government adopts to use the information technology in public. When all purchase cases are announced electronically, another electronic operational mechanism is also considered that e-bid system may be required in the near future. Therefore, the derivation of an appropriate e-bid system is inevitable. Is any existed e-bid system acceptable now? While the e-bid system is a required condition to reach the goal of electronic government, how to develop a qualified e-bid system? All these problems are worthy to note.

According to the goal of electronic government, a good mechanism is required to make the paper-based bidding system transferred to EC mode. The e-bid system may be the objective to reform the disadvantages appeared in paper-based bidding processes. Since the requirement of e-bid system is necessary, a research team from universities is therefore established. Under an attempt of generation of integrated operational system for bid system, this paper aims to develop the communication and interfaces for the objective e-bid system, all regulations and detailed processes are simultaneously considered according to the guide issued by PCC. Not only the detailed processes and regulations are included, but also the security is considered. A secure operational mechanism using computer and network is designed and developed.

While the establishment of e-bid system is required in the EC environment now, an integrated research project proposed by several professors of many universities are developed. According to "Electronic Industrial Promotion Program" led by the government and "E-Commerce", one of key point schemes of "Information Society Research and Development

in Information Security Field" led by National Science Council (NSC), this integrated project is intended to finish the design and implementation of e-Bid system in three years [4]. The proposed e-bid system should be setup on the bases of fairness, justice and open. The proposed e-bid system should also developed based on cryptographic components, the management of database, the design of fair e-Bid protocol, and the practice of e-Bid system via Internet are the objectives for the proposed scheme. We hope to fulfill the requirements of operation about e-Bid system of the government in the near future.

2. The Consideration of Different Factors in Governmental Procurement

To consider extensively, we may point out at least three conditions much different in consideration among civil and governmental procurements, those conditions include:

- (1). Making the announcement publicly:
- (2). No discrimination among suppliers:
- (3). Getting rid of the illegal business practices to e-bid system:

3. Communications and Interfaces

Communications and interfaces are the external world to all bidders, all necessary functions provided by the proposed e-bid system will be viewed and operated. It is therefore important to design and develop a secure environment in which all Internet bidders can easily operate and feel comfortable. Following to clear understanding of the detailed procedures illustrated in government procurement law, all professors in this project [7] has discussed the overall process flow and linkages. Consequently, communications and interfaces are then decided. The overall operational relationship among governments and bidders can be designed and described correspondingly. Integrated e-bid system is depicted in Fig. 1 and shows the overall secure operational environment. The procedure begins as any procurement case is announced, an announcement will be publicly opened in Internet. The procedure is terminated as no tender happens. At the moment bidder submits their tenders, bidder qualification is tested at the second step. Only verified bidders get allowance to enter the bidding system. Keys for cryptographic components are thereafter used to keep bidding processes secret. The functions of key management are always combined with all other operations. When the tender open time is reached, Java secret components are used to open all tenders and compared. A tender coincides the

requirement of the government budget estimate would be selected as a qualified tender and notice the corresponding bidder to continue the fulfillment of procurement. When any bidder has complaint or protest, a handling of protest and complaint is applied. Tracking and control of all processes are undertaken thereafter. In order to make operations smooth, illegal attempts or actions should be avoided and inefficient procedures should be improved, so tracking and control is always implemented in the interval the procurement case is active. All information generated in the e-bid interval have been kept in a database. The data kept in the database should be controlled that only the verified users can access the database. In addition, the database should also be maintained correctly since the information stored in the database has legal value. All directed linkages along all components illustrate the correlation. Fig. 1 illustrates all high-level flow chart for the proposed e-bid system. The directed linkages also reveal the goal of the communications and interfaces for the subproject 5.

Using the above-mentioned process flow chart, the integrated e-bid system may be depicted as a high-level block diagram shown in Fig. 2 in which five subprojects with different objectives are simply explained. From the diagram, communications and interfaces in Internets are the primary functions which subproject 5 has to implement.

4. Features analyses

(1). A detailed process flow is studied and designed to illustrate the overall bid operational logic:

(2). Secure components are included based on the environmental considerations:

(3). Making operational environment easy and friendly:

5. Conclusion and directions for future research

Currently, bid systems are always used very popular now, a fair and open bid system will provide equal opportunities for bidders to get grants. Governmental procurement of civil constructions or public utilities are specially

emphasized the usage of bid system, primary concern is to look for equality and fairness in bidding. There are five subprojects divided to various professors in different universities. We are responsible of subproject 5 for developments of communications and interfaces in Internet. Friendly and secure operation environment in e-bid system is the primary concern. After much discussions and studies, a detailed process flow of overall e-bid system has been designed and depicted. Concrete requirements for communications and interfaces in Internet can therefore be revealed. With such conditions, initial entry pages for various stages of e-bid system are designed and implemented. In addition, security components are also taken into consideration to get rid of illegal attempts. With such considerations, the proposed communications and interfaces techniques are the basic environment for e-bid system. In the proposed operational environment, several advantages of detailed process flow, security components and principle of user friendly have been gained.

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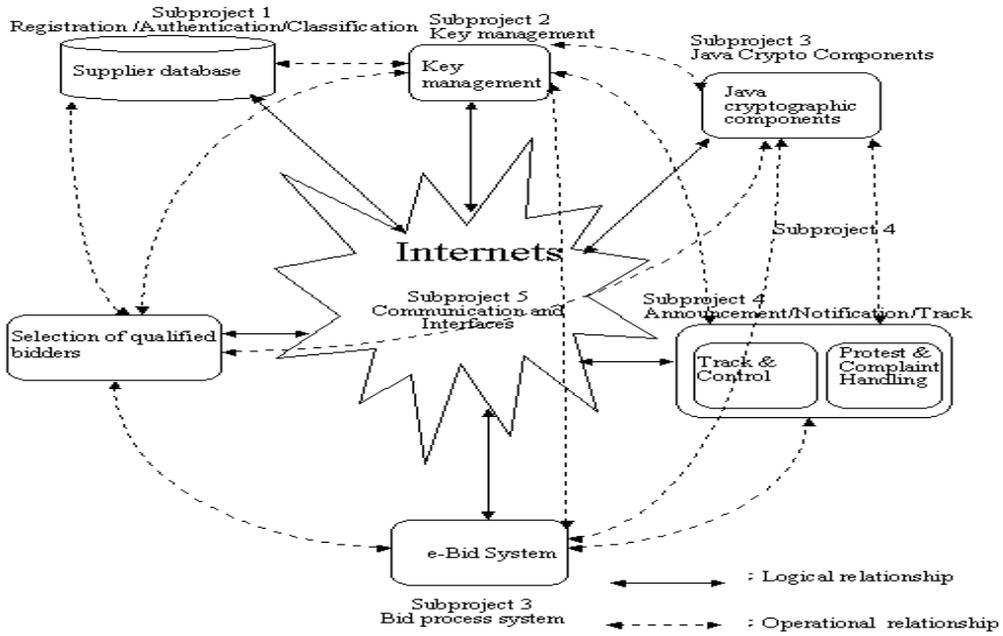


Fig. 2 Secure environment of e-Bid system