

웹 기반 전자 입찰 시스템의 설계 및 구현

Design and Implementation of Web-Based Electronic Bidding System

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요약

최근의 정보통신 기술의 급격한 발달과 인터넷 사용의 폭발적인 증가, 기업의 인트라넷/익스트라넷의 도입으로 인터넷 환경에서의 비즈니스 응용 프로그램의 개발이 다양해 지고 있다. 본 논문에서는 기업에서 조달 업무의 투명성과 신속성 및 인터넷을 통한 수요 기관 및 공급 업체간의 글로벌화를 이룰 수 있는 비즈니스 응용 프로그램으로 웹 환경에서의 전자 입찰 시스템의 설계 및 구현을 다룬다. 본 논문에서 설계 및 구현된 전자 입찰 시스템은 구매, 입찰 및 조달 프로세스로 구성되어 있으며 전자 입찰 시스템에서 입찰 가격이나 계약의 보안 및 인증을 위해 PKI 기반의 전자 서명 방식을 사용한다.

I. Introduction

Recently rapid development of computing and communication technologies, the era of internet computing comes through client/server and network computing. General use of Internet, enterprise information systems are built on intranet/extranet-based. Application systems related to electronic commerce between enterprise and customer or among enterprises in Internet environment are developed variously. In this paper, web-based electronic bidding system for business to business application is designed and implemented to provide transparency, fast response and quality improvement of supply process through global businesses to business in Internet.

II. Design of Electronic Bidding System

Electronic bidding system in this paper is implemented with the Java applet and servlet as the interface for the communication between server and client. JDBC driver is used for the connection between

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server and database management system. The client sides of electronic bidding system are demander and supplier, server sides are bidding server, CA (Certification Authority) server and notary server. Bidding server is in charge of purchasing order management, bidding management, and supply management. CA server and notary server are involved in the digital signature during registering bidding price and contracting process. Figure 1 is the component of electronic bidding system.

The component of Electronic Bidding System

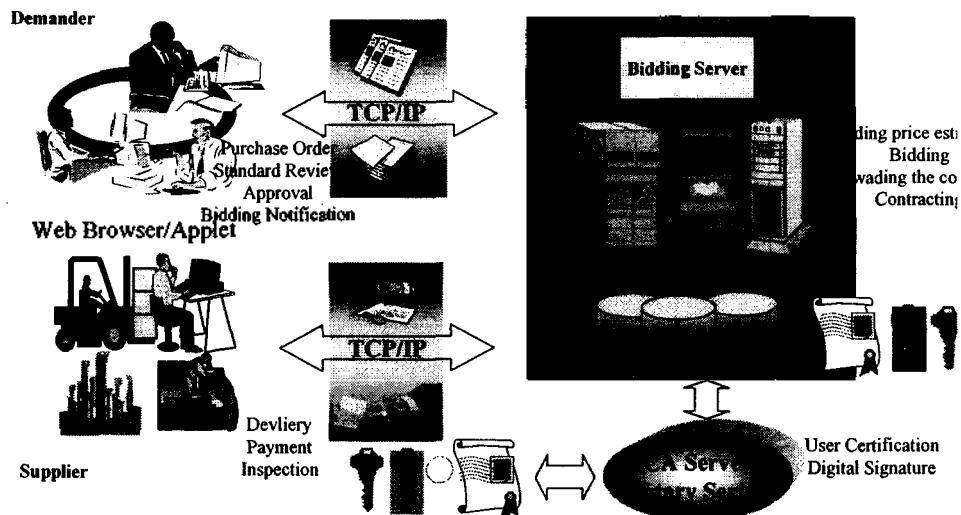


Figure 1. The component of Electronic Bidding System

The electronic bidding system is consisted of three processes: purchasing order process, bidding process, and supply process. The purchasing order process is involved in registering purchase order by demander, reviewing the purchase order in item, quantity, standard form, etc. and approving the purchase order. The bidding process is involved in notifying the bidding, executing the bidding by the lowest price or conditional lowest price, selecting the supplier, and contracting the bidding. The supply process is involved in supply schedule of items, schedule management, inspection of delivered items and payment in response to contracting. Figure 2 is the overview of process in electronic bidding system.

The functions of purchase management, bidding management, and supply management in electronic bidding system are as follows:

Purchasing Management Functions:

- Notification of purchase order and requirement plan
- Notification of purchase plan by period

- Stock status and requirement plan for stock items
- Registration, modification, and deletion of purchase order
- Retrieval of purchase order list
- Notification of purchase order modification

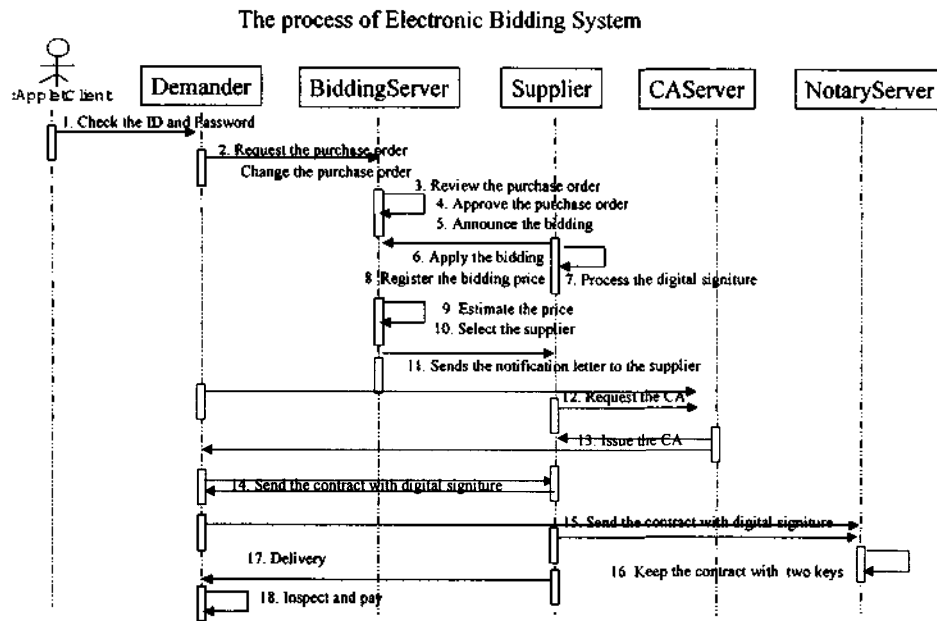


Figure 2. The process of Electronic Bidding System

Bidding Management Functions:

- Retrieval of notification of bidding
- Registration, modification, and deletion of bidding
- Applied bidding supplier information management
- Management and notification of bidding result
- Management of awarding the contract and condition of awarding
- Automatic judgement
- Notification to supplier as the awarding the contract by push service

Supply Management Function:

- Management of supply schedule
- Registration, modification, and deletion of condition of inspection and result of inspection
- Delivery of item management
- Management of settlement of account
- Management of item inspection

During the contract process of electronic bidding system, the security and certification processes to guarantee the confidentiality, non-repudiation, authentication, and integrity are as follows:

- Step 1: Both demander and supplier apply for issuing the certification letter to CA server.
- Step 2. CA server issues the certification letter to demander and supplier.
- Step 3. Demander signs the original contract letter and sends the contract letter with digital signature to supplier. The same procedure is applied for supplier, that is, supplier signs the original contract letter and sends the contract letter with digital signature to demander.
- Step 4. Demander sings the contract letter that is sent by supplier's signed contract letter and sends the final contract letter that is signed by demander and supplier to Notary server. The same procedure applies for supplier.
- Step 5. Notary server signs the two contract letters that have the two signature keys sent by demander and supplier and keeps the letters with keys.

The certification is based on X.509v3 and the algorithm of digital signature is used MD5(Message Digest) with 1024 bit RSA. Signature data format is based on PKCS#1 and PKCS#7.

II. Implementation of Electronic Bidding System

The implementing environment of electronic bidding system prototype is as follows:

- Platform: Pentium PC, Windows NT Server, Sun Workstation
- Operating System: Windows95, NT4.0, Solaris2.5.1
- DBMS: Oracle 7.3.4
- Web Browser: MS Explore 5.0
- Web Server: IIS 5.0
- JDBC Driver: Oracle Thin Driver
- Language/Tool: Java JDK1.1.8, Java JFC Swing 1.0.2, JBuilder, Plug&Play1.0.2

Figure 3 shows the screen of purchase order registration and purchase order change. When purchase order is registered, detail information of item including quantity and standard form is also inserted. After department of purchase order management reviews the purchase order and approves it, bidding server registers it to purchase order management and notifies the bidding on the web including information of closing date of applying for bidding, bidding date and location, bidding security, etc (Figure 4). Supplier confirms the bidding notification on the web, applies for bidding participation form, and sends the bidding price sealed with digital signature to bidding server (Figure 5). Bidding server confirms participating supplier list through bidding management function and estimated the anticipated bidding price. The anticipated bidding prices are based on the lowest price or conditional lowest price.

III. Conclusion

In result of rapid development of computing and communication technologies, EC that is the electronic business to customer and CALS that is the electronic business to business are booming. Specially, the use of internet is increased enormously, EC is generalized and the annual increment rate of CALS is 10 times more than EC.

This paper designed and implemented the electronic bidding system that is one of application system for CALS. Implemented electronic bidding system is used Java applet and servlet as the interface between client and server communication. With this approach, this system can be executed on any web server for the advantage of Java that is platform independent. The database connection through servlet solved the performance problem when the increment of user is proportion to increment of number of process in the case of using CGI. During contracting process, The PKI-based digital signature is used for the security and certification so that digital signature is served as a seal in paper-oriented bidding process or contracting process.

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