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Method to Automate Tender System with Calculation of Best Bidder under E-Governance

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Abstract

E-governance is today an emerging trend in the world and also has been widely accepted in India. Information technology has an immense influence on all the departments in Indian Government.It is considered a good practice when traditional paper-based business documents and processes are migrated to digital systems. Tendering system is no exception to this. It is an application through which proposals, bids and reviews are exchanged between interested parties for securing a project that is published via an automated tendering system.The effectual factor for providing the best bidder is to avoid manual intervention. Although, techniques have been developed to provide the basic exchange of documents andmessaging service, very little research and application has beendone in the area of authentication, secure exchange of data, andstorage of tender applications in multi-user environments. The aim of this paper is to convey an effective enterprise framework and an innovative automated technique for secured e-Tendering system. This will help flawless tender processing and avoid disintegration in Government affairs.

Keywords **— E-Governance, Tender, MD5,SHA;**

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I. INTRODUCTION

The communication in today's world is largely reliant on Information and Technology. Governments across the world are also making increasing use of digital techniques. E tendering in its simplest form is described as publishing, communicating, accessing, receiving and submitting tenders. Thereby replacing the traditional and manual paper based tender process and achieving a more efficient and automated solution. The basic idea behind this system is to authenticate the users, consider their history, focus on quality as well as price of their Tender project. It also aims at thorough visualization of the overall working with respect to regions and tender categories. The system will also focus on generating an automated best Bidder. This will help to avoid manual intervention.

There are three major entities in the system. The tender admin handles the overall process of registration and observes the overall working of the system. It is the duty of the seller to accept registrations and publish the tender and related documents. These are stored in a central or distributed environment but are only accessible via web application. The bidder can bid as many times before the end date.
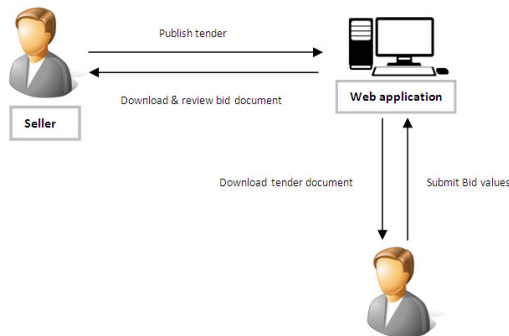
Fig 1.Basic process of system

This facilitates the bidder to submit the appropriate values and be responsible for the values submitted. It is worth noting that all the above process is vulnerable to confidentiality and integrity of the tender. Care is taken that security is adequately maintained.

Cryptographic techniques are used to secure the data.All the tendering data would be stored in encrypted format using SHA-1 algorithm. The login details are most vulnerable for misuse. This system therefore stores all the passwords in MD5 format which is non-recoverable.

The result for the tender is thoroughly examined by various parameters related to the respective tender. The parameters are itself the entities to judge the quality of the tender. Data security will further be enhanced by session handling.

II. MOTIVATION

Some companies still use the traditional paper-based tendering process, and it is well known that they have following drawbacks: less effectiveness, privacy issues, slow access and high cost. E-tendering systems exist to overcome the drawbacks, but may be prone to security relatedissues if security is not integrated into the design andimplementation of the system. These security issues are solved by using SHA encryption for tenders and MD5 for passwords.

In the manual processing the bidders are well aware of other competitors. It is seen that the competitive spirit among bidders leads to deterioration in quality of the tender project thereby affecting the sentiments of citizens. Confidentiality of the bidders is maintained which will make bidders unaware of each other's identity. Unlike the traditional system in which seller chooses the bidder, this system generates a best bidder by the techniques discussed further.

III. APPROACH AND CONTRIBUTION

The proposed system introduces a novel mechanism forsecure e-tendering in an open electronic network. Our system provides protection for bid proposals, authentication details, and documents exchanged during bid proposal and review. Our scheme allows uploading and comparison of bid proposals for a single tender.

There are three parties that are involved in the proposed system of communication using cryptography.

• Seller: any party submitting tender, including constructor, sub-constructor and suppliers, etc.
• Bidder: party inviting and receiving/storing tender bid proposals
• Admin/System: the party providing, and storing session keys for bid proposals.

Figure 1 shows overview of our system which gives the functionalities of each user.

IV. DESIGN AND IMPLEMENTATION

We have designed and implemented a novel mechanism to automate the e-tender system. This System is an integrated system using MS Windows

and web applications to provide secure transmission and authentication over the Internet. We have implemented mainly using C# programminglanguage, SQL server database, Web Service using Dot Net Framework 4.0. This uses the target platform as Windows application and Web application, since this minimizes the difficulty of installing and demonstrating the application.

V. MODULE IMPLEMENTATION

A. Admin/System Module:

Admin/system controls the registration part and authenticates the users as bidders by their submitted profile information and authorizing documents for their identity. If it is found that the document or any mentioned detail is not valid, his request as bidder is rejected. After the registration every bidder is given unique user id, used for session login. The password is stored In hashed format.

B. Password Storage and Confirmation:

For storing passwords, MD5 algorithm is used due to following features:

Hash length: The length of the hash value does not depend on the size of the file. The common hash value lengths are either 128 or 160 bits.

	P1	P2	P3	DIFFERENCE D
THRESHOLD	45	38	22	-
BIDDER1	40 $d_1=5$	39 $d_2=-1$	25 $d_3=-3$	D1=1
BIDDER2	42 $d_1=3$	35 $d_2=3$	20 $d_3=2$	D2=8
BIDDER3	45 $d_1=0$	33 $d_2=5$	22 $d_3=0$	D3=5

Non-discoverability: Identical files will be translated into a different hash value, even if the two files differ only by a single bit. This protects the integrity.

Repeatability: Each time a particular file is hashed using the same algorithm, the exact same hash value will be produced. This helps us to alter our information and store it in safe manner.

Irreversibility: All hashing algorithms are one-way.Once encrypted, we cannot get the same back. Thus, none of the properties of the original message can be determined given the checksum value alone.

After accepting the request by seller, Email is sent to the bidder by using SMTP Protocol.

C. Seller Module:

It is the responsibility of the seller to float the tender with tender details along with speculated time period.
The seller also submits the threshold values for the tender which would be compared with the bidder values.

D. Bidder Module:

The bidder registers himself in the system and can only login after the authentication. He can view the ongoing tenders and choose the one according to his will. Bidder activities are opaque to each other. A bidder is not able to view other bids and other users. The bidder can modify his values until the last date of the current open tender. If the bidder is awarded with Tender, he would be notified by email.

E. Steps to compare Bids and find best bids:

- Accept threshold values from seller in the form of parameters $\{p_1, p_2 \dots p_n\}$
- Accept values from bidder corresponding to each parameter $\{r_1, r_2, \dots r_n\}$
- Calculate the differences between p_n values and r_n values and save as d_n
- Add all the negative as well as positive d values to get D_n
- Find such D for all bidders.
- Search for the lowest D to give correct solution.

Table I

As D1 is the lowest difference in the above table hence Bidder1 gives the correct value.

F. Maintaining History of Bidders:

This is a very abstract parameter but also very important to ensure the reliability of the bidder. The seller will give the rating to the tender project when completed. According to this it would be possible to view which bidder has completed maximum number of tenders along with quality of work by which it helps in selecting a bidder in case of a tie.

G. Maintaining Dashboards:

Visualization of all the entities i.e. bidders in certain region of a state, their quality rated and areas in which tenders are coming up are shown using different charts. This will give the precise details about the overall view of the system and statistics of the development.

VI. CONCLUSION

Even though multiple techniques have been developed for providing the basic exchange of documents and messaging service for e-Tendering, very little research have been done in the area of authentication and storage of tenders. Our work presents a holistic approach for such requirements. We provide the application that makes use of authentication,security by MD5 and SHA, best bidder selection focus on history of bidders and overall review of the system.

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