

UTILITY BILL PAYMENT BASED ON NETWORK SECURITY

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Abstract - The main aim of online bill payment is to develop an innovative window-based online bill payment application system where the customer can pay their bills. It totally minimizes time and is easy to use. Online payments can be made for various purposes with the development of digital technology. Application that provides the user with the ability to perform all the payment of bills and taxes sitting at his or her desk by using the utility bill payment system. Our application makes it easy for departments and offices like the bank, EB, telephone, property tax, and water tax to offer online bill payment to their customers, allowing them to pay their bills with our bill payment system. Customers can go to our website, login with their respective login IDs, and have immediate access to their accounts. It is convenient and user-friendly. It focuses on measuring the efficiency of the application while processing it on a mobile phone.

Property Bills." Many people rely exclusively on computers to do their jobs. The Electricity Board, Water Tax, and Property Tax, and Telephone Bills System, in particular, have been computerized, which is very helpful for bill payments. The calculation of everyday, weekly, and monthly transactions is added to the table, and then the calculation of transactions is done in ascending order by the computer without any disturbances.

The proposed system aims to provide efficient and timely information for decision-making, integrate with other functions, and reduce redundant work. A computer at a very high speed does the calculations, and the accuracy is perfectly maintained and the processing speed is very high. So, the computerization satisfies all the transactions within the quick movements caused by the commands from the users. Now, a lot of time is saved, and it is used for additional work.

Key Words: efficient and secure payment, multiple bill payment, interactive, quality in service, automatic billing, immediate access.

1. INTRODUCTION

The purpose of the project is to present the requirements of the computerization of the billing system. Whenever the customer needs to pay their bill for electricity, water, property, and telephone, they need to login to the respective website and pay their bill through the bank. Once we send the bill amount for the electricity, water, property, and telephone bills to the bank, the bank will adjust the bill amount with their respective account balance for the particular person. It will totally minimize the work load of a person. It does almost every work that is related to the automatic billing connection system, including new connections, customer record modifications, viewing customer records, and all works related to the rate of bills. An application has been proposed to improve work efficiency, save time, and provide greater flexibility and friendliness. The right application has an impact on user satisfaction. A good-quality application can attract users to use the website again because they feel satisfied.

1.1 PROPOSED SYSTEM

Practically, a computer never makes a mistake of its own accord. The Billing System is very helpful for the computerization of the "Electricity Board, Water Board, and

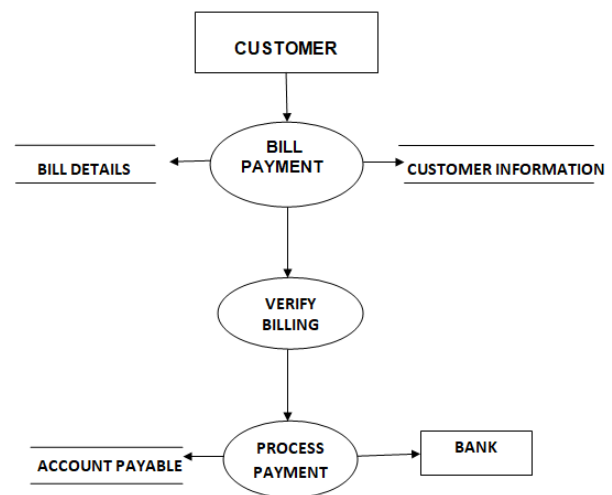


Fig -1: Block diagram of the system

So, quick report preparation is formed by the implementation of computers in the "Electricity Board, Water Board, Property Tax, and Telephone Bill Systems". Service quality is one of the determinants of satisfaction, so users will always use e-billing. The quality factor of the service determines its relevance to improving application performance. Usefulness provides usability of the application, which is felt by its customers; ease of use will give users freedom in their belief efforts. Information quality provides quality and up-to-date information. System quality

can provide or add features according to usability, availability, reliability, adaptability, and response time.

2. TECHNOLOGY AND TOOLS

THE.NET FRAMEWORK

The .Net Framework is the plumbing of .Net. The Framework provides the services necessary to develop and deploy applications for the loosely coupled, disconnected Internet environment. The two main components that make up the framework are:

- Common Language Runtime (CLR)
- Base Class Libraries (BCL)

The CLR is the foundation of the framework. The goals of the CLR are

- Secure and robust execution environment
- Simplified development process
- Multilingual support
- Simplified management and deployment

Visual Basic.NET (VB.NET) is a Microsoft object-oriented programming language which was evolved from Visual Basic 6 used to meet an increasing need for easy web development and services.

Base Class Libraries (BCL)

The BCL is divided into namespaces, which define a naming scheme for classes such as web classes, data classes, window forms, XML classes, enterprise services, and system classes.

ACTIVEX DATA OBJECTS

Microsoft's ActiveX Data Objects (ADO) are a set of Component Object Model (COM) objects for accessing data sources. It provides a layer between programming languages and OLEDB (a means of accessing data sources, whether they be databases or otherwise, in a uniform manner). ADO allows a developer to write programs that access data without knowing how the database is implemented. You must be aware of your database for connection only. Some basic steps are required in order to be able to access and manipulate data using ADO:

1. Create a connection object to connect to the database.
2. Create a record set object in order to receive data.
3. Open the connection.
4. Populate the record set by opening it and passing the SQL statement.
5. Do all the desired searching and processing on the fetched data.

6. Commit the changes you made to the data by using Update methods.

7. Close the recorder.

8. Close the connection.

Table -1

Column name	Data type	Constraint	Description
Accno	Varchar(50)	Not Null	Account number
Service type	Int	Not Null	Service type
Date	Date	Not Null	Date
Ebamt	Varchar(50)		Electricity amount
Propertyamt	Varchar(50)		Property amount
Wateramt	Varchar(50)		Waterboard amount
Telephoneamt	Varchar(50)		Telephone amount
status	Int	Not Null	Current status

Microsoft SQL Server 2008

Microsoft SQL Server 2008 offers a variety of administrative tools to ease the burdens of database development, maintenance, and administration. In this article, we'll cover six of the more frequently used tools such as Enterprise Manager, Query Analyzer, SQL Profiler, Service Manager, Data Transformation Services, and Books Online.

Buffer Management

SQL Server buffers pages in RAM to minimize disc I/O. Any 8 KB page can be buffered in memory, and the set of all pages currently buffered known as the buffer cache. Available memory in SQL Server decides how many pages will be cached in memory. SQL Server includes a cost-based query optimizer that tries to optimize based on the cost of the resources it will take to execute the query. Finally, it decides whether execute the query concurrently or not. While a concurrent execution is more costly in terms of total processor time, the fact that the execution is actually split among different processors might mean it will execute faster. Once a query plan is generated, it is temporarily cached.

Data Storage

The main unit of data storage is a database, which is a collection of tables with typed columns. A SQL Server database can contain other objects, including views, stored procedures, indexes, and constraints, in addition to tables and a transaction log. A SQL Server database can contain a maximum of 231 objects. Storage space allocated to a database is divided into sequentially numbered pages, each 8 KB in size. A table is split into multiple partitions in order to spread a database over a cluster. Rows in each partition are stored in either a B-tree or heap structure.

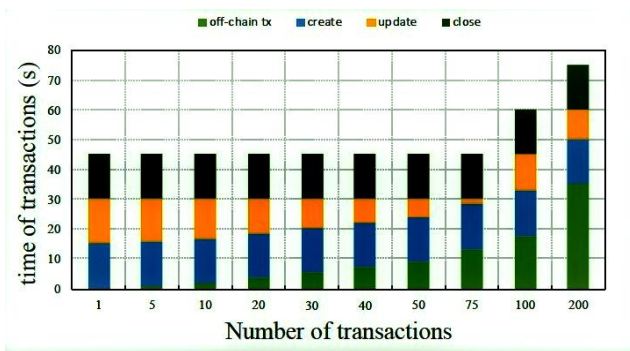


Chart -1: Multi transactions

3. DETAILED CONSTRUCTION

The model of multi payment is designed to highlight features of related work that integrates these to get the best protocol for mobile payments that can support new lifestyles.

The new model has four parts, as follows:

Customer (C): (client, purchaser, buyer) who obtain goods and services from a supplier for a monetary or other valuable consideration.

Merchant (M): is a business person who trades in commodities produced by others, in order to earn a profit.

Intermediary (IN): is a virtual mechanism connected to all parties for distribution of the message.

Payment Service Provider (PSP): A trusted third party that supplies money for businesses such as banks or nonbanks.

Table-2

Consider a scenario of public utility payment. The party C is a member of the party M_i for contacting the business. C and M_i are members of the same PSP, which have separate account numbers such as Acc-c and Acc- M_i . The M_i presents a hard copy bill to the customer for payment. The customer can make payments to multiple merchants via mobile applications that can select many bills payments per transaction.

The multiple payments protocol consist of six steps shown below:

Step1: $C \rightarrow IN: M1 = \{T_x, \{A_{cc-c}\}_{SK(c-psp)}, h(\{A_{cc-c}\}_{SK(c-psp)}), SK_{(IN-C_j)}\}_{SK(IN-C_j)}$

Customer send T_x and account number to PSP pass IN.

TID	Transaction Identifier of the payments
ID _x	Unique Identifier of entity X
PO _{M_i}	Multiple Payment Order
PO	Payment Order
BillNo _{M_i}	bill number for each merchant
Price _{M_i}	Price of goods and service
T _p	Starting timestamp of transaction processing
A _{cc-M_i}	Account number of merchant i
A _{cc-c}	Account number of customer
Status	Set of Confirm Payment each merchant i
Status _{c-M_i}	Approved/unapproved
{M} _k	Encryption message M by key K
SK _{X-Y}	A session key that shares a secret key between entity X and entity Y, in order to protect from replay attack session key used once.
h(m,K)	Message Authentication Code(MAC) or HMAC of a message m and key K
T _x	Payment Transaction={TID,Tp,PO}

Message (M1) was encrypted by session shared key between C and IN that provided confidentiality properties. People who do not have the session key cannot access the transaction.

Payment Distribution Process:

Step2: $IN \rightarrow M_i: M2 = \{T_x, h(T_x, SK_{(IN-M_i)})\}_{SK_{(IN-M_i)}}$

IN received the message from C then decrypted by using the session shared key and checked the destination to transfer

and distribute to all merchants via protected data using the encryption technique.

Authorization request from $M_i \rightarrow IN$ to PSP:

Step3: $M_i \rightarrow IN:$

$M3 = \{Status_{M_i}, T_x, \{A_{cc-M_i}, Price_{M_i}\}_{SK(M_i-PSP)}\}$

M_i checks the message to ascertain if the condition matches or does not match, then updates message (approve or unapproved) of status. Then call back to IN for transfer to PSP.

Authorization Request/Response Between $IN \rightarrow PSP$

Step4: $IN \rightarrow PSP: M4 =$

$\{Status_{M_i}, T_x, \{A_{cc-c}\}_{SK(C-PSP)}, \{A_{cc-M_i}, Price_{M_i}\}_{SK(M_i-PSP)}, h(\{A_{cc-c}\}_{SK(M_i-PSP)}, \{A_{cc-M_i}, Price_{M_i}\}_{SK(M_i-PSP)}, SK_{(IN-PSP)})\}_{SK(IN-PSP)}$

PSP checked the status and updated authorization request such as balance account of customer and merchant then responds to C and M_i pass In

step5 $PSP \rightarrow IN: M5 = \{Status_{c-M_i}, T_x, h(Status_{M_i}, T_x, SK_{(IN-PSP)})\}_{SK(IN-PSP)+1}$

PSP send message to IN for transfer to C and Mi
 Step6 $IN \rightarrow M_i: M_6 = \{Status_{C-M_i}, T_x, h(Status_{M_i}, T_x, SK_{(IN-M_i)})\}_{(IN-M_i)^{j+1}}$ and $\{Status_{C-M_i}, T_x, h(Status_{C-M_i}, T_x, SK_{(IN-M_i)})\}_{(IN-C)^{j+1}}$

IN divided the information and distributed to C and Mi. The aforementioned six steps of the proposed protocol ensures the security properties : CAIN. All messages that are transferred on network by using a cryptographic technique that consists of symmetric key cryptography, hashing function, and Message Authentication Code (MAC)

4. RESULTS

Figure 2 shows the login form, which has admin, user, and registration forms. In the registration form, the admin and user can register their details. Both users and administrators are provided with a username and password to login to the page.



Fig -2: Login form

Figure 3 is the bill number registration form, which allows the user to register their bill numbers provided to the specific department. We can provide the details of the electricity bill, water bill, telephone bill, and water tax.

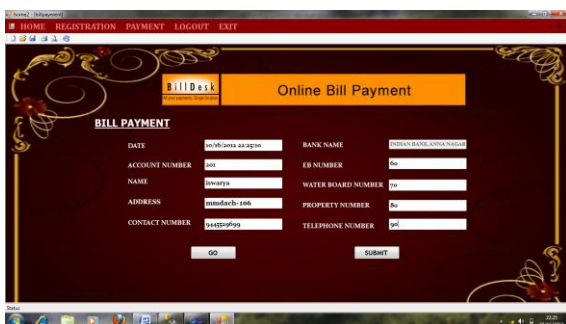


Fig -3: Bill number registration form

Figure 4 shows the adjustment of bills done in transaction form. Here, the user receives the multi-bills at the end of the month from the bank and requests to pay the bills. This transaction form allows you to combine the bills into a single payment. Finally, the user will get the confirmation of paid bill details through Email.

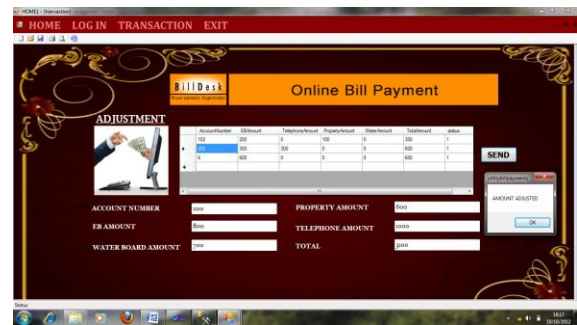


Fig -4: Adjustment of bills

5. CONCLUSIONS

We have tried to develop a system that can be a great help for the customer to pay their bills for electricity, water, property, and telephone through the bank. The application is very well tested, and errors are properly debugged. We have left all the options open. If there is any requirement by the user for the enhancement of the system in future, then it is possible to implement them. There is necessary of future enhancement in system, as the limitations will be overcome by better future technologies.

6. FUTURE ENHANCEMENT

For any system, it is necessary visualize the future scope. In the future, more software companies will hire this program because nowadays, the need for speed in day-to-day life has become essential. As competition increases, companies develop more efficient versions for individual success. For example, in my project, records of the customer and their transactions are maintained, which will be helpful in the future as references prior to dealings as well as evidence. Also, limitations can be overcome by better technologies, and systems can be made more efficient.

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