E-Bill: Development of Web Based Application.
Generating Online Electricity Bills for Albanian "CEZ Distribution" Customers

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Abstract

Based on the very difficult situation of distributing energy bills to all customers in Albania, for "CEZ Shperndarja" Electricity Company was necessity to come-up with the development of E-BILL web based platform to help all our customers to print the invoice, see the monthly consume of the electricity, see even the whole historical consumption and one more steps were the data-cleaning forms updating those contract personal data. Why E-BILL was the first question? And the answer immediately was as e-bill is fast, correct, and secure and you need to spend less time staying in line for hours to our customer care centres. All clients can have possibility to see their invoices and print them from home, office, or internet cafe computers.We choose the WAMP platform as a dynamic web-based application of type client-server developed and implemented in a Windows-Apache-MySQL-PHP platform. It ends up with the conclusions, which indicate the usage of E-Bill platform from actually registered customers getting monthly bills and facilitate the data cleaning process through fullfillment of the forms.

Keywords: Web Platform, E-bill, Survey, monthly bills.

1. Introduction

The delivery of invoices by "Posta Shqiptare" or other private delivery companies has been a big problem for all Albania "Cez Shperndarja" customers, around 15-35% was declared as undelivered invoices and the number of customers waiting for getting the printed invoices at our customer care centers was increased monthly up to 10-15%. "CEZ Shperndarja" as per the data cleaning project, to have a better collection performance, as per invoice delivery through the readers project decided to improve the performance of delivering the invoice by:

- Designing a new web platform called E-Bill for generating all customers invoices
- Designing and usage of Data-Cleaning form for updating and correcting all customers data registered in E-Bill.
- Delivering invoices in very difficult rural areas through the readers staff and make aware clients using E-Bill more often through internet

This paper presents the E-Bill web platform designed for Albanian Citizens for generating their electricity invoices online. The primary goal of this application is to offer a suitable interface to all "CEZ Shperndarja" clients in Albania in order to simplify and reduce the time consuming for generating monthly invoices, correct and fulfill all data-cleaning process for having the most accurate data for all customer contracts with "CEZ Shperndarja" company.

Figure. 1. E-Bill Platform User Interface

Figure. 2. E-Bill Platform/Data Cleaning Form User Interface.

We aim to present a mostly complete view of our application focusing especially on the design process and the pre-analyses done before arriving to the needs of this development.

With E-Bill platform all clients can print the invoice, see the monthly consume of the electricity, and see even the whole historical consumption. One more steps were the data-cleaning forms updating those contract personal data.

All customers need to be registered first on the E-Bill and been recognize by the system with the following credentials:

- Contract Number
- Name Surname (Holder of contract)
- Agency
- Tel Number or E-mail Address

The system generates immediately secured login credentials:

Username and Password (unique for each client on Billing System)

Since the beginning the number of clients registered on the first two months was up to 50.000 clients, and after two years application running and fully functioning the total number of clients was 350.000- 400.000 customers registered.

The feedback of this survey of how much important and useful was for the customers the development of E-Bill platform was as positive as the whole portfolio number of clients was 1.2 million customers in total. Including even big companies were using e-bill fully and in two years fully operation application was 400.000 clients registered and active monthly.

2. Analyses, Implementation, Testing and Go Live.

The system and application software is required to develop E-Bill application software for generating monthly invoices, historical invoicing and fulfilling a data cleaning forms per each contract/client belonging to for updating the actual data and correcting mistakes on the name address phone number and e-mail address. The present Web technologies support to develop web-based software for various services that can be accessed anywhere and anytime are categorized as LAMP (Linux, Apache, MySQL and PHP) and WAMP (Windows, Apache, MySQL and PHP). [3, 7, and 8].

After several meetings and interviews with the Customer Care, Sales, Collection, IT highest manager's level and IT analyses development and maintenance team the requirements specification document was created for developing the E-bill application and Data-Cleaning form. Review of existing documentation helped us on understanding all elements of electrical invoice. The whole database platform already existing in Billing System, were a good reference when working for the final requirements specification document for both E-Bill and Data Cleaning form. Project Methodology used

- First phase:
    - Analysis and Definitions
    - Implementation
    - Backup Policy
- Second phase:
    - Final preparation (Migration, Integration tests, Documentation, user training)
- Simulation before Going LIVE supporting or not 1.2 million customers
- Go Live
    - Testing with internal users of the company
    - Go live on the internet platform

In general, all CEZ Shperndarja internal users using the E-Bill system from the Intranet and all other customers accessing from Internet founded the importance of such application and how useful was for all of them the use in facility and simplicity in their work. The success or the failure of a software system depends mostly on its utilization. If the E-Bill application doesn't help and facilitate user's work, or if it is too complicated and time-consuming for them, they will never use it and that is why the correct definition of functional requirements is essential.

3. Software Design and Model

After the analyses phase and agreement for the further steps the software design is the most important phase of the project and it is usually the most crucial one or the success of a the E-Bill system. It consists in developing a database and software model which will interact with the database for storing, modifying and retrieving data.

The first step in this phase was modeling the real world system in a well structured database (used the same structure as Billing DB but a normalized one). This model is represented by the entity-relationship diagram as shown in figure 3.

During the designing and normalizing the E-Bill Database, we have done the proper analyses of the real world system and model it in a database. A well-designed database takes time and effort to conceive, build and refine, this was done for E-Bill keeping in mind all problematic platform the Billing Database was phasing during the time. The main and primary DB which replicates daily with the E-Bill Database is the Billing System Database; the back- up of both systems is done daily and weekly.

An effective data model completely and accurately represents the data requirements of the end users. The model used for E-Bill eliminates redundant data, it is independent of any hardware and software constraints, and can be adapted to changing requirements with a minimum of effort [1, 2, and 4].
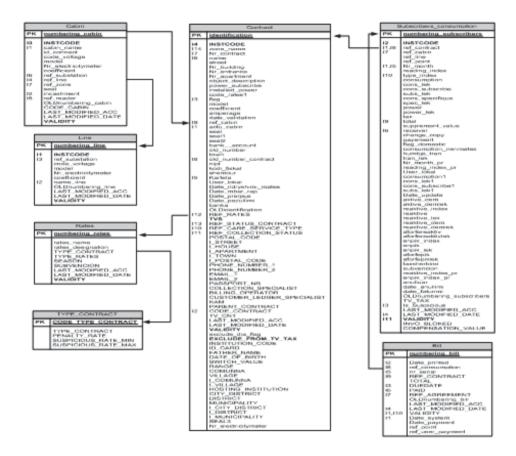
Figure. 3. Entity-Relationship Diagram of the E-Bill Platform

In figure 3 are shown the most important entities of the model and their relationships, where this core model was achieved after consulting several times the requirements specification document in order to assure the best modeling of the real world system. The further step was designing the software model and it was already agreed to use Object-Oriented Modeling as one of the most used techniques based on the advantages it offers.

4.   Implementation

The next step is the implementation of the software for interacting with the database and most importantly offering a user friendly interface to do so. E-Bill platform everyday make a copy of the previous day registered regularly on Billing System on a day routine, meaning the E-bill platform is one day in delay with the main DB of Billing System from which gets the data and fulfill the others tasks for generating the invoices platform for the clients registered and requiring their data.

   The communication between the database and the software includes:
   - Storing data/information into the database
   - Modifying data/information already stored in the database
   - Retrieving and consulting data/information

   Each user of the application should fill identification requirements in order to login in its personalized interface and use the application and its features.

   Security infrastructure is essentially required to protect the systems (servers and personal computers), software, applications and the data that are being used in the E-bill, where invoices and data cleaning forms are made available in to be accessed, printed or fulfilling data.

5. Conclusions

With the initiative of the ICT Director and full support of Sales Division Director and Customer Care Director of CEZ Albania/CEZ Shperndarja it was established a working team for the analyses, design and implementation of E-Bill system.

The goal of this project was to develop E-Bill platform helping all around Albania CEZ Shperndarja customers generating their electricity consumer invoices monthly, historical invoices and updating their personal contractual data on Billing System through Data-Cleaning form.

To this end, we claim that a path - based incremental development approach, in which users are involved in evaluating each increment, is a good approach for appropriate technology Web applications.

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