# Document Cloud Storage: DocDigitize

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## Abstract

In today's technological era, the use of cloud computing and cloud storage has become the norm for many big companies. This is no different for Health Insurance Organizations that are regulated by various corporations such as the Commissioner of Insurance of Puerto Rico. They require extensive documentation of every document that is sent and received. The goal is to design a multi-system application program for the Health Insurance Organization. The primary purpose of the application is to facilitate and improve the process of digitizing different documents of the company. It will offer a secure way to save the documents and at the same time ensuring the quality of these in the system. Employees can upload, monitor, and view the documents required by the company in a simple and safe environment. It will also help the company in audits and increase the overall income of the company in terms of storage, employee time and printing of document copy

## Introduction

The health insurance company, the main objective of the company is selling health policies, Individual Retirement Account (IRA), Annuities, and other products. Is one of the biggest Puerto Rican insurance companies that offer services that can help people have a better future. For many years, the company has been highly dependable on internal servers and manual methods to store documents. These have become a problem for the accessibility of the documentation, document security, and document integrity. This inefficiency has been observed as part of audits or annual revisions, as a regulated company this affects the compliance systems and in the long run, will result in loss of money.

## Problem

The actual system of contract documentation is completely human dependent. Employees are required to store every document (forms, personal information, bank account information, social security, among others) the process requires a person to: receive the physical documents, scan them, move them to the corresponding folder and file a hard copy. Because of the extensive number of customers and products the process can be slow and not 100% efficient. Also, the search of documents requires time, seeing that the only traceability that exists is a manual log that specifies who stores the files and where it is stored. Presently, one of the most critical parts is security. There is no traceability of the process and human error can damage the quality of the document.

## Goals

As part of the creation of the software, the primary objective was to store all previous documentation and current documentation more securely and efficiently. Another important capability was to bring better and consistent access to all required users. Last, provide the company with an importing monitoring system and maintenance of all documenst. Base on this the following requirements were established as the key for the software creation: Document/Information Storage and Accessibility, Log Maintenance and Regulation, Document /Information Security. Some other key aspects are to reduce document damage or loss by 10%. Also reduces a 25% on labor (cost = (quantity of time takes to complete a task)/ (employee work hours) * employee salary). Reduce 50% to 60% in the used paper in the creation of a duplicate hard copy of documents.

## Methodology

To improve the documentation process and the security software was created with the language of C# [1] and Visual Studios to create the GUI interface in the WinForm model [2]. This software allows having the documentation centralize and improve security. To manage the program analysis and creation a waterfall model structure was utilized. To create the software is important what data is collected and stored. Once the process of normalization was done the entity-relationship model that is shown in Figure 1 was established. The database management system (DBMS) that was utilized was SQL Server 2019 [3] it is the company's primary DBMS system. To comply with the objective of security, all data will be encrypted utilizing SQL Transparent Data Encryption (TDE) as well as storing the data in a varbinary type format.

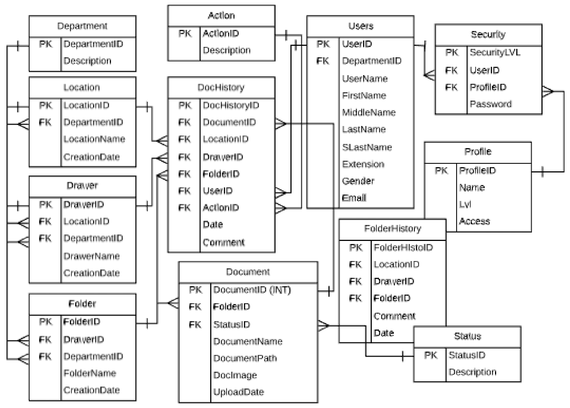


**Figure 1 ERD Diagram**

To analyze the functions that the software will perform, a program flow chart was developed, showed in Figure 2. These requirements are base on the end-users needs, company law, regulations, and requirements. With this flowchart requirements between screens can establish this includes events that are required and functions that will be utilized by the system. The program flowchart allows to determining the key requirements and the environment in Microsoft Visual Studio. It helps users understand in graphic design how the program is structure and how they are to interact with the application.

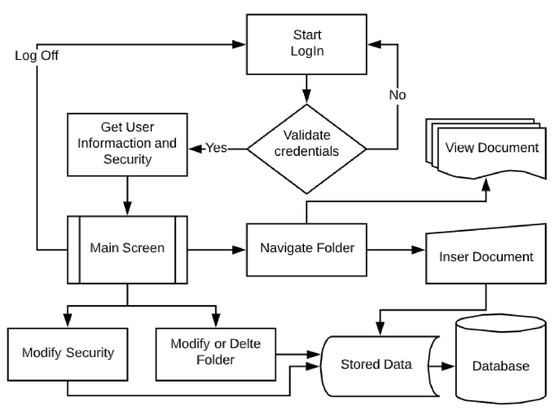


**Figure 2 Program Flow Chart**

## Results

For the software to be presented as a completed software, the three primary objectives determine by management were completed. One of the three primary objectives is Document/ Information Security. As shown in Figure 3 a Login module was created, this window is the primary filter of security to have access into the documents. It is connected to the company's windows registry and company employee database, given only access to authorized employees. This module provides better monitoring of the users, better maintained, and accurate user information.

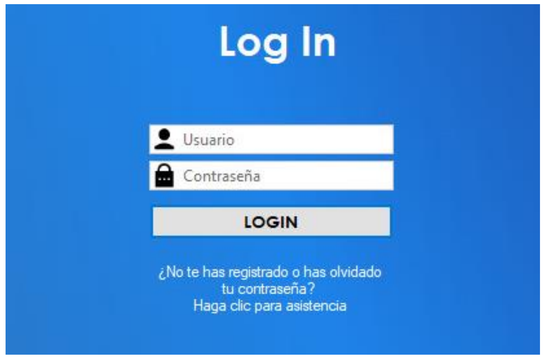


**Figure 3 Login Result**

Once the user credentials have been validated, the user will be presented with the main screen shown in Figure 4. In this section, the Document/Information Storage and Accessibility are managed. From here the user can upload and navigate among documents, base on the security permitted to the user. To provide an easier search for document a search bar option is included in this window.

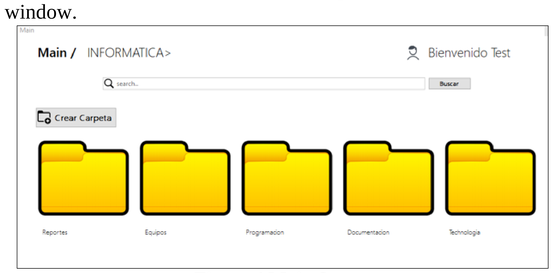


**Figure 4 Main Screen**

Once the user selects the document, it displays the document and an information window like showed in Figure 5. The information window is a structure to Log Maintenance and Regulation, complying with the primary objectives. It includes an audit trail that will present the history of the document, including changes and movements with the date and user information.

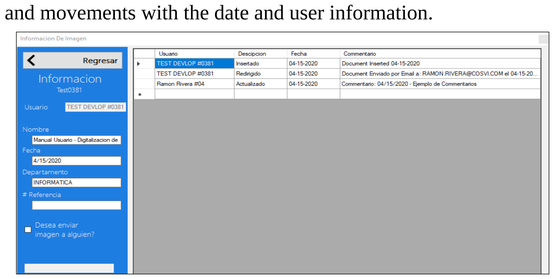


**Figure 5 Document Information and Audit Trail Screen**

## Conclusions

In conclusion, all three primary objectives has been fulfilled. In security, by including the logging window with: windows register and approved user list the access to the document is 100% regulated. For an extra layer of security, no document is deleted from the database. The visibility is disabled and status in the audit trail is set to delete, this prevents the loss of documentation. The document audit trails, as well as other internal logs within the, can provide effective responses to documents changes or movements in audits and other law enforce regulations. Achieving the primary goal of reducing loss in documentation by 10% or less. The document information storage and accessibility were established by providing a united database system that employees will store all the information and giving them access through the application, given a 25% boost in productivity. Finally, because of the improvement in accessibility and storage of the document in a digital format, the need to duplicate hard copy documents is not required, reducing 60% of paper utilization.

## Future Work

Some future work that is plan for the next phase, a mobile app in Xamarin [5] and/or web application, will be introducing. In the mobile application the utilization of the mobile device camera for scanning documents and uploading images is a strong upgrade. To ensure the upload user's integrity a digital signature will be implemented as a watermark to identify the person that uploads the document as a visible mark. Other improvements that are been requested by personal is the inclusion of in application reports, document rotation to an Upright portrait mode, and document word scanning to help with searching text found in documents (this could include the reference number and lots number).

## Acknowledgements

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