

# One approach to design and implementation of law office information system

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**Abstract**— Information systems are becoming a necessity in every line of work. Technology is progressing with enormous speed and small businesses, as well as big companies, have to keep up with the change so that they can offer services and products that are better and have more quality. In a line of work such as the law practice, where every day work cannot be imagined without tons of paperwork, information systems can achieve their main goal which is helping the users' business by supporting its processes, operations, management and reducing the amount of paper data. In this paper we describe the process of the design and implementation of one such system. Our solution is called LawOffice. Within our solution, we have a desktop application, which is the main application of the system, and an Android application for easy data access from user's mobile device wherever the user is located.

**Keywords** - law office; information system; WPF; WCF; Android

## I. INTRODUCTION

One of the key conditions for the survival of a certain business is its flexibility and adaptability. In other words, a company needs to react adequately to market changes on strategic, tactical, operational and technological level. A certain level of business monitoring can be achieved by manual records such as paperwork, but such records are not fast and precise enough. They are prone to errors because human factor is involved too much. Paperwork is often subjective and performing certain actions often requires involvement of several people, and if the time factor is added to it all, it becomes clear that expenses rise significantly [1].

For all these reasons, information systems introduced in companies have a task to convert a huge amount of data to useful information. Information systems support business processes, their operations, management, decision making and reduce their cost. It is a common mistake that only bigger companies benefit from information systems. Modern business, from small entrepreneurs to the largest companies, has information-technology needs. Even though information systems for small businesses cannot compare to the systems of larger companies, essential functions of doing business require some sort of information management technology. Appropriate technological infrastructure can help to successfully start a business [1].

There are countless software companies that develop software for small businesses: accounting software, human resource management software, etc.

Some lines of work have to deal with a huge amount of information. One of them is law practice. A law office depends on quick and high quality information so that it can provide quality service to its customers. The basis of law practice consists of gathering and organizing facts, clients' cases, statutes or communicating with clients and third parties [2]. With the help of information technology, lawyers can effectively do that. It changes the way data is collected, retrieved and organized, and thus transforms the practice of law itself [3].

The concept of eLawyering or virtual law practice exists for about 12 years. Methods and IT platforms that facilitate eLawyering have not stood still. ABA's Law Practice Management Section started the eLawyering Task Force in 2006. Its responsibilities are to define eLawyering within boundaries of new techniques, both organizational and technological, and to generate best practices and guidelines for practicing law online [3].

From these methods and guidelines a number of software solutions for law offices were created. Most of them are Cloud based software that offer their clients secure way to transfer their legal documents and information to the corresponding law office [4]. Some of them are Advologix, MyCase, HoudiniEsq, and Clio and all of them provide a secure way for communication with clients as well as sharing documents, bills and making online payments. Many solutions provide integration with Microsoft Word, Excel, Outlook, Acrobat, Google, and many other.

As it can be seen, future of law practice lies in quality information systems that can help law offices to go paperless, which is the goal in this line of service [5]. A big market exists, but not many offices have a software solution that is designed especially for them. This is what we intend to exploit with our solution.

In this paper we will discuss our software solution - LawOffice. In contrast to most of the existing software targeted at similar applications, which is web based, our solution is desktop and Android-based. We feel that this

increases client confidence in the system and creates a market advantage.

The rest of the paper is organized as follows: section II presents system design and architecture, section III presents system implementation, and section IV presents conclusions and future work.

## II. SYSTEM DESIGN AND ARCHITECTURE

Our desktop application uses mix of technologies that allow its development and implementation. The application itself is developed in Microsoft Visual Studio using C# and .NET technologies. Microsoft's UI framework WPF (Windows Presentation Foundation) is used for the purpose of developing the graphical user interface for the application. The application relies on Web Services for data exchange and WCF (Windows Communication Foundation) for defining access protocols to Web Services. A Microsoft SQL Server database is used to store the data.

An Android application has been developed in the Java programming language, using the Android Development Tool and Android SDK integrated with the Eclipse IDE. Like the desktop application, the Android application uses the same Web Services, WCF and Microsoft SQL Server database.

The database is located on a single server machine. Both the Android and the desktop application manipulate the data in the database only through a single WCF service. The service receives all requests from applications and depending on the request performs a certain operation on server database. It can be writing new data in tables, updating existing data or simply reading the data. After getting a response from the database, the service passes data to corresponding application, which then presents the data to the final user. A block diagram of the system is shown in Figure 1.

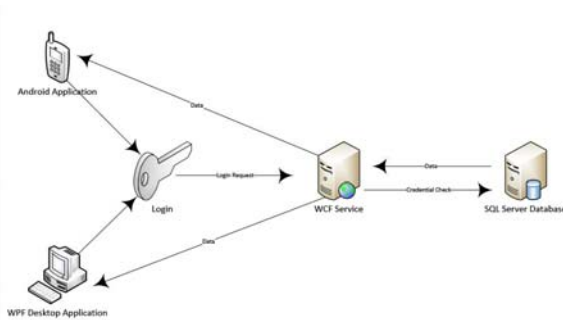


Figure 1 Block diagram of the LawOffice system

In the following text, a more detailed description of applied technologies is given.

The database used for both the desktop and the Android application is a Microsoft SQL Server 2005 Express edition relational database.

The main mode of retrieving data from the SQL Server database is by executing queries. Queries are created in web service methods and define what data is going to be retrieved or stored.

An UML for the database used for presented applications is shown in Figure 2.

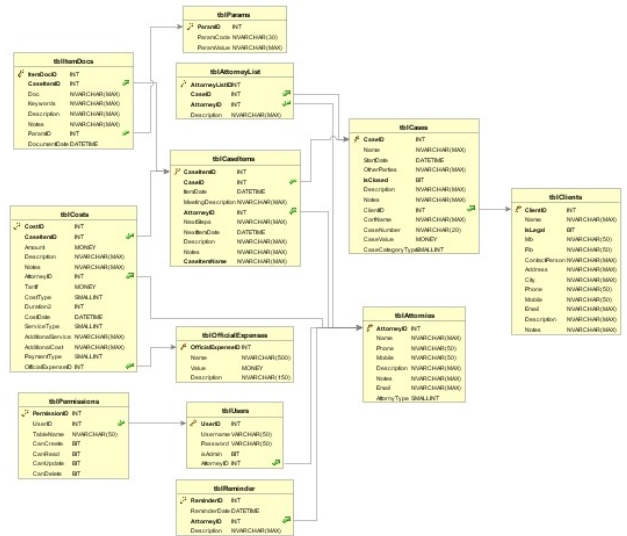


Figure 2 UML of the database used for the LawOffice application

.NET software framework, version 4.0, developed by Microsoft is used during the development process.

Windows Communication Foundation (WCF) is a Microsoft framework designed for building service-oriented applications [6]. It is a replacement for all earlier web service technologies from Microsoft. WCF's fundamental communication mechanism is Simple Object Access Protocol (SOAP). It is a flexible platform and can be easily combined with other Microsoft products. WCF implements interoperable Web services, integrated with cross-platform security, transactions and reliability. It provides many other features such as multiple transport and encodings, multiple message patterns, AJAX and REST support and etc.

Windows Presentation Foundation (WPF) is a Microsoft's GUI framework, used with the .NET framework [7]. It is a user-experience platform for developing highly interactive and sophisticated UIs. WPF uses Extensible Application Markup Language (XAML), a declarative XML-based language, for defining UI elements, data binding and other features. XAML makes easier creating and editing GUIs and allows the work to be split between a designer and a programmer. WPF as a GUI framework allows creating applications with wide range of prepared GUI elements without having to write or buy new controls.

The programming language used for desktop application is C#. It is a multi-paradigm programming language that includes strong typing, declarative, functional, imperative, generic, component-oriented and object-oriented programming disciplines and methods, developed by Microsoft under .NET framework. It is chosen as a great solution for use in developing software suitable for deployment in distributed environments. In addition, C# gave us a great support for internationalization.

The programming language that was used for developing the Android application is Java. Android Development Tools

(ADT), plugin for the Eclipse IDE, that extends the capabilities of Eclipse, was used in order to enable quick set up and development of the projects.

### III. IMPLEMENTATION

In this section a more detailed presentation of both the desktop and the Android application is given.

#### A. Desktop application

The desktop application was developed using technologies described in the previous section. It is important to emphasize that this application is developed to be able to handle different cultures and regions. It supports three languages: Serbian, English and Hungarian. Additional languages could be added easily.

After the user initializes the application, a login window is shown. Application uses security protocols and password encryption provided by the WCF service protecting user's data from unauthorized usage. The messages are encrypted using the default AES algorithm with a 256-bit key, but a number of other encryption algorithms are supported by the WCF (3DES, RSA, SHA256, etc.).

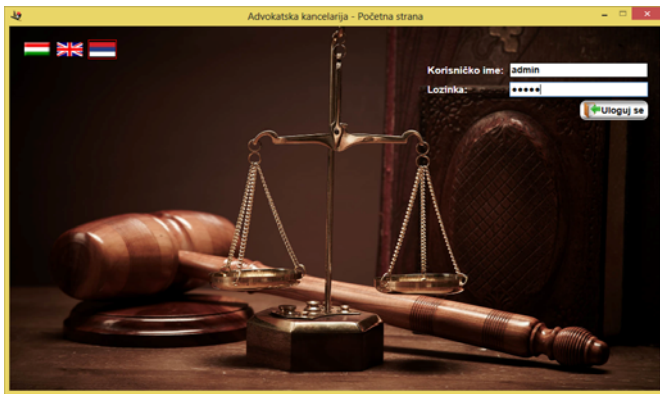


Figure 3 Login window of the desktop application

Application is divided into six sections as shown in Figure 4.



Figure 4 Sections of the application

First section is called "The Office". It provides basic information about the office itself, as well as options to change or update the information. This data is used in headings for various reports that we will discuss later.

Second section is called "The Executors". It contains a list of all the executors (lawyers, managers, helpers, couriers...) of the law office. It provides options to add a new executor, edit or delete an information of an existing executor, or to see his detailed info. Besides the basic options, this section allows to see reports from every executor. It allows the user to see the executor report for a certain time period and for a certain client in whose case the executor was working.

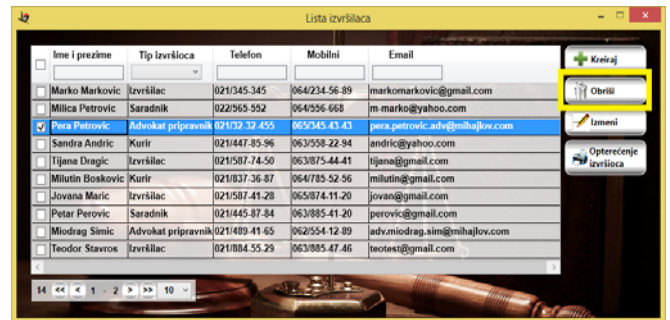


Figure 5 Section „The Executors”

The third section is called "List of users". This section is only visible to the system administrators and contains information about app users and their level of access in the application itself. In this section, administrators can add new users, change their level of access, delete users, etc. Type of application users are administrator, advanced user and basic user. Administrator has all the privileges, advanced have some advanced privileges like creating, editing or deleting cases, but cannot manage other users, and basic user that has limited privileges like edit case items, but cannot delete existing ones, thus protecting sensitive data from unauthorized usage.

The fourth section is called "My profile" where the user can change its information like password, email, etc.

The fifth section is called "Tariff". It contains a list of tariffs on rewards and compensation costs for counsel as prescribed by the Bar Association of Serbia. In this section user can create a new tariff, or edit or delete an existing one. Tariffs are used when creating expenses for a certain case. This will be explained in more detail later in text.

Sixth and final section is called „Reminders". This section provides reminders for the user in order to have a better insight in following events like meetings with client, hearings in court, etc.



Figure 6 Section "Reminders"

After a user logs in, he is offered a list of clients that currently have an open case in the office, or they had one previously. In this window, the user can search for clients based on their case number or their name. The list of clients contains information about every client, such as their name, date of birth, identification number, tax identification number, etc.



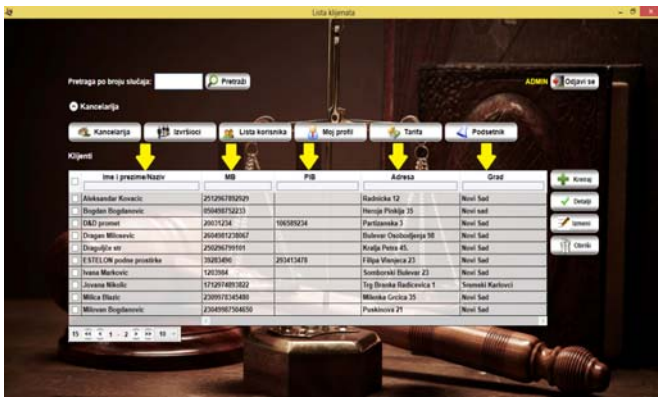


Figure 7 List of clients

User can see the details of a certain client by clicking the button “Details” or simply double clicking on a clients name in the list. In clients details, a user can see all the cases that the given client have, both closed or active, as well as executors that worked or are currently working on said case. The user can also see the items of the selected clients case, as well as expenses and documents.



Figure 8 Client details with tabs for client’s cases, documents, expenses, reminders etc.

The user can see all the cases for a certain client in client details. Also, the user is able to add a new case, new documents for certain case, edit them and delete them. This makes the application more user friendly, when all the cases for a single client are in one place, and all the documents are precisely organized. A user can also add a certain tariff from the tariff section to a client's case, based on the work that was done in it. If a case is more complex it can have multiple tariffs added to his expenses, which together sum up total expenses that will be billed to the client.

### B. Android application

Through the Android application the user can read all the data that was entered using the desktop application. This app is read only, which means, the user cannot change any data using it. Only reminders can be set. The goal is for user to be able to quickly find information about his clients and cases anywhere the Internet connection is available.

After the user initializes the application, a user authentication window is opened. User credentials are same as in the desktop application.

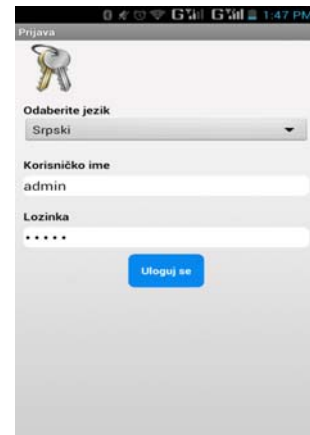


Figure 9 Log-in window

After the user logs in, he is presented with the main menu of the application, where the user chooses to see his reminders, cases, executors and documents.



Figure 10 Main menu

Like in the desktop application, the focus of the Android application is on clients, their cases and everything about their case, executors, expenses, documents, etc.

When a user clicks on the “Clients” icon, he is presented with the list of clients. Simple click on a client’s name, shows the corresponding details.

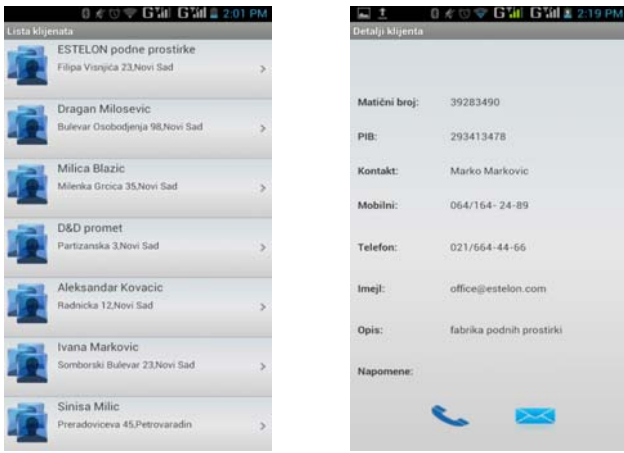


Figure 11 List of clients and client details

Click on the “Cases” icon, leads the user to the list of cases. Simple click on a particular case, shows the list of case items of the given case. In every case item, user can see its details like who was the executor, description, meetings, etc.

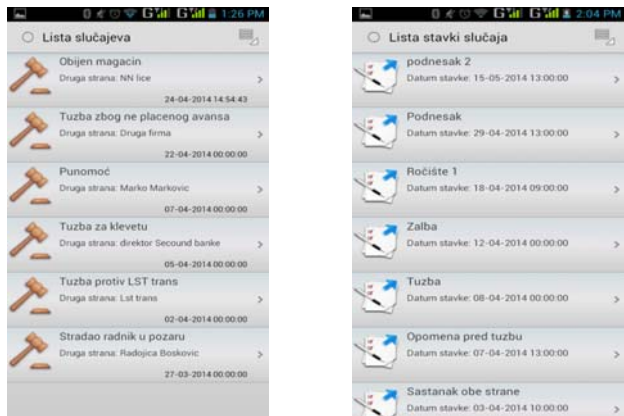


Figure 12 List of cases and items of the selected case

In every case item, the user can see the documents that were given by the client, court or collected by second or third parties.

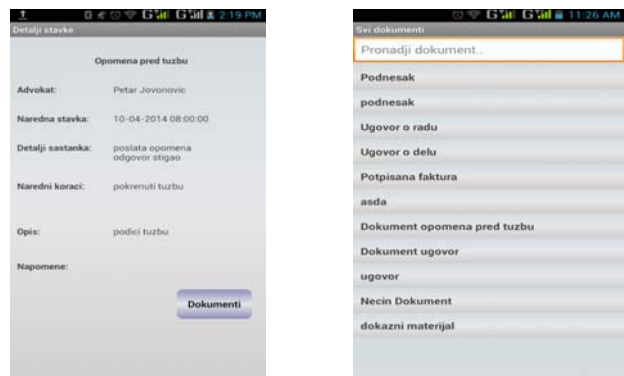


Figure 13 Case item details and its documents

Much like the desktop application, the user can see details of every executor, see his reminders, etc. The Android application is intuitive and easy to use and it has modest hardware requirements.

#### IV. CONCLUSIONS AND FUTURE WORK

An application targeted at law practice management has been presented in the paper. The main goal when designing such systems is to develop a user-friendly interface, which works as the users would expect. In order to stimulate the learning curve, the system is designed using suggestions from the lawyers with different fields of expertise.

LawOffice provides solutions for tracking all the tasks, meetings, clients’ cases and value pricing. With all these features implemented in the system, it allows the users to focus on creative and problem-solving aspects of the work. Both applications, the desktop and Android, use the latest security protocols and encryptions, protecting sensitive data form an unauthorized access.

Future work will be focusing on increasing the number of features, which could be helpful to the potential users, whether they are working as solo practitioners, in an in-house legal department or in a law firm. The main features which are intended to be implemented are the integration of the systems with Google, Dropbox and MS Office Suit. Beneficial to expanding the system, developing a web application is planned.

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