SOFTWARE REQUIREMENTS SPECIFICATION FOR MPAYMENT IN BANKING SYSTEM

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Abstract— When introducing new software products in the banking system the most important segment is well-specified requirements. This paper describes an example of requirements for a banking product mPayment. It describes details about development phase of the requirements, as well as the characteristics that he should have. Emphasis was placed on the organization of the team that is participated in its development.

Index Terms— Core Banking System, mPayment, Software requirements specification, Terminal.

I. INTRODUCTION

In rapid expansion of development of internet and mobile technologies, where each branch of the economy which can offer their products on the internet, is trying to be more competitive in the market, efficiency in software development is gaining priority. This is especially emphasized in banking system, because a fast and efficient offer of a new products on the market can mean winning over new customers. In this paper, the most important details and characteristics of requirements specifications for the introduction of new banking products mPayment, is presented. A key part of building a software product is a precise definition of what should be built. No other phase is as demanding as this one. Errors and problems in any other phase can not disable the end product as the ones that occur in this phase. Also, recovery and correction of errors in any other phase is not as difficult as it is in this one. [1]

Proper specification of the software requirements significantly reduces the possibility of errors in other phases of the system development, shortens development time and thus influence the reduction of financial costs.

Software Requirements Specification is a document that describes the complete necessity of product and its expected behavior. This is a document that is used in all stages of introducing a new product: in development, testing, evaluation, etc. Therefore, it is very important that the requirements for development of the new product are precisely formulated. [2]

During the creation of the SRS (e.g. Software requirements specification) it is necessary to take into account all aspects that a new product has to cover.

Therefore it is necessary to include users of different profiles, in order to specify both the user and developer side.

There is a complete picture of the product in the SRS, i.e. what it allows, what are the advantages of its implementation, classes and characteristics of end-users, as well as limitations in terms of performance, regulations, security, etc.

The basis for the creation of high-quality SRS are the forms presented in the IEEE Standard 830-1998. This standard clearly defines the content and quality of a good SRS. [3]

II. THE CHARACTERISTICS OF THE REQUIREMENTS SPECIFICATION IN THE BANKING BUSINESS

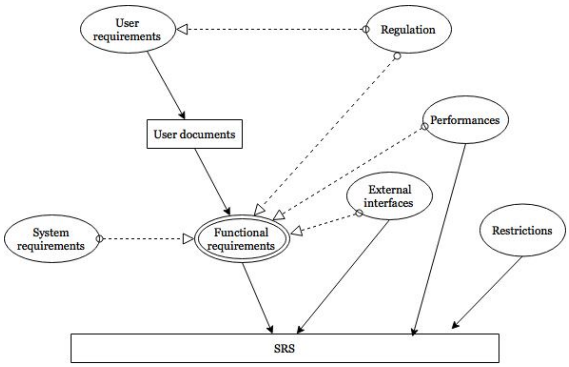
It is important that the SRS has certain characteristics that positively affect its quality. Primarily, the SRS should be complete, i.e. it should have all the necessary functional and non-functional requirements because some assumptions can jeopardize the realization of the entire product. During creation of the SRS conditions are changing and new ideas concerning the product are created. Therefore, the structure of the SRS should be flexible in order to be adaptive for these changes. [5] The SRS should be reviewed and that clearly shows the connection to the regulations, legal and other documents. [2]

During creation of the SRS it should be taken into account that individual functional and non-functional requirements have some important characteristics. They are to be precisely described, so as to clearly present the functionality which will be made, as well as to clearly indicate the reason why they should be realized. Feasibility of functional requirements within the existing constraints (software, hardware, budgetary etc.) should be examined. Therefore, it should be determined which of them are feasible, and which might be feasible with additional cost and effort. Having in mind that the deadlines for the introduction of a new product can be very short and resources limited, it is very important that priorities and dependencies between individual requirements should be set and respected. Priorities can be defined in several ways, e.g. according to its necessity

(mandatory, necessary or not necessary, additional), the degree of stability.[3]
Good SRS is consistent with the higher level SRS. The steps in the execution of their individual requirements may not be in conflict. Furthermore, the same terminology and the same definitions in their description should be used.
Requirements should not be ambiguous, and therefore any possibility of ambiguous interpretation of them should be eliminated completely. For this purpose, a comparison is made between each interpretations of every members participating in the creation of the SRS. If a term from the description of requirements can be interpreted in many ways, it is necessary to unambiguously define it in the glossary at the beginning of the SRS.

III. CONNECTION BETWEEN BUSINESS AND FUNCTIONAL REQUIREMENTS

Creation of the SRS includes two different levels: User requirements and functional requirements. Additionally, each system has a group of non-functional requirements. The interaction between the levels is shown in Figure 1.



Picture 1. Interaction between SRS level

Customer requirements include targets i.e. what is expected of the product. Functional requirements describe to the developers what they need to include in the product to fulfill the user requirements. All external factors: software, hardware and personnel, which may affect the functional requirements, belong to the System requirements. [2]

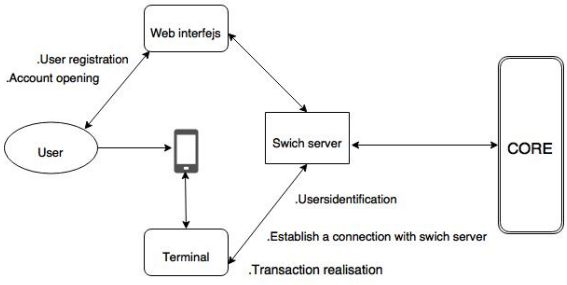
A special group of requirements make non-functional requirements, including above mentioned System requirements. The term "Non-functional requirements" says a lot, this is a huge collection of different needs, including any type of requirement, except functional. It is natural to start working from what the new products should enable. This is especially true for software products, where the functionalities are something what the product should provide. In this way, non-functional requirements are placed on the second place. [4]

The banking sector is very specific in the sense that there are many non-functional requirements that must be taken into account in the specification of requirements. One of the most important non-functional requirements are legal and business regulations, i.e. procedures and rules in the banking business.
Non-functional requirements include product characteristics, connection with the existing software and certain restrictions. Product characteristic describe the product's performance, how much the product is safe, secure and reliable. External interfaces show mutual influence between the current system and planned products, while the restrictions relate to the product design itself, i.e. how much attractive and user friendly product will be. [2]

IV. GENERAL DESCRIPTION OF PRODUCT MPAYMENT

MPayment is a new project on the market that provides contactless payment for goods and services in the country with a mobile phone. mPayment customers use an appropriate application installed on the smartphone / tablet (or call the free phone number from phone with older interface) to connect to the terminal that has the appropriate commercial application installed. Terminal establishes a connection with the Core banking system using the Switch server.

The diagram of mPayment system is on the Picture 2., which illustrate the interaction between the participants of the system.



Picture 2. Diagram mPayment system

The external user interface consists of hardware and software interface. Therefore, the SRS specifies that web user interface is necessary. So, precondition is that the user must have the phone and the merchant must have the terminal. And, at the end of the process of defining the requests for the external user interface it is necessary to have the application on the user's phone / tablet (to generate authentication sounds), applications on the terminal (for selecting the type of transaction and printing the slip for end users) and a communication interface between the smart phone / tablet and terminal (Voice server that unambiguously

coverts authentication sounds into mobile phone number).

There are different class and characteristic of end users. Table 1. presents them and describes their characteristics.

Table 1. Type and characteristic of end users

type	characteristic
retail	resident
	non resident
	have smart phone
	have older generation phone

The SRS also describes regulatory and security restrictions. User identification must be carried out in accordance with the personal data protection law. It is necessary to check whether and how payment can be processed on the terminals according to the payment system law.

V. MAIN FUNCTIONALITIES OF MPAYMENT SYSTEM

The main mPayment products functionalities and their short description are presented in the Table 2. Each product functionality have description about its purpose, description of the functionality and the appropriate sequence diagram.

Table 2. Main functionalities

Main functionalities	Short description
Registration of end users via the Web user interface	Registration of customers and opening their accounts
Registration of traders and their terminal	Recording of traders who would have terminal for executing transactions
Realization of transactions on the network terminal	Identifications of customers and executing transactions
Accepting transactions through other channels	Transfer of funds between account of two customers
Add in account	Add in account from other customers account or cache
Mass booking of the corporate transaction accounts on retail account	Enable companies to supplement account following list (eg for their employees)

VI. NON-FUNCTIONAL REQUIREMENTS AND RESTRICTIONS

Performance, protection requirements and security requirements belong to non-functional requirements of the application. MPayment requirements for performance are related to communication between Core banking system and Terminal. These functions should last only a few seconds. The speed at which the terminal will be informed of the transaction depends on the internet terminal-server switch connection, and it is advisable that the trader provide sufficient speed internet link. Example of a security requests is that there must be no possibility that the application installed on your smartphone, which is used for user authentication, affects other functionalities of the system. Also, transactions made by the user of the mPayment account, should be standard banking transactions, so the security of the banking business is not disturbed. One of the protection requirements refers to the fact that when the user opens mPayment account activation of the account is not executed until the user performs user identification with identity documents in the Bank. By activating mPayment accounts at the bank, the customer should receive a unique PIN number which he will use to verify executed transactions at the terminal. After obtaining the PIN number, the user will be responsible for the verification of transactions at the terminal, as the execution of transactions is carried out by sound identification and entering a PIN number. Also, the PIN code should be used for modifications of the mPayment account on the Web interface. Finally, the design of the Web application should be taken into account in order to be user friendly (easy to use and accessible to all types of users, regardless of their education, age, opportunities, and training in working with computers).

The SRS should have a separate chapter relating to restrictions. Thus additional functionality is separated from the basic functionality, which makes it easier to prioritize in the realization of the project. In addition, these requirements should be presented in the same way as the main requirements. That means that there should be a description of their purpose, description of proper functionality and sequence diagram. Table 3. Presents restrictions in the mPayment system.

Table 3. Restrictions in the mPayment system

Other functionalities	Short description
SMS notification	Notifications of changes of customers accounts
Active SMS	Insight into the state of customers accounts
Regulatory limits	Copy for basic tasks
Limit	Setting a single, daily, and total amount of transactions
Enabled/locked accounts	Enabling and locking of customers accounts
Cancellation of account	Closing account on customer's request

CONCLUSION

Well-specified requirements are the key to a successful project and represents the top of the pyramid of needs and requirements of end users, management, compliance and IT engineers. By specifying a requirements for mPayment we concluded that the participation of the system part of the IT sector would

significantly facilitate and speed up the whole process. Their presence in the team for specification of the requirements, would give significant contribution to specifying non-functional requirements. This leads us to the conclusion that in specification of requirements in the banking system the composition of the team for that task must be taken into account in a way that the personnel from a much larger number of different areas of the banking business is involved. Depending on the type of project, it is necessary that the personnel from the system part of the IT sector is included, in addition to the usual inclusion of staff from the application and the database part, personnel from the sector for prevention of money laundering, personnel from the legal unit, compliance, sales, etc. Good assessment of the structure of the team for the requirements specification leads us to the successful implementation of the SRS. Inadequate team can make omissions in the SRS, which can lead to the eventual failure or restrictions at a later stage of the project and result in a change in the requirements specification itself. This could lead to a very negative impact on the realization of the project such as: deadlines extension, costs increase, and possibly a rejection of the entire project. As a result, the bank would either fail to execute a good project or allow the competition to implement a similar project before them, and thereby win a significant number of clients. In today's market it can be considered as very costly mistake that has long-term negative consequences for the bank.

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