Document Management

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Abstract. An analysis of one's organization is a necessary first step for any effective business strategy. Such an analysis needs to begin from one of the most notorious sources of costs and inefficiency: document management. This is an area where a transformation is in order to meet the need for an increase in company productivity and in process efficiency, while reducing operation costs. The proposed project is placed in the context of IT and Cloud Computing, and aims at creating an integrated system capable of providing a set of solutions and dedicated services for document management. This project is developed by the Department of Electrics and Electronics Engineering of the University of Cagliari and T Bridge S.p.A. It is financially supported by the Autonomous Region of Sardinia with European local development funds.

1 Introduction

Companies are undergoing a rapid transformation, under the pressure of an increasingly digital world and increasingly competitive markets.

Rationalization, simplification and automation of processes have become an essential leverage to free resources, which in turn can be invested in technology to accommodate business innovation and generate competitive advantage.

Public Administration in Italy has an established legal framework defining the digitalization of the administrative action. The latest reforms focused on new technology as the main tool to interact with citizens, with a consequent impact on communication processes between public institutions and private citizens, as well as on the internal organization and instruments of public institutions themselves.

This paper is structured as follows: the second section describes the context in which the proposed project lies, while the section following it describes activities and objectives in detail, and the schedule of the project is outlined. The last section hosts our final observations about the project.

2 Context of Research Proposal

The potential market segment to which document management is associated offers a swath of products and services capable of supporting communication and

interoperability among different subjects. These products and services target all business users, such as institutions and public administration.

Regarding information flows and communications, business users who choose the proposed solution will be potentially able to save both time and money.

Companies, under the pressure of an increasingly digital world and competitive markets, are adapting at a fast pace. Processes rationalization, simplification and automation have become a fundamental means for unleashing resources to invest in the technology necessary to foster business innovation and create competitive advantage. In this scenario in order to develop a successful strategy, managers must first analyze the organization they work for, starting from the information management, being one of the most common sources of inefficiency; then, also, the management of all of the processes related to documents. This is the aspect where a deep transformation is required, as it reflects the need to increase business productivity and process efficiency while reducing the operating costs.

Public administrations and specifically the local ones, organizations usually relatively complex, could especially benefit from these solutions: an increased document management capability without the need for conspicuous investments to increase disk space, application servers, front-office extensions and back-office maintenance.

To provide a effective and tangible response to each and every one of these challenges, it becomes necessary to make the most simple choices, which are also easily shareable and implementable in a short time: the solution is the employment of a series of services provided by a website, where the users will be able to fulfill all of their needs: tasks organization; communication; electronic documents creation, digital signing, marking, registering, safe submission with return receipt on multiple channels (mail, email, fax, certified email, SMS), and storage in accordance with the law.

By leveraging these services, companies and professionals will be able to organize their work without worrying about all the aspects related to the management of paper documents (printing, mailing, cataloguing and storage), while a public institution will benefit from being delivered from all of the back-office processes requested by the management of the electronic document in different departments (registering, general affairs, accounting, and so on).

3 Research Project Description

This project aims to create an innovative software platform for document management. The platform will be offered to users "as-a-service", and be used to manage communication, electronic document creation, digital signature, digital registration, document recording protocols, and secure transmission. It will ensure messages will be received through several channels (mail, email, fax, certified email, text messages, voice), and that archiving and storage will be performed according to local laws.

The main goal is to provide end users and companies (that already use Gmail, Google Calendar, and Google Docs) with a suite of web-based RIA tools both safe and reliable, which will serve as a means of communication with other institutions, such as public ones, but also banks, companies, freelancers, etc. The applications dedicated to

document management will be created leveraging the open source development toolkits provided by Google.

An advanced Lean-type approach to software development is deemed to be suitable for the project. The Lean approach was meant to be used to support systems' maintenance and evolution, and the first applications of Kanban actually concern maintenance processes [1]. Moreover, it allows to effectively manage the development of several concurrent projects by a single team, that is not an ideal situation but a very common one. It is indeed a fairly flexible approach, which meets the actual needs of the organizations that must develop and maintain software, especially if compared to other less recent approaches.

The Lean approach is spreading fast. In order to avoid past mistakes, however, it is vital for the "Lean" approach to undergo a rigorous and experimental observation [2] [3]. Given the radical difference of this approach in comparison to more common models of software development organization, it will be important to understand the impact of its introduction at marketing, organizational, and company level [4], [5].

The solution we intend to create in this project makes use of powerful and widely tested development tools, already adopted by wide developer community, which can provide support to implementers.

As for the reference market, this solution will be able to be transmitted through the widespread usage of the tools provided by Google.

Concerning the production model we adopted, the development tools we used ensure a high productivity in the solution selection process, guaranteed by software development platforms provided by Google.
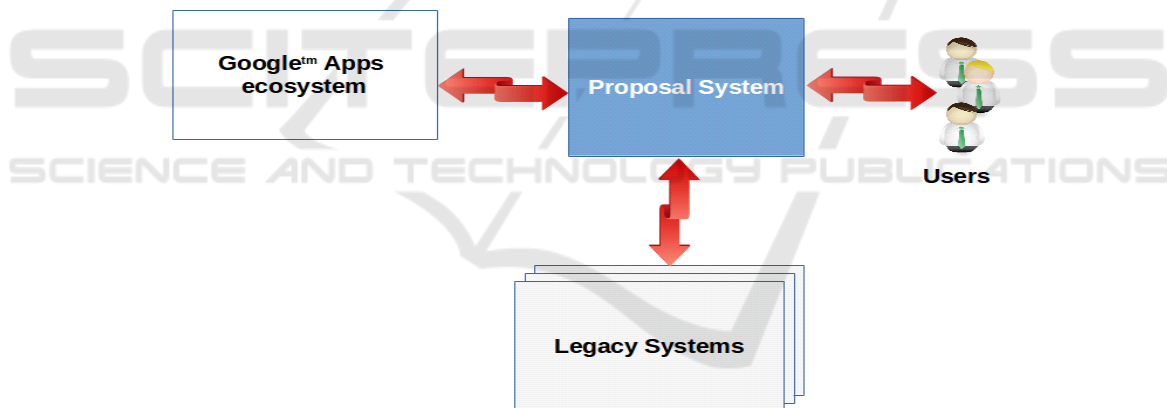
Fig. 1. Proposal system and interactions.

With regard to the prototype, modularity will be a regarded as a key feature of the architectural solution chosen for the system, since it requires the integration of software components, which are themselves modular, interoperable and flexible, thanks to the adoption of open standards.

Attention will be paid on the building of a prototype that solves the complexities arising from the interaction of separate, although interdependent, processes. An interoperability infrastructure between solutions and specific services will be studied, to fulfill each user request through an integrated and transparent manner, and also taking the Cloud Computing paradigm into account [6]. The paradigm offers several

advantages in terms of reliability, scalability, resource optimization, cost reduction, failure recovery, environmental impact, etc. [7].

The project is highly innovative and ensures acquisition of valuable new knowledge for all the involved parties, especially because of the dense cooperation network it will foster. Knowledge and technology dissemination will be ensured by the intrinsic features of the project, being it an open-source project: it is open to external contributions, particularly from those entities that see the project as a solution for their business challenges. The open-source diffusion lead us to face a revolution in the IT market,which in the recent years made us witness the evolution of the business model from the development of stand-alone software packages to the so-called "System Integration", thus proving the shifting of the investments on services.

New knowledge acquisition will be ensured by the tight collaboration between T Bridge and University of Cagliari, together with the dense cooperation network which will be generated, also with the aim of creating clusters of IT companies.

The project will lead to a considerable advancement in the state of the art, as it is concerned with the process management related to Service Oriented Architectures (SOA). It will foster the integration with the tools for the management of the documents involved in such processes, and the management of all the data deriving from those processes [8] [9].

3.1 Project Subdivision

The project officially began on October 1, 2015, and its conclusion is estimated to be on September 28, 2018.

The project covers a number of operational stages. Every stage of the working plan is organized in Work Packages (WP), parallel phases in which operational objects are reached with work group activities, through the production of expected results and products and the application of a specific methodology.

The WP included in the project are five:
- WP 1: State of the art evaluation.
- WP 2: Software development tools and technologies assessment.
- WP 3: Applications and services definition.
- WP 4: Architectural solution design.
- WP 5: Prototype development.

Below is a brief description of each phase of the project development.

3.1.1 WP 1 - State of the Art Evaluation

The first work package is focused on the study of the wide-ranging needs of innovative Cloud Applications, with the aim of performing a proper selection, and drive the project towards the development of the most disruptive functionalities. These functionalities will be selected based on their potential practical impact on the industrial project.

3.1.2 WP 2 - Software Development Tools and Technologies Assessment

This work package concerns on the one hand the design of an innovative Lean approach for supporting software development in a Cloud environment, and possibly in a distributed and collaborative context, on the other hand the design of an integrated Lean approach oriented towards the management of the business processes of the partner company. The activities will go beyond the study and design of a Cloud development methodology, as also the idea of "developing software for the Cloud leveraging the opportunities offered by the Cloud" are to be followed to determine which key modules to select in a stand-alone environment.

3.1.3 WP 3 - Applications and Services Definition

Challenges specifically Cloud-related will be here studied, together with the effectiveness of the solutions currently proposed on the market, in view of future developments in the medium to long term. The tasks in this package have a primary role in the project as, currently, there are no similar studies that use data from student projects, and that could be regarded as representative of an industrial or professional development.

3.1.4 Wp 4 - Architectural Solution Design

The aim of this package is to study suitable architecture solutions, and finally design it. Basically, the final objective is to analyze a possible technological infrastructure, which can integrate the primary issues and those related to the associated applications.

Cloud computing will be taken into account from the point of view of technological cooperation, and of cooperation logics between applications and data, which can come from both different systems and different entities.

The infrastructure will be able to handle document management streams in support of an effective application engine for applications management [10], [11], in addition to a presentation through Google apps tools, in a SOA logic. The ultimate goal will be the definition of an easy-to-use tool for the end user.

3.1.5 Wp 5 - Prototype Development

In this phase, the prototypes for all the software components of the document management system will be implemented and validated. The development will require specific modules, that will consider key features such as modularity, interoperability, and flexibility, by leveraging open standards. Special attention will be paid on the development of a prototype which, in the context of applications, will solve all the issues which originates when making distinct yet interdependent processes interact.

Another aspect that will be taken into consideration in the prototype development phase is the SOA integrated security management for the Cloud, in a dynamic implementation, with focus on access authorizations. Moreover, in this work package, the results of the project will be published, through specific planning activities and the organization of workshops, participation to international conferences, and scientific articles.

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3.2 Project Results Protection and Valorization

All the acquired knowledge and expertise will be protected through the ownership of the know-how in the specific context in which the project will be developed. As the industrial partner features an open source business model, and most of the tools selected for the system are also open source, it is not wise to perform expensive procedures for patenting all the proposed methodologies and practices. Also, this would not be suitable because obtaining and, particularly, making patents respected in such an intangible context is extremely difficult. Moreover, it should be noted that, as of today, software in Europe can not be patented, considering all the currently available procedures for the patenting of both methodologies and practices.

Enterprise protection is a process based on professionalism: its foundations are its superior know-how and the know-how continuous development with respect to the competitors. This will make the company rely exclusively on it acquired expertise.

Enterprise value will be obtained through added value services sellings (services development, installation, training, customization, etc.), which will be all the more marketable and remunerative the greater the specific know-how and visibility of the company.

Scientific and technological results which will be obtained through research are:
− the study of the interoperability infrastructure in its basic applicative challenges;
− SOA integrated security management for Cloud support, paying special attention on access authorizations;
− the application engine for the applications management and a presentation via Google Apps tools;
− the definition of an innovative architecture for integrating a service development tools suit;
− the industrial results which will be obtained through research are:
− the acquisition of the relevant know-how related to open contexts and their application on the service-oriented Web, in order to increase users productivity, and quality;
− the development of specific modules which take into account all the fundamental aspects, such as modularity, interoperability, and flexibility, through the use of open standards;
− the acquisition of the know-how concerning Cloud processes, in a model where the application-centered aspect is integrated with a document-centered approach;
− the acquisition of the relevant know-how related to the use and integration of open-source tools for supporting software agile development.

4 Conclusion

The solution will be an easy-to-use tool for end users, and, as it is based on Google technology, will offer high security with low downtime levels. The results of the project will be disseminated through workshops, conference participation and international scientific publications.

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Line of Activity 6.2.2.d - Interventions to support competitiveness and innovation, under the Regional Committee Resolution no. 33/41 of 08/08/2013).

The creation of the platform will stem from the strategic partnership between T Bridge S.p.A. and the Department of Electrical and Electronic Engineering (DIEE) of the University of Cagliari. The purpose of this choice to use the results of fundamental research as well as of industrial research to elaborate an innovative prototype.

This project is coherent with the strategic objective of the regional planning in Sardinia, since it aims to implement innovative methods of the ICT sector in the library industry, and it complies with the objectives described in the Regional Strategic Document (Documento Strategico Regionale, DSR) 2007-2013 for Sardinia.

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