Politecnico di Milano

Polo di Como

Scuola di Ingegneria dell'Informazione

Corso di Laurea Specialistica in Ingegneria Informatica

An Application of EDM for Invoice Management in a Large Company

Tutor universitario: Prof. Giuseppe Pozzi

Elaborato finale:
HEIDARI Masoumeh, 796706

Anno Accademico 2014/2015

Abstract:

To record and archive all the documentations inside the company would be considered as one of the most significant problems every single company is struggling with. (Hediyeh Baban, Online Document Management System for Academic Institutes, 2013) As a consequence, the aim of such a study is to provide an application in which data organization within the company in a very structured manner is going to followed. In better word, to decrease the bureaucracy by the help of an online documentation system would be recognized as the most substantial goal in this project. To design and develop the application at the very beginning has been taken into account using Microsoft.NET and Microsoft SQL Server. Then internal test aiming at scrutinizing the accuracy of the information is employed. Before launching the application, customer's approval is needed as a kind of model (application) validation. It's worth adding that supporting based upon the customer's feedback plays very critical role in such a project. In a nutshell, the requests from the customers are delivered to the company in the shape of work flows. Then, their requests will be processed commensurate with what they exactly want and send back to the customers. Note that such an application assists the speed and the accuracy of organized data transition.

INDEX

Summary

Paperless

With Document management systems which allow you to assign a legal value of digital data, finally, companies can manage their accounts completely electronically, eliminating paper records and archives, which were required in the past.
Thanks to Electronic Storage, organizations can simplify administrative processes, dramatically reduce costs and improve the company's control.

Application spheres:

The areas that benefit more from the Substitutive Storage are: active and passive invoicing, management of the Single Employment Ledger and accounting bookkeeping.
Substitutive storage can be favorably used also in all spheres where it is fundamental to generate non-editable electronic documents, which are not subject to deterioration, with certified origin and date.

The process:

active and passive invoices issued or received in paper or electronic form, will be transformed into a standard digital format by means of scanning and conversion tasks. After being approved, the invoices will be stored electronically in a replacement volume provided by the storage note, the time stamp and digital signature of the storage manager.

Each volume is indexed, the backup object and monitored regularly to check its true legibility and to ensure the integrity over time.

Company, as delegated by the customer, is responsible of the Electronic Storage procedure and will manage all operational and administrative activities associated with the

dematerialization process and preservation by law for tax documents and compulsory registers.

Company entrusting with the management in outsourcing of the entire process, the customer does not need to deal with the complex organization, legal and fiscal level, the implementation in-house and makes sure that the regulations are fully complied with by means of a proper storage procedure, controls effective and appropriate security measures.

Sommario

Paperless

Con i sistemi di gestione dei documenti che consentono di assegnare un valore legale di dati digitali, infine, le aziende possono gestire i propri conti completamente elettronico, eliminando i record e gli archivi cartacei, che sono stati tenuti in passato.
Grazie alla memorizzazione elettronica, di organizzazioni in grado di semplificare i processi amministrativi, costi notevolmente ridotti e migliorare il controllo della società.

Sfere di applicazione:

Le aree che beneficiano di più dal Sostitutiva bagagli sono: fatturazione attiva e passiva, la gestione della singola occupazione Ledger e contabilità.
conservazione sostitutiva può essere favorevolmente utilizzato anche in tutti gli ambiti in cui è fondamentale per generare documenti elettronici non modificabili, che non sono soggetti a deterioramento, con l'origine e la data certificata.
Il processo:
fatture attive e passive emesse o ricevute in formato cartaceo o elettronico, saranno trasformati in un formato digitale standard per mezzo di operazioni di scansione e conversione. Dopo essere stato approvato, le fatture saranno memorizzati elettronicamente in un volume di sostituzione previsto dalla nota di archiviazione, il timestamp e la firma digitale del gestore di stoccaggio.
Ogni volume è indicizzato, l'oggetto di backup e controllati periodicamente per accertare la sua vera leggibilità e per garantire l'integrità nel tempo.
Società, su delega del cliente, è responsabile della procedura di archiviazione elettronica e gestirà tutte le attività operative e amministrative connesse con il processo di dematerializzazione e la conservazione per legge per i documenti fiscali e registri obbligatori.
Società affidando la gestione in outsourcing dell'intero processo, il cliente non ha bisogno di affrontare la complessa organizzazione, piano giuridico e fiscale, l'implementazione in-house

e fa in modo che le norme siano pienamente rispettati per mezzo di una corretta conservazione procedura, controlla le misure di sicurezza efficaci e appropriate.

1. Introduction

This chapter provides the reader with a high-level description of the application domain dealt with by thesis.

1.1. Introduction

This chapter briefly explains the context in which the research work. The target and objectives are set and some basic concepts for the management of documents discussed. During last decades' quick access, fast creation and reparation of documents has become more essential in everyday life. Therefore, a lot of big companies put their interest in this market to develop a good software to resolve the problem of comfortable access to create on-line document. There are lots of banks, Financial institutions, Supermarkets, Supermarkets, Factories and Archive Institutions all over the world need to resolve the lack of the slight access to archive documents and on-line access to them and be able to take advantage of this technology in the effective way. Considerably scientists and researchers have been focusing on how to develop assistive technology in order to facilitate them to use electronic documents. Management document systems had been considered as a rehabilitation technology relevant to this field. It refers to record and archive all the documentations, decreased bureaucracy, reduce the cost. These days, electronic systems allow the rapid creation and destruction of documents. So, people prefer to use electronic documents instead of paper documents, for example, electronic documents as sources of information increase a lot in terms of amount and retrieve the information in university area and academic field becomes a serious problem in terms of find a specific information. In academic field Document Management System can improve the output and effectiveness of research proceeding and can also meliorate the sharing of students' knowledge and ideas by other researchers. Students who need a well-organized knowledge for reuse information through research, new opportunities for cooperation, coordination and exchange of information between students working on a construction project can benefit from Electronic Document Management system. And of course the other factor is reducing the costs and response times. All services provided through the Internet at any location can access the documents. (Ikeda, 2007) Document management system should have some factors for example it should have a very good designing and the logic in which the

different parts of the system should communicate, It should have a storage which containing the actual documents, an engine which should work on top of it, must have some logic and functionality for storing data, navigate search and retrieving documents, and of course it should have advanced features like version and access control. Document management system can help user to have a space to store and share documents with other users in the specific system with aim of having quick access to retrieve information. We can have an example by taking a look into academic field and environment. In the academic field, users interact with different type of text-documents, like thesis, research report, conferences, magazine, e-book and so on. Here for Document management system we are interfacing the same story, like for those who forget where they saved documents, or maybe it saved with a wrong name, perhaps having duplicated documents and many other errors can have happened. There is always an issue that we can find to improve and make it better. Document management system is a way for sharing knowledge.

In this research DMS will design and develop for clients and users which need to archive their documents and have a quick access to them. Most professionals spend a lot of their time looking for the document they need so it a really essential needs to discover a method to save time and getting them to focus on their work.

As a result, many companies from different countries have developed a document management system. (Hediyeh Baban, Online Document Management System for Academic Institutes, 2010) Every system has some benefit and weakness point. There is constantly some point that can be meliorated and some point that should be focused more. There is unfailingly a place we can find to improve and make it better. Document management system is a method to share knowledge in this study. DMS will design and develop research with the need of different big companies. Organize and classify everything has a positive effect in people's lives, which means that it will organize their work and can able them to have more focused on their most important works, so requirement a system for organizing electronic documents is very noticeable because in this age of technology that organizations ranging along paperless environment every important document are electronic, to maintain the huge number of documents is not easy and mess and is a strenuous and time consuming work. The organization of a collection of large documents is very laborious and needs a lot of attempts to keep them, on the other hand, classification of documents in the knowledge management systems to increase the acquisition of knowledge. (Y. J. C. Byeong Ho Kang, 2007), of course, essentially

users who are working on the serious documents with different logic for banks, supermarkets, insurance companies, legal office and so on are involved with a lot of documents. With the use of the document management system two valuable factor will reduce, time and costs for the management and distribution of user's documents. In this chapter, our focus is on showing the relation between manage information and knowledge management. Document classification based on users' needs is a way for managing and sharing knowledge between users.

1.1.1. Problem Statements

The first problem happens when users spend more time on finding the documents they have already saved before, perhaps they forget the location of the document, name or folders which is saved. This problem occurs to a lot of the users which have forgotten the name or location of significant documents. And take time to copy the document and distribute it, users who are working with other people in a group and have some common ideas and document to share, so whenever they need to meet or mailing one another that is wasting time. Most of the time the users have questioned and want information from the other one and there is no way to get this quick and fast answer.

For critical information is stored on the personal computer or laptop or in the office, that may be lost, stolen, or damaged at any time. With access to the Web Document Management System user need not to worry about documents, which can be accessed anywhere at any time without to apart the documents.

1.2. OVERVIEW OF ONLINE DMS

There are many types of applications and other software components for managing files on a local computer, but it is very difficult to organize your personal documents in a consistent way and to try those expected precisely. When users store documents in their computers, they have to remember the file names or locations to retrieve them. A file-search tool such as Windows Explorer is usually based on information about the physical characteristics of the file. Even if we remember the names and file locations stored in our computer, it would be almost impossible to find the right ones without knowing their contents. (H. L. Kim, 2004) Document

management system is able to upload, manage, organize and find desired documents in a simple and fast way. By document management systems user is able to share all the documents he wants within his company and business partners. All the user need is an Internet connection to share documents, instant access to all your documents from anywhere with an Internet connection. DMS offer online storage, sharing, different access location, security, as well as searching, categorizing and back-up capacity, with DMS user can access documents across multiple locations.

As we mentioned before online document management can be take in consideration and use in so many different field like educational, government, private and commercial institutions from anywhere it is easy to use can save time and it is secured and compliant.

1.2.1. Document Classification

Classifying the documents help users to retrial them in the easier way and of course faster, another option which is possible to give the user is the capability of finding the relevant documents as well. These days' automatic document classification has become basic of research theme in information detection. Because of increasing number of document collections, by this method user can resolve even the problem of organizing the information in automatic manner to find them easier. (A. Veloso, 2006)

Practically, document classification research focuses on the automatic placement of unpublished documents into some pre-defined categories. Another benefit from classification of documents is in the knowledge management systems. It must support the acquisition of additional knowledge and maintenance as a result of the dynamic knowledge.

Knowledge management systems have some technical component, one of its important technical component that we can say it is the core of the system is the classification by users.it can support to manage precise knowledge more and meliorate knowledge sharing between users. There will be a lot of examples and path to classification documents, each user has its own need and want to create and elaborate its own structure in order to simplify their job. We mean that the system should satisfy different document classification pattern, and different acceptation result.

In addition, integration and interaction of so many classification base on the need of each user

would meliorate, document classification efficiency in the knowledge management context. (Y. J. C. Byeong Ho Kang, 2007)

For Document Management System (DMS), classifying can be done or in automatic way or by user. putting documents in different categories can help user to retrial and find them faster and easier and when user cannot remember the name of document by searching and looking different categories can find document easier and faster.

1.2.2. Hierarchy classification

Hierarchical classification system builds a tree of different classifications, usually with single root. Paradigms are then will put in the more appropriate class (P. Dourish, 2002), in our case we can define a tree. The famous and well-known parent-child relationship demonstrate generality or specificity among two categories. The set of some categories are partitioned and divided into real categories for keeping and holding documents and virtual categories for the future and further classification.

Normally, we can use another type of classification like those one that have been illustrated in ACM Classification Scheme, ACMCS and Dewey Decimal Classification System, it is work like leaf nodes are mapped to real categories and all internal nodes to virtual ones.

Usually, all leaf nodes are mapped to actual categories, and all internal nodes in the virtual ones, as shown in the MCA classification scheme (ACMCS) and Dewey Decimal Classification system. (Desai, 2007)

One of the good example that we can consider is the Dewey Decimal Classification for classification of books and other information resources.

By this method user can categorize documents based on the content, even images, emails and so on by location to folder and sub folders in hierarchy structure. User can have and handle a lots of categories and subcategories that relevant to each other in hierarchy structure so when users need to find specific document and data in particular location, by looking at categories and subcategories that are relevant to the same category can find a lots of document about wanted information. (P. Dourish, 2002)

1.2.3. GUI of hierarchal classification

Graphical User Interface or GUI interface plays a very important part in every kind of program. Good and user friendly graphical interface can cheer users to work with this system. Graphical User Interface must be designed in a manner to be easy to understand, simple to work and comprehensible to all kind of users. This is our goal to be reach in this study. However, the system has the benefit of the search results in a new design. The user interface UI have to be more interactive, and provide a method to reach randomly the search result and the corresponding documents are collected and clusters using explicit rules. Each UI must provide a flexible graphical environment for model structure that exceeds the main problem of many traditional input file structure. The graphical interface has to have two components, intuitive and graphics, and should even support twisted modeling through a hierarchical structure.

In this background, the hierarchical design means the capacity to construct a new component schematic using components available include this new component in the component library (Lasseter, 1995). Hierarchical GUI can be attractive for the user to see all the categories and subcategories as well as documents related to this investigation can help you get more idea of subjects.

1.3. KNOWLEDGE SHARING

Knowledge sharing is an activity for exchanging the knowledge between different kind of people like family members, friends, colleagues, a community like Wikipedia or organization and companies.

Companies and organization realized that knowledge establish a precious untouchable asset for developing and sustaining contesting benefits. Knowledge management systems usually supporting knowledge sharing activity. Any way technology establishes just one of the so many factors that affect the sharing of knowledge in organization and companies, like organizational culture, trust, and incentives. The sharing of knowledge established one of the biggest challenge in the field of knowledge management, since some employees tend to stand out sharing their knowledge with the other colleagues in the company.

There are two sort of knowledge:

- Tacit Knowledge

  when it is hard to transfer knowledge and information to transfer to someone else like for example to write it the document or verbalize it. By the aim of tactic knowledge, most of the time people don't recognize the knowledge and information they possessor and how much value contain for other people. Impressive transfer of tacit knowledge usually needs immense personal contact and trust. Other example of tacit knowledge that we can mention is the capability to riding a bicycle. Knowledge that is simple to negotiate is called explicit knowledge. The procedure of transforming tacit knowledge is known as codification or artic The process of transforming tacit knowledge into explicit knowledge is known as codification.

- Explicit Knowledge

  The knowledge that can be articulated, encoded, and store in specific media. Can be easily transmitted to others, normally these kind of information possess in encyclopedias as example for explicit we can mention Wikipedia. The most common forms of explicit knowledge are manuals, documents. The companies comply with group-ware applications to collect, store and share their explicit knowledge, and once this has reached an enough level of efficiency, collaborative technologies such as intranet, the internet, extranet, e-mail, video-conferencing and tele-conferencing are used to assist in the growth of implicit and tacit knowledge transfer (H. Smuts, 2009).

1.3.1. Knowledge sharing in DMS

We can say that one of the important firms' knowledge assets is document, so we need a good designed document management system (DMS) to provide collaboration and coordination mechanism to provide the users with an active figure in growing the knowledge foundation

and linkage mechanism among users, as well as furnishing a foundation for evaluating the system.

To address the problem of an effective DMS design, we set the stage with the essential terminology. A document may have very little context and simply presents (Ginsburg, 2000) DMS can enable and capture explicit knowledge, knowledge management is the explicit management of knowledge and information held by individuals so that it is effectively shared and used by others in 'vital organization. Via the impressive sharing of corporate reflective capital, Organizational Knowledge have to be efficiently transformed into business intelligence, Personal knowledge involving a business process has to be turned into corporate knowledge so that it can used to the advantage or the organization and applied throughout with consistency.

The members of a traditional work group, held their individual and collective tasks that use a physical space in which all the necessary objects, tools and guidelines are made available. Anyway, the members of teams geographically distributed using a virtual place as a substitute for the physical space. These virtual spaces are called workspaces, which are designed as a logical counterpart to the physical spaces and are based on physical metaphors. As physical spaces, these workspaces are required to make all the necessary items, tools, people, and guidelines available along with all communication channels and coordination mechanisms necessary.

To creating opportunities for different users to turn them to the place of cooperating as in virtual world a workspace is expected. It is not the spatial features of a space that matter most, but what can do the user of that space inside it and what turns such a space into a place.

This is a reason that fundamental that a virtual space furnishes its users with a chance to turn into a place for cooperating. (Ali-Babar, 2008) we have two benefits. One knowledge sharing can save time and energy. Second, knowledge sharing can meliorate the effectiveness and the output of the management information sharing.

1.4. SYSTEM REQUIREMENTS

- For easy access to be reached from everywhere the application should be web-based.
- The application should give the opportunity to the user to create categories and have some default categories and sub-categories.
- Should be user friendly or in other word it should have good and simple UI.
  (Hediyeh Baban, Online Document Management System for Academic Institutes, 2010)

1.5. Content organization

The current thesis describes an experience in configuring a document management system by a world-leader company. The document also describes some plug-ins to enrich the features of document management system.
My focus lies in two different parts; first I will illuminate how to design a software with particular focus on recent methodologies and secondly I will explain how to equip this software with DMS in respect of access to archived and electronic documents for simplify the user's problem in sense of easy access to the online and electronic documents.
This technology would give the users the opportunity of web surfing and enable them to obtain all of the relevant information independently.

Chapter two presents a brief background of different kind of Software Development Methodologies and document management system on environment and business and how it can be helpful for companies in virtual environments and how choosing right SD methodology can impact on software efficiency.

Chapter three represent the goal of this thesis and why company choose this path to be on market. Discuss about the environment of the software. take in consideration the requirement and based on gathering requirements will choose the correct material and software.

Chapter four demonstrates the design and implementation of the software with a special focus on improve the daily access to the huge amount of electronic documents.

Chapter five concentrate on implementation and validity of this system which has been quiped with DMS, study different task and give te priority of each task. Decide the steps of the work.

And finally chapter 6 illustrate the ways that systemis working and how it would be helpful for users with some echematic of designed software and it's User Interface

2. State of the Art

With Document Management System (DMS) we can store, search, track, share, and retrieve documents of various kinds like text files, spreadsheets, presentations, and images. (Srikant Krishnan Nary Subramanian, 2015) A DMS is a core technology applied by so many companies for managing their electronic documents and is mostly the central component of content management systems. A DMS can be used locally, on a network, or in the cloud. The aim of research of 'Srikant Krishnan et el.' Is to concentrate on the fact if DMS can reduce carbon footprint. DMS can work on several network ways like client server type system, web-based system (the access can be done through many ways desktop, laptops, tablets, smartphones).

2.1. DOCUMENT MANAGEMENT SYSTEM BASICS

DMS software's user interface let users to interact with system. it has some components to use like:

- The OCR: to read the electronic document when uploaded to DMS and automatically indexed.
- Tagger: tag a document with keywords for searching and retrieving document
- Indexer: classifying an input document with metadata for easy retrieval.
- Tracker: keep track of access and changes to a document.
- Searcher: allows the repository to be searched
- Collaborator: let communication between DMS users through email or chat messages.
- Access Controller: controls access to a document for read only or read and write or read/write/print or other combinations.
- The Workflow Controller: helps create, update, and delete business process workflows for a company.
- The repository stores the data: it may be a database or a filesystem or a combination of the two.

It is difficult and expensive to archive document physically in storage and warehouse. for

example, its cost in India is about US $2 per square foot and purchase is about US $5000 per square foot. Hence, convert them to electronic documents so it is convenient to use DMS. For scan the archived document a farm of scanner is needed since one scanner can just scan about 5000 page per day.

Srikant Krishnan et el. Chose the GeSI's method to quantify the carbon footprint impact.

The fact that why they've chose this method is summarized into two basic reasons:

the process-sum approach is simple to put on when several overlapping modes of apply exist as in the case of DMS; and itis approved by industry consortia. (Srikant Krishnan Nary Subramanian, 2015) (Dahiya, 215)

When several overlapping modes of use, exist then sum of impacts of individual processes is easier to estimate or economically input output calculations. Moreover, GeSI approach is adapted to use of ICT.

Based on the study of Srikant Krishnan et el. using of DMS is definitely helping environment. If there won't be any usage of paper maximum benefit will have obtained about 1448kgCO2e/day.

In case of converting archived documents to electronic one a benefit of 62 kgCO2e/day is obtained.

2.2. Design DMS software and chose the implementation methodologies

During past years, a huge quantity of companies and organization start their business in global environment.one of the main concern of these organization is to choose a methodology for software developing. Hence comprehension of SD methodologies on enterprise SD is a serious indication and important step to the adopt the correct technique to adhesion in any business strategy in the IT industry based on various business. These days there are so many methodologies and process are used in the market, one of the main challenge in the SD markets is business strategic plan. (Dahiya, 215)

2.2.1. Classic models

Based on (el. N. M., 2013) there are different kind of software development life cycle, some

example of this methods are “Waterfall”,” Iteration”,” V-shaped”,” Spiral” and “Extreme programming”.

These days, infrastructure growth more attached on computer in terms of doing their job as an outcome of computer technology. Computer is though-out a time-saving machine and its improvement supports in carrying out assembled, long, endless activities in a very short period with numerous velocity.

“A software process model” (el. N. M., 2013) presents an explanation of a procedure

- Characteristics
- Design
- Reliability
- Assessment

Common Software Process models are:

- Waterfall model: detached and distinct stages of characteristics and developments.
- Prototype model
- Rapid application development model(RAD)
- Evolutionary developments: characteristics and reliability are interleaved
- Incremental model
- Iterative model
- Spiral model
- Component-based software engineering: the systemic complex from available parts.

(Bohner, 2005)

2.2.1.1. Waterfall model

Based on the ‘Nabli Mohammed et el.’ The “Waterfall model” is the classical model of software engineering. This model confirm schematization in primary phases, it warrants layout defect before they develop. As well as, its intensive document and layout make it work fine for project in which quality control is a leading relevance. The pure waterfall lifecycle contains a multiple non-overlapping phases. The model starts with organizing system prescriptions and software provisions and continues with architectural design, circumstance design, coding, testing, and maintenance. The waterfall model render serves as a baseline for plenty other lifecycle models.

In first phase “System requirement” appoints to the components for anatomy of the system, like hardware, software and etc.

In second part “Software requirements”, instate the prospects of the software functionality and recognize which system requirements the software result. This study consists defining interplay demand with other applications and databases, efficiency requirements, UI requirements.

Third part “Architectural design” specify the software frame of a system to confront the particular requirements. this phase describes the main components and the interplay of them, but it is not describing the structure of each one.

Forth stage is talking about “Details design”, test software components which were described in the “architectural design” phase and vintage a characteristic to tell how each component should be execute.

Point five, fulfilments the detailed design characteristics.

The sixth stage talk about the software testing, it specifies if the software needs any changes and if there is any bug or error existent in the code.

Finally, the last part is taking care of “Maintenance” of the system, it addresses problems and gain the demand after the software release.

Benefit:

- Simple to figure out and execute.
- Broadly used and known (in viewpoint).
- Amplify good addictions: define-before- design, design-before-code.
- Recognizes outputs and landmarks.
- Document driven, URD, SRD…
- Good functioning on major products and fragile teams.

Weakness:

- Doesn’t identify fact well.
- Doesn’t reflect interaction property of development.
- Illusive to await exact requirements in initial project.
- Software is deliver late in project, late detection of rigid errors.
- Hard risk management.
- difficult and expensive to make changes to documents,” swimming upstream”.

- Considerable executive, expensive for small teams and projects (el. B. B., 2000).

Pure waterfall model includes alternative steps: concept, requirements, architectural design. Nabil Mohammed et el. Shows that this model accomplishes well for products with obviously realize requirements or when working with well comprehend technical gadgets, architectures and Subtractions. the weakness of this pattern is its frequentative debility make it adverse when fast development is required. For solving this problem, it is better to use the "Modified Waterfall" pattern [3]. This pattern benefit from same stages like "Pure Waterfall".
The previous model "Pure Waterfall" can also split into subprojects at a suitable stage.

2.2.1.2. Iterative Development

In the next phase Nabil Mohammed et el. Have studied the "Iterative development" model and compare it to the previous one. The weakness point of the previous model builds a request for the new model which can offer quicker outcome, needs minor up-front data, and present major flexibility. With this new model, the project is distributed into smart phases. This let the development team to represent result sooner on the process and gain rich feedback from system users. Mostly, each replication is needed a Mini-Waterfall procedure with feedback from one stage processing fundamental information for the plan of next path.
In an alteration of this model, the software products, which are yielded at the terminal of each phase, can go into production instantly as incremental releases.

2.2.1.3. V-Shaped Model

The same as the "Waterfall model", this model life cycle is a consecutive path of implementation of processes. Any step shall be completed before next step starts.
Examination is accented in this model rather than the classical model "Waterfall model".
The examination methods are developed primary in the life cycle before any coding is accomplished, during each of the steps preceding execution. Demands begin the life cycle model the same as the waterfall model.

Benefit:

- Simple to figure out and execute.

- Each step has special deliverables.
- Better opportunity of achievement upon the Waterfall model due to primary development of test plans within the life cycle.
- Works well for small projects where requirements are easily understanding.

Weakness:

- Very solid as well as waterfall model.
- Rare flexibility and adjusting extent is hard and costly
- Software is implemented pending the implementation step, so no primary prototypes are produced.
- This model does not offer a clear direction for issues found during testing phase. (Karlm, 2006)

2.2.1.4. Spiral Model

This model is equivalent to the "Incremental" model, but assertion is on risk resolution.

It has four steps:

- Planning
- Risk Analysis
- Engineering
- Evaluation.

A software projects frequently passes through these steps in replications.

The emphasize is on planning steps, data are prepared and risk is distinguished.

A prototype is yielded at the termination of the risk analysis step.

Software is generating in the engineering step, along with testing at the finishing of the step.

Assessment step let the client to figure out the efficiency the project to date before the project start to the next spiral.

Benefit:

- Numerous quantity of risk analysis.
- Well for major and mission-critical projects.
- Software is yielded primary in the software life cycle.

Weakness:

- Could be expensive to use
- Risk analysis needs highly specific competence.
- Project's achievement is highly related on the risk analysis step.
- Doesn't work well for smaller projects (Karlm, 2006).

2.2.1.5. WinWin Spiral Model

This model use theory approximate covering on system's next-level goals, limitations, and alternatives. This model brings in identifying the system's stakeholders and their success status, and using discussion process to specify an exclusively satisfactory set of objectives, limitations, and remedy for the stakeholders.

W theory:

1. **Determine Objectives**: determine the system life-cycle stakeholders and their win conditions and instate primary system edges and outer interfaces.
2. **Determine Constraints**: identify the conditions under which the system would produce win-lose or lose results for some stakeholders.
3. **Identify and Evaluate Alternatives**: supplicate proposals from stakeholders, rate them with respect to stakeholders' win conditions, merge and discuss candidate win-win alternatives, analyze, distinguish, resolve win-lose or lose-lose risks, record obligations and areas to be left flexible in the project's design record and lifecycle plans.
4. **Cycle through the Spiral**: Elaborate the win conditions measure and screen alternatives, resolve risks, stack suitable obligations, and develop and execute downstream plans (Rlewallen, 2005).

2.2.1.6. Extreme Programming

An approximate development, relying on the development and rendition of very small enhancements of functionality. The basis is on stable code progress, user involvement in the development team and pair knowing programming. It can be hard to hold the concern of the clients who are involved in the process. Team members may be unsuited to the strong involvement that determines agile procedures. Extreme Programming Practices:

- Incremental planning: demands are storage on Story Cards and the Stories to be set in a release are specified by the time existing and their respective lead. The developers unlink these stories into development “Tasks".
- Small Releases: The minimal beneficial set of functionality that process business worthiness is developed first.
- Simple Design: Sufficient design is conveyed to meet the current requirements and no more.
- Test first development: An automated module test frame is used to write tests for a new segment of functionality before functionality itself is implemented.
- Refactoring: All developers are attended to re-factor the code frequently as soon as possible code betterment is found. This keeps the code extensive and maintainable.
- Pair Programming: Developers work in pairs, checking each other’s work and providing support to do a good job.
- Collective Ownership: The pairs of developer’s work on all areas of the system, so that no islands of competence develop and all the developers own all the code.
- Continuous Integration: As soon as work on a task is done, it is maintained into the whole system. After any such adhesion, all the segments test in the system must pass.
- Sustainable pace: Numerous amounts of over-time are not attended tolerable as the net trace is mostly to decrease code modality and medium term productivity.
- On-site Customer: Client should be extended full time for the use of the XP team. In a screaming programming method.

XP and agile principles

- additional development is supported through small, continuous system releases.
- Customer contentions alternative full-time customer nomination with the team.
- People not proceeding through pair programming, plural acquisition and a process that eludes long working hours.
- variation supported through arranged system releases.
- holding easiness through fixed refactoring of code (Sommerville, 2004).

benefit

- Weightless process segment small-medium size projects.
- Produces good team connection.
- accent ultimate product.
- Iterative.
- Test relying approximate to requirements and quality collateral.

Weakness

- hard to enhancement to numerous projects where documentation is necessary.
- Needs experiment and dexterity if not to decadent into code-and-fix.
- Programming pairs is expensive.
- Test case manufacture is a hard and specialized skill (el. B. B., 2000).

2.2.2. Agile Software Development methodologies

Based on research done in (Lohiya., 2011) there are several Agile methods exist for Software Development like:

- Extreme programming
- Scrum
- Dynamic system development method
- Adaptive software development
- Crystal methods
- Feature driven methods

Brief explanation of each method (Bohner, 2005)

2.2.2.1. Extreme programming

The most favored Agile method is extreme Programming (XP). The method is made by five steps to reach scope. 1-exploration in customer requirements and tools and technology chosen by SD team.2- preparing the schedules and partition work into several iterations.3-in this step releasing the iteration created in previous step.4- testing and identifying improvements and maintenance5-last step is Death which has agreement of client with the application design with no changes required in future (Bohner, 2005).

2.2.2.2. Scrum

Communication between team member, daily meetings, issue of changing situation and keeping coordination (e, 2009). This method has three steps,1-pregame,2-development and 3- postgame. First step which is pregame has two sub-phase: planning the identification requirements and design application. New function is identified in development phase. development is based on sprint which has some sub-stage as requirements, analysis, design, evolution and delivery (Bohner, 2005).

2.2.2.3. Dynamic system development method

Time is fixed amount of functionality for each requirement should be decided, the stages: feasibility study, business study, functional model iteration, design and build iteration and implementation. It is most appropriate framework for rapid application implementing. (P.Abrahamsson, 2009)

2.2.2.4. Adaptive software development

This method is useful for large and complex SD projects. its main feature is designing the framework for large project which can decrease the confusion and keeps the development team working on track. The main features are mission-driven, component-based, iterative, Time-Boxed, Change-Tolerant and Risk-Driven. (P.Abrahamsson, 2009)

2.2.2.5. Crystal Methods

The most important element used in this method is the people involved in the project, they are more important the tools or processes which are used during the project life cycle. It is best choice according to the individual project's needs. Selection of this methodologies is based on: level of communication needed, life-threatening implication and corporate priorities (Livermore A. , 2010).

2.2.2.6. Feature Driven Development

Main benefit of this method that it doesn't need insidious training for SD team. It is simple to use, can provide timely and accurate data of progress to management for review. (Livermore A. , 2010)

Based on study in (Lohiya., 2011) agile methods are emerging a new successful SD methodology by overcoming limitations of traditional method in practice.

Limitations:

It is not suitable for big organization and large SD projects because so many small group are involved. (Fitzgerald, 2013) (Boehm, 2002)

Based on researcher teamwork can increase the quality of the project but in the other hand risk become higher.

2.2.2.7. Waterfall Model vs. Agile Model

The quality produce is almost the same in both methods. The difference is that agile method is cheaper than waterfall (M. Huo, 2004).

After researching and examining some real cases, on (Lohiya., 2011) proved that agile methods are best suitable for small organization and better quality product as well, under certain management constraints.

2.2.3. Secure Scrum

Based on the study of Christoph Pohl et el. The Secure Scrum is an expanse of the scrum frame which can support developers, also non-security proficient, to be able to develop secure software. The previous research demonstrates that scrum is one of favorite software development framework (K. Beck, 2013) (K. Schwaber, 2015). In scrum model small teams in term of quantity of the developers have a deterministic autonomy to develop and create a software. Based on the (Hof C. P.-J., 2015) all team member can develop all tasks at hand.

Software is step by step developed this method is called sprints. Usually sprint duration is among two or four weeks.in sprint meeting each user (developer team member) generally describe the new specification of functionality which can be consider as "user stories".

In sprint meeting this "user stories" from product backlog are distributed into tasks.

And eventually are going to be cumulative in sprint backlog. One of the important role in the

scrum model is the “Product owner” which is the refer point between client and develop team. Scrum template doesn’t contain any security-specific steps.

One significant motive of software security in Secure Scrums the determination of security related parts of a software project. The related security is then made dominant to all team members at all times. The approximate is investigated to increment the security level since team members put their concentrate on things that they had rate, and they don’t have any problem to understand that manner and when their preferences of requirements doesn’t vary from prioritization of other (C. Riemenschneider, 2002) (Turk, 2012). Secure Scrum proffers a method to not just determine security convenient steps of the project but to also advise on the attractiveness of attack vectors in the sense of ease of utilization. (Herley, 2014)

Scrum concentrate on wealthy connection, self-accusation, cooperation among the project corporates. This is contrast the rigid implication. In the other hand the main compete of the software security in Scrum is not to contradiction with the agility perspective of scrum.

Secure Scrum (D. Mougouei, 2015) is a “security enhanced version of Scrum”. It’s changing the scrum steps with concatenating spikes. “Each spike possess analysis, design and verification related to security concern”. (Hof C. P.-J., 2015) This passage required a lot of modification so prevent deployment in the ambient which are using already Scrum. Based on research done in (Z. Azham, 2011), security master must be accountable for new Backlog. This way shows the experts the way they can adapted the security aware parts to the Scrum process. Any way as mentioned before this method does not fit the grown Scrum team because of its lack of flexibility. Within this method it is not feasible to bind Scrum user stories with security relevant stories. Secure Scrum in confronting holds the link among security theme and user stories of the product backlog respectively tasks of the sprint backlog. In (L. Williams, 2010) Researchers studied the risks of poker game and approximation security to explain requirements in terms of security to explain the required scenario to the develop team. These studies demonstrate that it is feasible way to incorporate security awareness into scrum. It settles down the difficulty of requirements engineering with concentrate on IT Security. Any way it won’t help a lot in term of verification of software development. In other hand Secure Scrum enable a solution for all steps of software development.

2.2.3.1. DESIGN OF SECURE SCRUM

"Secure Scrum consists of four components:

- Identification component: First component "Identification component" is apply to recognize security issues within software development.it is also applying within the primary development of the product backlog also pending product Backlog filtration, Sprint Planning and sprint review.
- Implementation component: enhance the information of the Scrum team for security problems within a sprint. This step is applied in Sprint Planning, also within the Daily scrum meetings.
- Verification component: ensure that teams members are capable to examine the software with concentrate on IT Security. It can be managed during Daily Scrum meeting.
- Definition of Done component: provides developers to determine the definition of Done for security relevant issues as postulated in standard Scrum.

(Hof C. P.-J., 2015).

A. Identification Component

Within this step security-relevant user stories can be recognized and indicate. The concentrate of this step is on security implementation works on section of the emerging software which his very valuable for the stakeholder. This component is helping within creation of backlog, Sprint Planning, also during Product Backlog Refinement.

First of all, team member should decide the loss value of each task and obviously it is not the worth of development not even the advantage of the functionality which implement the user story. It's worth is defining based on the loss can happen if the functionality that implementation of user story erns attacked or data will be lost or manipulated. Precise description of security issue helps the team to understand security concept.

B. Implementation Component

The concentrate of Scrum is on implementation, so every member team should know specifically the priority topics of the project.so the most of the functionalities are specified in the Product Backlog. Within a sprint some user stories break down to tasks.

C. Verification Component and Definition of Done Component

Based on Secure scrum there two different ways to "verification and therefore the Definition of Done". For simplification some works which is possible to be done by one developer is called "task" and it is one Definition of Done. Verification of a task should be done during same sprint and by a developer who I working on it and it should be a part of task. So the verification should be a part of "Definition of Done". If the developer is not able to verify the task it shouldn't be a part of the task. In this case a new task with scope of verifying the pervious task should be creating. So developer can define the "Definition of Done without the verification".

D. Integration of External Resources

IT security knowledge perhaps is infrequent in a Scrum team or special knowledge not present in the Scrum team may be essential for some of emerging software. Secure Scrum suggest methods to place outside resources in all components of Secure Scrum. Outside resources can have these functionalities:

- Enhance knowledge
- Solve challenges
- Provide external view

Enhancing knowledge:

This function contains security relevant training for the Scrum team to get a better understanding of a specific security-related area.

In this way the workplace during a project offers the possibility of teaching the IT security with a specific instance at hand and can be more efficient training on safety in the course of two projects. The training may be necessary for the aspects that are not part of the work of every day, the usability of the security mechanisms (Hof H.-J. , 2013) (Hof H. J., 2010).

Solving Challenges:

Some activities are difficult challenges to security that require special expertise or special experience, so that it is more cost efficient to external resources to solve this challenge. To

avoid violations in Scrum, it is necessary that these external solutions can be treated as a tool, a well-defined part of the development, a framework or a "black box", which is ready for use.

This means that this outer solution must be encapsulated and hence does not impression to Scrum or Scrum teams. For instant, this can be a functional part of the software or parts of the project which can be used with an API by Scrum teams. Another compete is the adhesion of outer services such as influence testing in the development process. One way to do this is that the external resources provide test cases (M. Huo, 2004) which can be used for each substation of emerging software at any time. The test results can be documented as artifacts in the order book. Then you can be treated like any other change request.

Providing external view:

An important part of IT security is to identify ways to operate your system. In other words, you should think like an attacker to identify the possible offensive vectors. Generally, it is simpler for an outsider to identify the potential weak points of a system which is mostly of a system developer. So, external resources can introduce an external point of view of value to a project. When using the identification component of Secure Scrum, an outer adviser can be helpful to point the team to safety concerns. When using the implementation component, outer resources may be useful in the sprint planning. When using the verification component, an outer consultant can help to construct tests for security problems. These intermediations by outer resources cannot be part of the normal Scrum process, the outer resource should just help to raise questions. Finally, the outer resource should help to concentrate on the team's problems is not aware.

Christoph Pohl et el. Demonstrate the Secure scrum is capable to progress the security level of the developed software. Secure scrum is simple to figure out, can be used in action, and is also appropriate for teams that have no deep end security awareness. Assessment also demonstrate that it is feasible to have a suitable documentation via all phases of the experiment. The instrument of Secure Scrum harmoniously mixes into the standard Scrum toolset without the need of much overhead for training.

2.3. Literature conclusion

Document management systems helps a lot in term of reduce the duplication of documents in the past systems and improve a lot the controlling of the uploaded documents. (Rashidah, 2012)

In today's market the time factor in terms of access to data is playing the main role and has one of the biggest growth factor for big companies. (Buckland, 1997)

Based on [30] which study the role of document management technology in terms of quality of easy access to the course documents compare to the old system with lack of a good tools to help the students 'Rashidah, Mokhtar et el' show that integrated database can improve the system by tracking the process faster and easier.

In traditional model like "waterfall model" which is reflected as a linear model the main focus was on "sequential flows of software development life cycle, from identification of project requirements until the maintenance part." (Buckland, 1997)

different phases of the project are connected to each other.it means the output of each phase, subsequently is the input of another phase, the waterfall model is a good choice where the requirements of the projects are very well defined and maybe it is convenient for the projects with rapidly altering requirements. (Dixit, 2011)

Based on the research in (Rashidah, 2012) has its own advantage and disadvantage. as the strengths points it is easy to implement and unrested, very famous, a good example for "define-before-design, design-before-code" and very well working on mature products and weak terms.

As the weak point we can mention: it does not match the reality well, difficult and expensive to make changes to documents and so on.

In (Rashidah, 2012) scrum method has been used which can involve the customer for approval of the projects in each single phase of the project. In the daily meeting any issues can be recognized beforehand. (Mehta, 2012)

Scrum methods help a lot the projects which need the rapidly changing requirements in all the cycle of developing the projects. (Livermore J. A., 2008)

In (Santos, 2013), it shows that any foundation can profit on better performance on cost and scope in four different perspectives which are "team abilities", "management of

requirements", "quality of code developed" and "delivery of the system" by using agile principles.

At the end, after studding different methods, Rashidah, Mokhtar et el, have been chose the agile developments principle" scrum" and "waterfall model". By this method changes can make rapidly as well as the communication between different departments of the organization.

Two strengths point: it can manage, first manage MQA proof corresponding to areas as confirmed in "code of programed Accreditation Practice (COPPA)" online and secondly this method can detract the feasibility of plenty and overlap documents in different areas. It is also able to cooperation: higher learning institution in managing in significant document in academic level,

External and internal experts to behold the document evidences for complete processes of academic system implementation and the person in charge for each part can prepare adequate documents faster.

This software has different ability like, delete particular documents, edit available one, print the related documents, it can search for any document and storage all data for each document In (Gao-feng, 2009)[35], the researcher accord "advanced B/S architecture" and "Asp.NET" technology and takes Microsoft SQL Server 2000 to plan and realize the document management module in a "Product Data Management (PDM)" system.

How the design and realize the system, object classes in each business logic layer are all corresponding to data classes in a database access layer, the calling of data classes encapsulates the storage process of the operation for database and the operation or mapping of object classes for database are all realized by calling this system mostly belongs authentication and authorization to handle security.

according to the researcher the PDM system is suitable for small and medium-sized documents which can be a problem in the market in order to handle the big data.

3. Goals of the Thesis

Target of this chapter is to figure out the state and the elements of the problem, and that defining scope to achieve the goals. The first part of this chapter is devote to analysis of the problem: a brief overview of the evolution of the DMS brings us to the current situation, let you to understand what is the importance of the technologies used in this work, and above all what is the user impact. The second section focuses on Software and the elements made available by the platform developers. The third section concludes the overview of the analysis of the problem by examining the impact that large amount of data has on use, both from point of view of perception, from the management point of view. In the last section we define objectives of the work, in the light of the aspects of the problem analyzed in this chapter.

3.1. Environment of the problem: the web

The first website was published on 1991 by Tim Barents-Lee it was one of the biggest developments in the history of human communication. Surely, the web as we know today has made a huge walk over what is available in 90's, especially the conditions which it had been though. The project saw the light within the CERN in Geneva as a software system able to allow the sharing of scientific documentation format Electronic independently of the platform used, in order to allow cooperation and facilitate communication within the scientific community. At the same time, it has therefore the development of the HTML standard for the composition of the pages and the HTTP protocol for communication between computers. This winning pair arrives until today, although with considerable evolutions and accompanied by a large set of technologies and features both proprietary and open source. The original web, composed of static pages is as dynamically evolving web, capable to give greater flexibility and scalability. If on the one hand the simplicity and HTML immediacy are the key points that have allowed the affirmation web, the language deals with markup and aspects like structure and meaning of contents are largely sacrificed, making it difficult to find and reuse information. It is in this context that makes the Document management system (DMS) give life to the web for having more management efficient use of network resources and documents.

3.2. Requirement gathering

Several methods were used to examine the usability of the DMS. A test system environment

was set up in order not to influence the actual recordings and usability tests were conducted using this environment. A pre-test questionnaire was given to the developers in order to record and analyze demographic information. Task analysis was performed in order to decide the basic activities and to illustrate how these operations are performed step by step. Subsequently, the usability tests were performed by developer team, project manager and end-user. In the first step, the first test group has aim of technical-valuate purpose. In the second phase Project manager will organize two group of user testing to check to communication between the Database and Software. In the third phase tracking the uploaded data and meta-data on the database and communication between this database and the software will check for big data. Agile software development methodology and classic software methodology were analysis choose the methodology of work. After analyzing so many methods with different scope "Secure Scrum" and "waterfall model" were choose. These two methods were convenient more respect to other methodologies for the company in terms of the cost and time and the quantity of the work. This study contains certain phases. The first phase is the selection of the Electronic Document Management System (DMS) for Document engineering service. One of the basic reasons why DMS is chosen for this study is that it will be a mandatory system for the affairs of state in the near future and based on Italian government and low each document should be archived fiscally, the needs of many company in terms of respect these low for having secure fiscal archiving and electronical archiving system lead them to demand a powerful software to resolve the problem of easy access to both archive systems. One of the important phase in this level is to define valuable tasks to give to the developer team.

3.3. Materials, Instruments and Software

As it demonstrates in section 3, developing environment are using form these Microsoft SQL data Base, ASP.Net techniques. The recorded test sessions conducted with users to measure how long each task, and see if they focused on the relevant part of the screens or objects. New technologies have arisen together with the advancement of science. One of these technologies is DMS which organize and manage electronic documents. Considering the increasing amount of document needed for the institutions, it could be said that there was a need for a system to manage this complexity. Moreover, the time spent to distribute and share the documents in short time periods is important in our global world. Furthermore, knowledge

and sharing this knowledge within an institution have vital importance. It has to be a private asset it should not be kept in office desk or on personal computers for the sake of institutions. Therefore, these kinds of issues lead us to take advantage of internet by transferring the documents to an electronic form. Other aims that drive institutions to use electronic format for documents are to save time and secure the data. Even if the reliability of such system depends on the developer, they provide more flexibility than paper work. However, the structure of the network for the system, the amount of the documents that need to be collected and the maintenance of those documents and the system are not easy.

There are several technologies for document generation and management. However, as Gilani, Ahmed and Abbas (2009) offered that there should be a single software unit running to ease the necessary processes for creating and sharing the document. This kind of software would facilitate the regulation of the documents and it would make documents to manage easily for institution.

The system enables the users manage different types of operations such as:

- filling a form and tracking it
- searching and previewing document/form
- assigning deputation and cancelling it
- editing and cancelling document
- archiving documents
- issuing reports
- sending message
- scanning document and transmitting it into the system
- sharing documents with other users
- creating private folders

The Online Digital Document service plans to offer Customers the possibility to consult via web in PDF format the documentation that traditionally the customer receives the original one printed on paper and physically delivered to the customer at home or in branch. This submission is the replacement of the paper version.

4. Design Choices

WebSafe is the Software product for online retrieval of indexed documents.

The documents are processed through the ingestion products Designed by the company (ColdSafe for spool data, PushDoc for images, dsc2aslite and tabulati2aslite for PDF). The images are stored as: ADB (proprietary structure for spool data), DB (obsolete structure for spool data), TIF, JPG, DOC, XLS, SLK, PPT, ZIP, TXT, RTF, MSG, EML or PDF. The indexes are stored in a Database hosted by a DB Server (Microsoft SQL Server).

Through an Internet Browser, the user can submit requests to the Web Server (Microsoft Windows 2000 Server) hosting the service. The main actions of WebSafe are:

- Searching for the documents through the user fields stored in a Database.
- Viewing the document images generated on the fly as PDF.
- Attaching a textual annotation to a document.
- Updating the user fields stored in a Database.
- Managing the users who can search and view the documents.

Every action completed by WebSafe is logged.

The graphical interface can be completely customized.

4.1. Different part and process of the company

4.1.1. Document Process Services

SERVICES	Description
Operating Support	Operating units, which are specialized to support and monitor using of process.
Infrastructural Support	Data Storage, imaging and physical filing services rely on logistic and technological structure.
Application Support	Rationalize the document-related workflows by supplementing with its own corporate applications (ERP, CRM, …).
Consulting	Support client with a team of consultants who organize and design process.

4.1.2. Partners

Partners	Description
EuroNovate	Specialized in offering advanced electronics signature solutions.
Kofax Group	Specialized in manufacturing and distributes intelligent Capture and Exchange technologies.
OpenWork	Business process management industry to regulate business.
ifinSistem Technology	Assuring high quality standards of the services and full compliance with regulations about substitutive storage operations.
Ephesoft	Open source enterprise capture platform for document acquisition.
Bremp	Important background in creation of optical storage and data capture systems.

4.1.3. Involved Actors

The actors that come into play in the definition of the process outlined above are specified in the following Table:

Role	Description
Developer	Developer means the person or team of people who are in charge of the implementation of the software or configuration of software which are only required parameter settings or customizations. It is usually one of the developers of IDM, but may be the Team Leader or the same person who holds another position 1, and participating in the project as a developer.
Team Leader	It is the responsibility of the team that is in charge of the product to implement SW / configure. Independently from the organization of IT, in the scheme of the above process, with team leader he is the person who commissioned the feasibility analysis, functional analysis and project supervision. It could be any member of the IT team, delegated by the Team Leader.
Product Manager / Product Owner	Project Manager (or, more correctly, the Product Owner of the project) means the person, within IDM, who has contacts with the client and that is, to the IT team, in agreeing the time and manner of development SW. This is typically a project manager or other person IDM that fulfills the same task (for example: one of the area managers, etc.).
Client / End User	With the generic term customer means the customer (or rather, the interlocutor of IDM at the customer, for a specific project) or, for internal projects, the person who has been appointed the company to become a promoter of a request development / SW configuration. Its main functions are to express the needs and at the end of the process to validate the results of the product developed.

4.1.4. DB Server

The *CUSTMER* Database hosts the following tables:

Role	Description
PSAFED	It includes the system fields *SYSTEMFIELD3*, *SYSTEMFIELD5*, *SYSTEMIELD7* and *DATA* and an undefined number of user fields (alphanumeric, numeric, date).
SEARCHFT	It includes the pointers to the archived documents.
CATALOG	It includes the pointers to the absolute paths where the documents are stored.
ANNO	It includes the text of the annotations and the system fields for matching the annotations with the documents.
LogUserSecurity	It includes the information logged when a user submits a request to the CGI for searching for a document.
LogReqquestedDoc	It includes the information logged when a user submits a request to the CGI for viewing a document image.
WebSppolimg	It includes the name of the temporary files.

4.1.5. Flowchart of the process

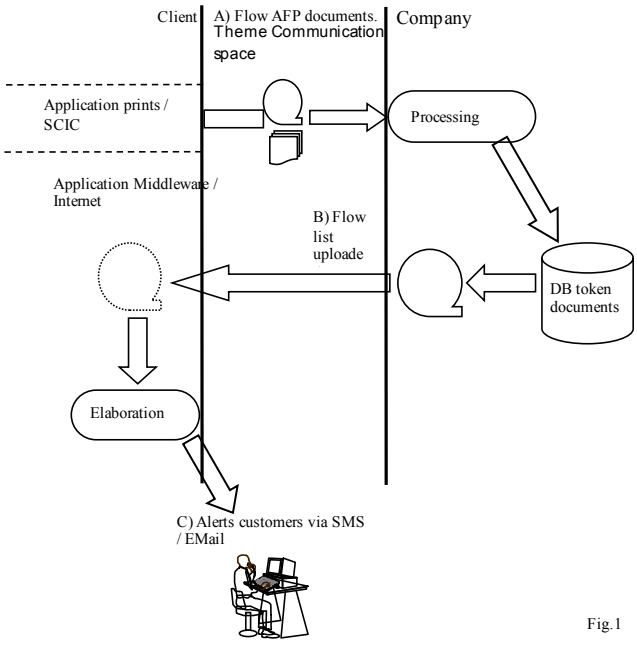


Figure 1 Flowchart of the process

In Figure 1 schematically the way in which client send the Flow **Advanced Function Presentation** (AFP) documents accompanied by descriptive streams of the same, as is the

creation of PDF, loading the DB index of documents, communication with client and the created PDF 'sending alerts to web users.

In response to the generation of documentation by the Client procedures, the flow is sent AFP containing all the information needed for printing and archiving of the document to the press area. In the flow supplied to draw each document contains a flag indicating the destination of the document or if the document is an original for the customer or if it is a file copy. By Theme space (communication already activated) flow is sent to Company (see Figure 1 A communication). From these flows Company:

- Generates PDF files;
- Charge a DB containing the necessary information to find the documents and tokens to the request of the PDF documents;
- Creates a flow where lists identifying information of pdf loaded for customers and places it in a SFTP site;
- Client daily basis leads to this box (see Figure 1 communication B) to pick up the flow of documents created and based on the information contained in it sends alerts to its customers (see Figure 1 communication C).

4.2. AFP FLOWS FROM Client TO Company

4.2.1. Introduction

Client sent AFP documents streams from the topic Space, each document includes all relevant information of the document, such information is also used to store and search for the same. This session will be analyzed all the information available in each document and how the analysis of the original in an archive will not be instead treated any details on how to send and receive streams, the name of the boxes, the management of any anomalies in the transfer or other aspects dealing with details of communications between Client and Company via Theme space. These aspects, in fact, fall within the issues covered in the formalization of the

relationship between Client and Company, which has a broader scope of access to documents from the web.

The flow of documents from Client can be grouped into two main groups:

- Documents from the procedure SCIC (accounting);
- Documents from the procedures not SCIC (bank statements, documents sintesi etc.);

In each of the two groups will be dedicated a special section where we will list the information present in the stream. Following will be explained the structure of the table (only) dedicated to the census of the information contained in the flows. This will be based on which documentation realize JOB loading tables and interfaces of the methods of the WS for the consultation of the indexes of documents.

If a regime arises document flows for customers that contained information consistent, incomplete, or abnormal in any aspect it must be suspended uploading that stream and immediately communicated the problem to client.

4.2.2. Download PDF document from WEB

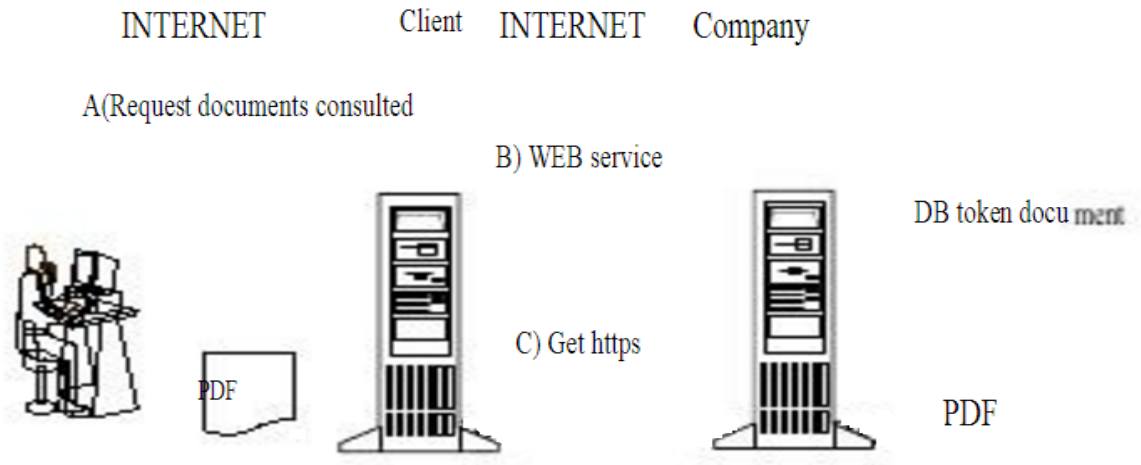


Figure 2 download PDF from WEB

the interactions between Client and Company that are triggered by each search and download files from a web

4.3. FLOW CREATION OF GENERATED DOCUMENTS

Once PDF documents generated and loaded, the Company database provides a stream containing the list of uploaded documents. This stream is a text file made available via SFTP. That file is a record for each uploaded document and the document contains document layout. The files contain records identifying the new documents for customers provided by Company, in other words the data contained in the files are incremental compared to the information contained in the files earlier. In any case, even if there were no new documents uploaded files must be created and contain a record head and a tail. These records are used as additional elements for assessing the integrity of the files taken.

4.4. Address, authentication and transaction security

Communication with Client and Company happen with https (SSL encryption to 128 bit). The application will be authenticated by the application based on the credentials provided by the client certificate. Company will provide a copy of the certificate (complete the certificate's public key and private key missing) to be installed on your system. The Company defines a consumer associated with the certificate which will authorize you to browse / edit the database and request the download of PDF documents. The produced certificate will be compatible with the web server Microsoft IIS 5.0. Will accept requests intended application only from IP addresses that will communicate to Company.
Every request from a known IP address and performed by the user associated with the certificate provided by client will be processed, Company not enter into the merits of the requested data, the profiling of the end users of the application remains with SGS.

4.5. Download document

For requesting documents in PDF format you need to send a request to the server Company with https POST method. CGI passed the variables to server Company. The request is made by the URL of the CGI dedicated to the service followed by action which is directed towards the CGI. For the application phase of the document image the action is "/stream".
Upon receipt of the request, the CGI decrypt the token and will ensure the integrity to verify the authenticity of the request. If the comparison does not show problems, the CGI will create the created PDF document. The created PDF will be streamed to the calling process.

4.5.1. Authentication

WebSafe uses the Windows NT authentication to validate the incoming requests and to access to the DB Server. The user must be created on a Domain Server and it must be granted on the DB Server. When the user submits the first request to the service, it must supply for its username and password. If it is validating by the system, then it can consult the service during all the current session.
Much more, WebSafe is completely integrated into the WIN2000 Active Directory model, so that it is possible to filter at run-time user-by-user the search criteria sent by the users. Through the user properties in the LDAP standard, for every user it can be defined the subset of data he can search for, and WebSafe builds at run-time the corresponding filter linking it (with the logical operator AND) to the query submitted to the Database.

4.5.2. Security

Data exchange between the actions of WebSafe is cryptographer for security reasons. Before doing any action, WebSafe makes the DE cryptography of the data, and only if they are consistent, WebSafe goes on with the request. This process can be performed with two cryptographic methods: one access the WSFunc.dll and the other interfaces the ActiveX FishCom.dll.
WebSafe first changes the attributes of every stored document as “Archive”, and then displays its image. For security reason, every document is stored with the name enriched of a

hash which corresponds to the DATA value. If the two keys don't correspond, the document image is not displayed by WebSafe.

4.5.3. Annotations

The user can attach a textual annotation to a document. He can load annotations already attached to the documents and he can delete them. The user can also search for documents with a given attached annotation.

4.5.4. LOG

Every action completed by WebSafe is logged. In particular, every time a user sends a request, WebSafe logs his IP address and Username, and at what time the request was sent. The generated search criteria (search) and the viewed documents (viewer) are also logged. It is possible to log further information requested by the customer.

4.6. Web Server

This Section deals with the Web Server which provides the service.

WebSafe is composed of:

- A CGI executable with a corresponding INI file and some DLLs. The CGI and the INI file must have the same name. The CGI submits the query to the Database and builds the result set grid, and it generates on the fly the document images.
- A group of files (ASP, HTML, TXT). Through these files the users generate the query to submit to the Database, update the user fields in the Database and attach the annotations to the documents. Through these files the entire service can be completely customized.

4.6.1. Cleaning Service

The PDF files are generated in a public area, on which the users have read and write permissions (not execute). WebSafe stores the pointers to the temporary files in a Database common to all the CGI executable files, belonging to the same Web Server. Typically, this Database is *WEBSPOOLIMG*. Every temporary file is automatically deleted in x (parameterized) minutes after its generation by the WsServ service that must be installed on the Web Server. WebSafe and WsServ query this Database via an ODBC Data Source (typically *WEBSPOOLIMG*), that must be created on the Web Server with SQL Server authentication *user, password* (this user must be created on the DB Server as a SQL Server user). WsServ is a

service and it requires a registry entry to direct it.

The parameters of the service are:

5. System Description

5.1. Diagram of process

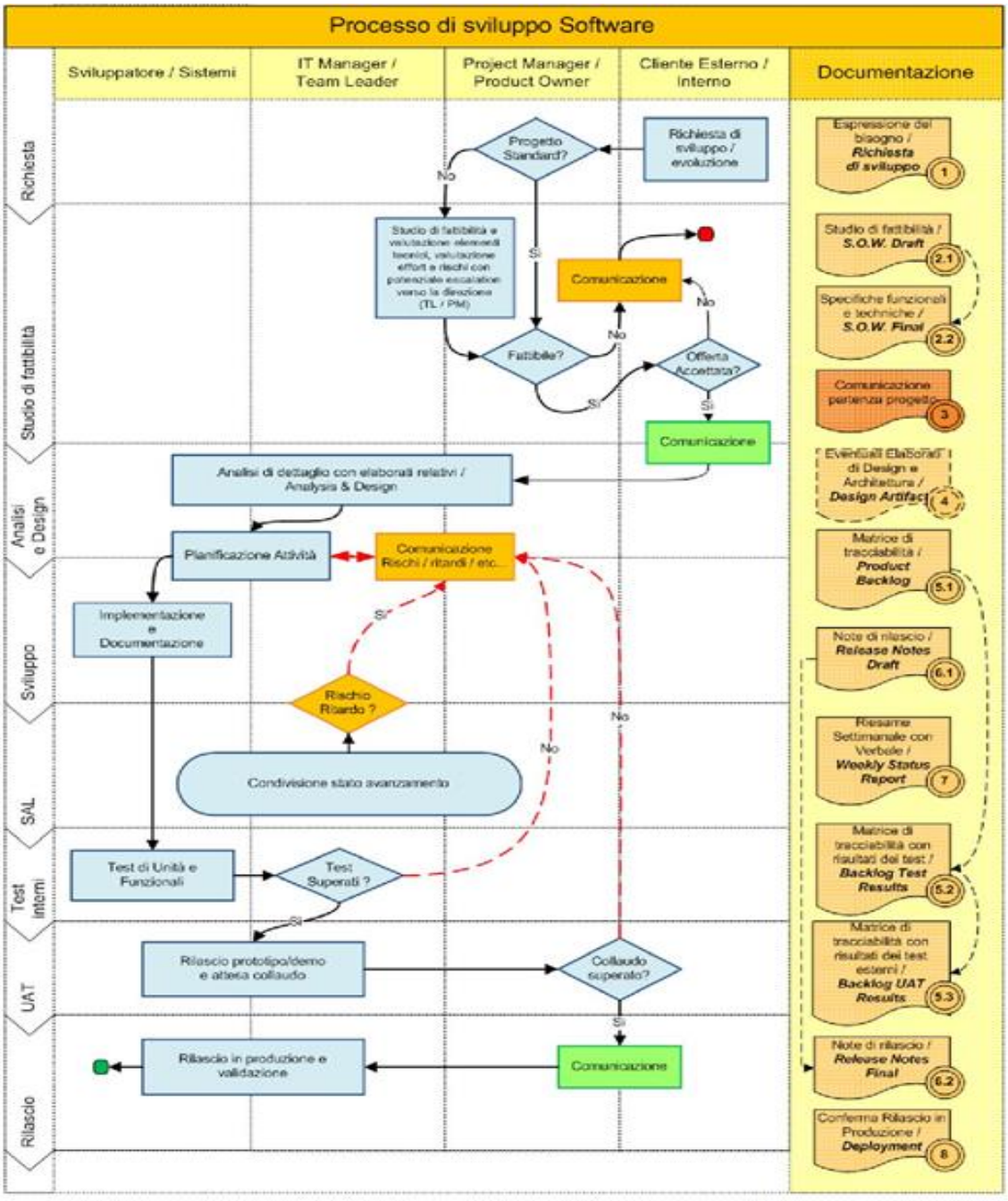


Figure 3 diagram of process

The process is divided into the phases, better specified below:

5.1.1. Request

The customer expresses his needs related to development or configuration SW. The request comes from the client involves only expressing what the characteristics of the required software, any technical information may have the form of requirements HW-SW with which the product will have to be issued interface.

The customer's contact is the Project Manager, who acts as an intermediary between the customer and the IT team.

5.1.2. Feasibility study

If it is a standard design (possibly software to configure the second default mode), the PM can autonomously perform a feasibility study, also informal, to inform the customer of the time (standard) expected; These data can then be used for the formulation of the economic offer to the customer.

Alternatively, if it is instead of a new development or otherwise of a non-standard process, the technical evaluation needs to be made jointly by the Project Manager and Team Leader responsible for the kind of activities required.

In case it is considered that the request is not feasible, it is the responsibility of the Project Manager to communicate the situation to the customer.

If the request is deemed feasible it is carried out a further study, more specific, aimed at assessing the commitment expected of:

• total man days required by the project;

• any investment HW / SW;

• any other items that might affect the economic assessment (fees, etc.).

All this leads to the PM to provide the necessary information to agree with the sales data technical-economic offer; the offer is made, the customer can, of course, reject it and in this case the process stops, or accept it and, in this case, one passes to the next step.

5.1.3. Analysis and Design

Once you accept the offer by the customer (or in the case of an internal request, authorized by the various managers), the Project Manager Team Leader to provide all necessary documentation (SOW etc.) in order to initiate an analysis of detail.

This constitutes the input to the phase of technical analysis and determination of the individual activities planned for the realization of the project, each quantified in terms of the expected time and represented by a single element on the software project management.

The analysis ends with the technical indications of the products to be developed and with a matrix of traceability of the tests that the products must overcome to release SW, Matrix of traceability (Product Backlog).

5.1.4. Development (Implementation / Configuration)

The developer by analyzing carefully the document of the project manager, can recover which technical issue should be developing, and depending of the priority of each task must start to develop them.

At the same time, the project, due to its complexity, requires a TDD approach too, and in order to focus on the more complex aspects of the code, the developer shall carry out a first draft of Release Notes for purposes of internal documentation, Release Notes.

5.1.5. SAL (Meetings of sharing the work progress)

Throughout the life cycle of the software developing, the IT team meets regularly, for mutual update on the progress of activities. These are technical meetings, short-term, in which they can actively participate the only members of the development team.

At these meetings can however assist other people, especially the project manager concerned to be updated on the progress and any problems the team is facing to release the requested product.

5.1.6. Internal tests

After implementation, the developer submits the software product to test both white box (that performs specific tests that are based on code written to verify characteristics, peculiarities and points deemed critical) and in black box (that is, from the outside perspective the behavior of the application).

At the end of these tests, to certify our review, the developer compiles the pattern supplied to the functions were create his Team Leader traceability matrix (Product Backlog)), indicating just what particular ted (or such defects have been fixed) and when.

5.1.7. UAT (User Acceptance Test)

After passing the tests described in the preceding paragraph, the software is released in demo mode or test and the project manager is responsible to contact the customer because these proceed to testing and final validation.

If problems are found, the software returns to the developer for bug fixing. At the end of these possible iterations, when the customer believes appropriate software product, communicate (usually via email) so that his communication is inserted between the documentation of the project and constitutes User Acceptance Test

5.1.8. Release

The release of the product must necessarily be accompanied by the final draft of the Release Notes, which allow both the installation, configuration or deployment of the same, and the subsequent use by the customer and the maintenance by the competent team.

Released into production (deployment, for example on production web servers), generally run by the team of systems (system administrators), it is confirmed by an email sent by a person / team that has performed.

5.1.9. S.O.W. (Statement of Work)

The Statement of Work is a document produced by the Project Manager, with which the

project is started. Within the horizon technological verified and agreed with Team Leader (HW-SW technical possibilities, resulting effort, any investments and structural requirements), the project manager in the SOW formalizes all the features you will need to have the product software required by the customer. In SOW shows, for example:

• Conditions of entry and exit of the application

• Rules data validation;

• structural and technical requirements;

• Characteristics of human-machine;

The production of the SOW document ends the first part of the involvement of the project manager in the development project and is the true input for Team.

The final version of S.O.W. is sent to the team leader attached to email confirmation of order acceptance by the Project Manger along with other attachments / details about the offer. After receiving this document, the IT can start to proceed.

5.1.10. Traceability Matrix (Product Backlog)

The Team Leader shall ensure that the information provided to the developer are still clear, unambiguous and sufficient. To do this produces a detailed list of the features of the software itself verifiable: the traceability matrix.

This document is for the Team Leader, a way to fully express, albeit in schematic form, all the requirements that the software will have to be released to the customer and, for the developer, a clear end point to claim to have developed and tested the application as requested.

At present the traceability matrix is not a stand-alone document but a list of features and / or tasks in the project management system with additional attributes that describe the status of the tests.

The traceability matrix at this point can be seen as a document that passes through the following stages:

• Creating Traceability Matrix Home - during the analysis and design

• The update with the results of internal testing (where possible) - during the development and internal testing

• The update with the results of BAT (where possible) - during UAT

5.1.11. Reviewing weekly report (Weekly Status Report)

With a view to better control and constant updating of the IT team and other players involved in the design / development (PM, commercial, ...), it is drawn up a weekly summary - Weekly review - on the progress of works related to projects in the course of the development team concerned.
The document contains only general information on the project (On Target status, risk Delays or resources, the need for further analysis or third party involvement, etc. ...) is generally sent via email to interested parties.

5.1.12. Release Notes

The document containing the Release Notes (or Release Notes) is an essential process of development and not a possible addition. Without this document, the software is maintainable only by the developer that has implemented, compromising the overall performance of the project (in case of troubleshooting, bug fixing, changing or otherwise). Moreover, the production of Release Notes at an early stage of development helps the developer to focus and better understand the software itself.
In their final version, we need to production release, the Release Notes are an essential kit of the software product.

6. Results

6.1. WSDN High Level Representation

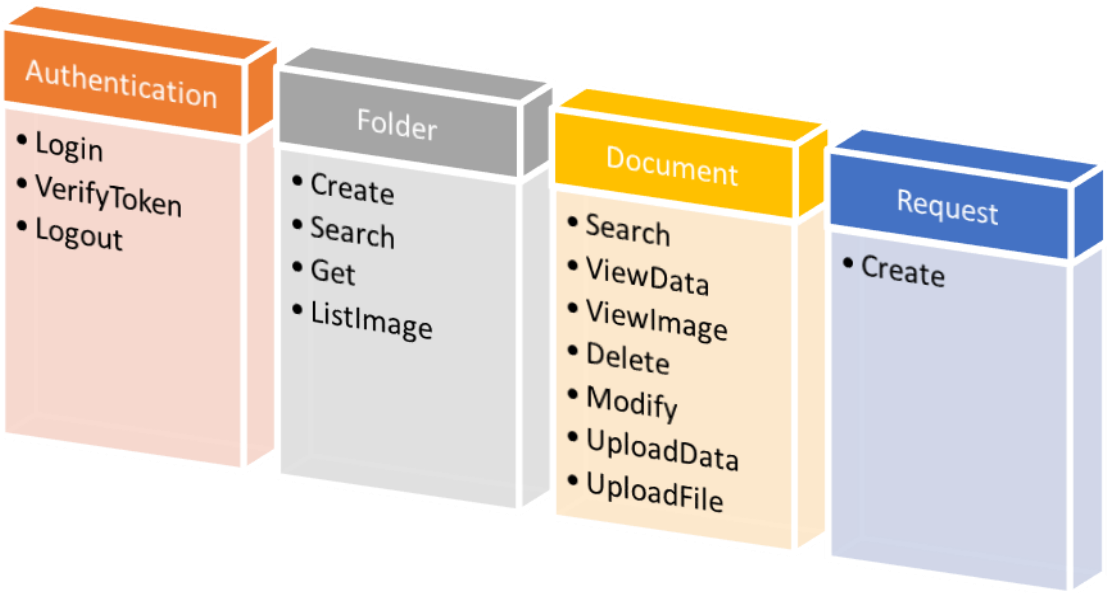


Figure 4 WSDN High Level Representation

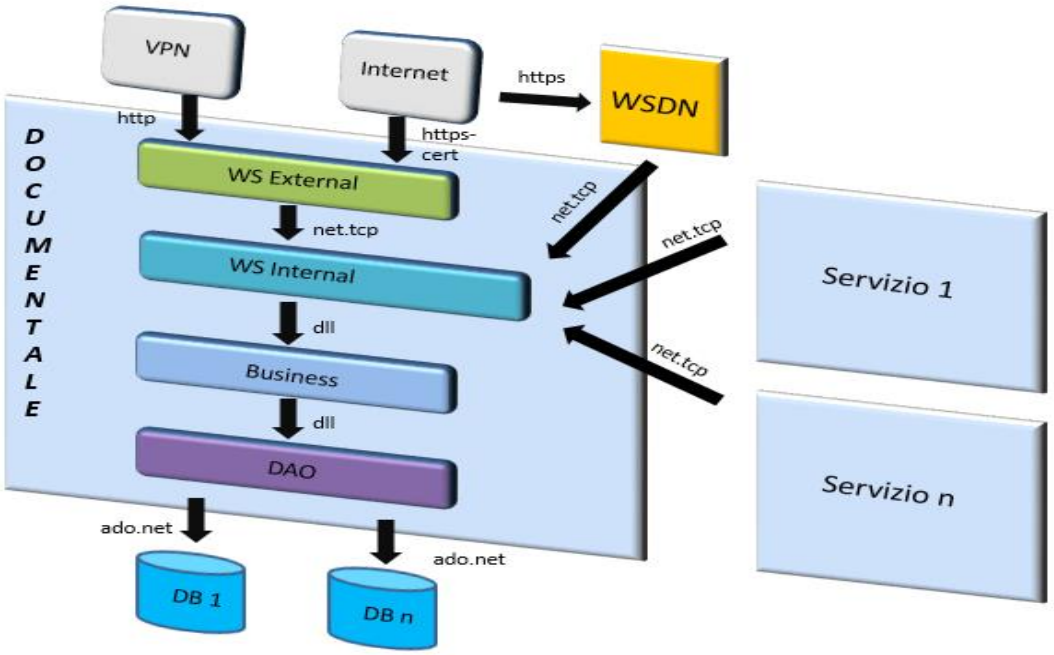


Figure 5 Managerial view

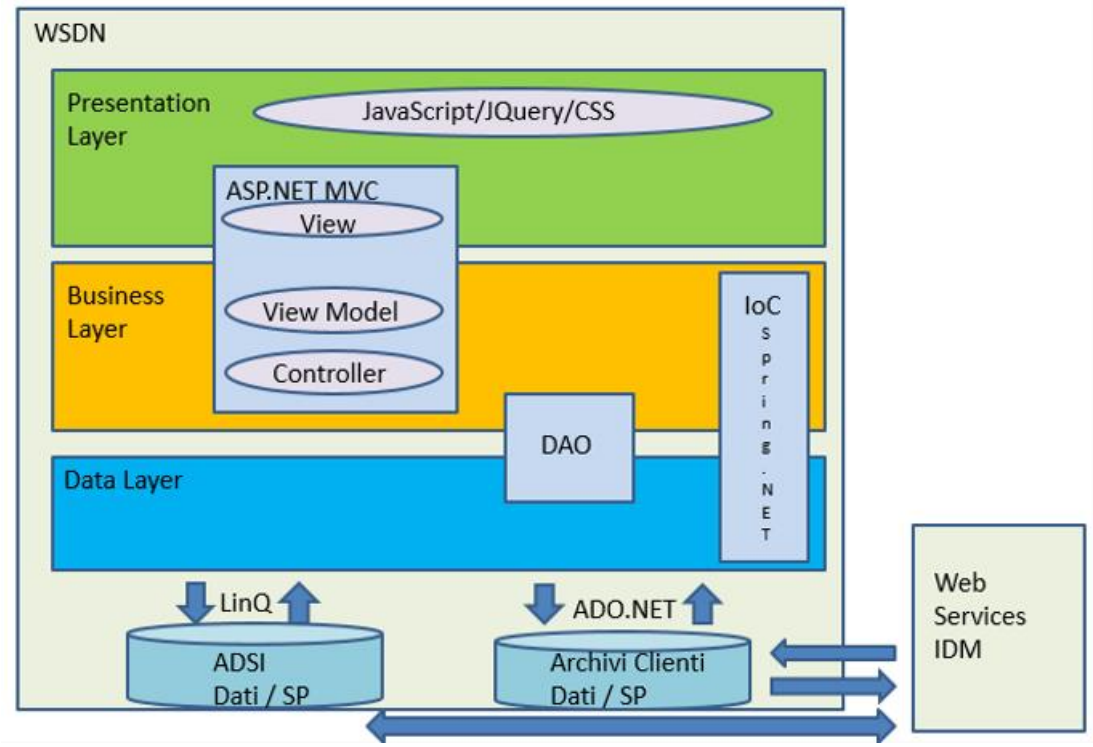


Figure 6 Technical representation

6.2. The Main Concept of Software

6.2.1. Search

The search for a document can be performed in two ways: relational search and navigator.

6.2.1.1. Relational Search

Through a user friendly interface, that can be completely customized, the user can generate an undefined number of search criteria, the user can generate a sorting rule of the result set: the values in a specified column can be sorted in ascending order, or in descending order.
The user submits the desired search criteria to WebSafe, which submits the corresponding query to the Database and generates a result set grid, grouping the results in pages of *N* (parameterized) records maximum. The current page is highlighted by parenthesis. Then the user can navigate through the result pages. The maximum number of records returned by the submission of a query is parameterized.

6.2.1.2. Navigator

Through the navigator, the user can perform a hierarchical search within the Database.

6.2.2. Viewer

The image of every document (it can be only the first/second/ecc. page or all the pages of the document) listed in the grid can be viewed clicking on the corresponding link. WebSafe always generates on the fly the PDF image of the document. If the stored document is a spool file, also the HTML image (with textual information only) is available. If the stored document is a DOC, XLS, SLK, PPT, ZIP, TXT, RTF, MSG or EML file, only the original format is available.

Much more, the user can view a single multi-document PDF including all (*N* maximum) or a selection of the documents currently listed in the result set grid (not supported for spool documents stored as the obsolete structure DB and for DOC, XLS, SLK, PPT, ZIP, TXT, RTF, MSG and EML documents). This multi-document PDF is enriched with bookmarks, which hold the pointer to the first page and a report of the user fields for every document. The bookmarks are added to the PDF also when the user requests all the pages of a single document.

WebSafe generates the PDF images in a public area of the Web Server and sends to the client the pointers to these files. The client Browser provides for the download of the PDF file.

Much more, when WebSafe generates the document images, it can also directly send the PDF files to the client as a stream of data.

6.3. graphical layout

- Web platform based on new technologies (.net 4.0, MVC2, JQuery)
- Single interface and configurable operations for different customers
- "Application Configuration" rather than "development sites"
- Quick, "side-effects-free" to "themes" of the colors of the client
- Bug fixing quickly, available to all customers / applications
- Testing massive and frequent: 500 200 manual and automated tests with every new release, performed in environments DEV-Quality-PROD;
- Natively HTTPS

- Multi browser (Internet Explorer 7.x, 8.x, 9.x, Firefox, Chrome, Opera, Safari) and possible opening to the mobile world.
- Bug Tracking: automatic creation of reports to OnTime.
- Better protection from external attacks
- frequent releases of new features (Sprint release of 15 days)

Composition User Interface (Menu, Header, Footer, Parameters, Application Toolbar, grid results, action).

Ricerca	Esporta in Csv x2
Visualizza Selezione	Nuovo/Upload Doc x2
Visualizza Doc x2	Modifica x2
Cancella	Visualizza Dettaglio
Send Mail/Fax	Note
Naviga Verso	Estrazione Schedulata
…	

- WEB application dedicated to user profiling platform WSDN *.
- What runs:
  - Registry data (name, Email, Office, Office, etc.)
  - Registry Specification Data Client
  - Groups
  - filters
  - User Credentials (Username, Password, etc.)
  - Autonomy customer in user profiling.

- Flexibility.
- Extensibility.
- Ease of use.
- "Logging" of transactions.
- Configuration stored in a relational DB (SQL Server).

6.4. User Management

6.4.1. Who can use it

- Can be used as an Admin user (created during the configuration of the first application WSDN for the customer).

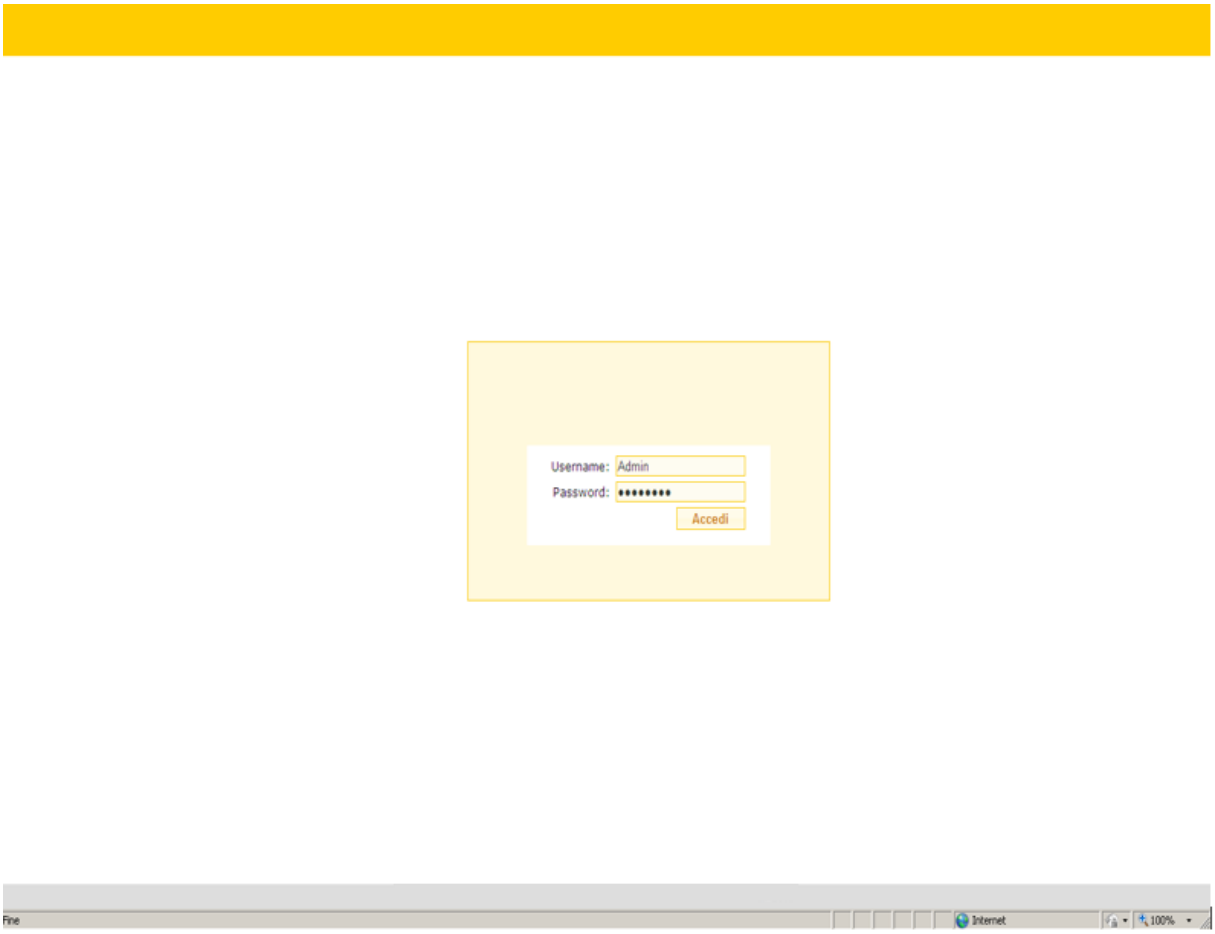


Figure 7 Log in view

When Admin's login with their username and password, they are directed to the home page. The home page that they see can be seen below in Figure.

User management system is useful for creating and managing users. After entering the system settings menu, the Admin would see five button on the left side of the screen and these buttons create, modify, Enable/Disable, Delete, reset password.

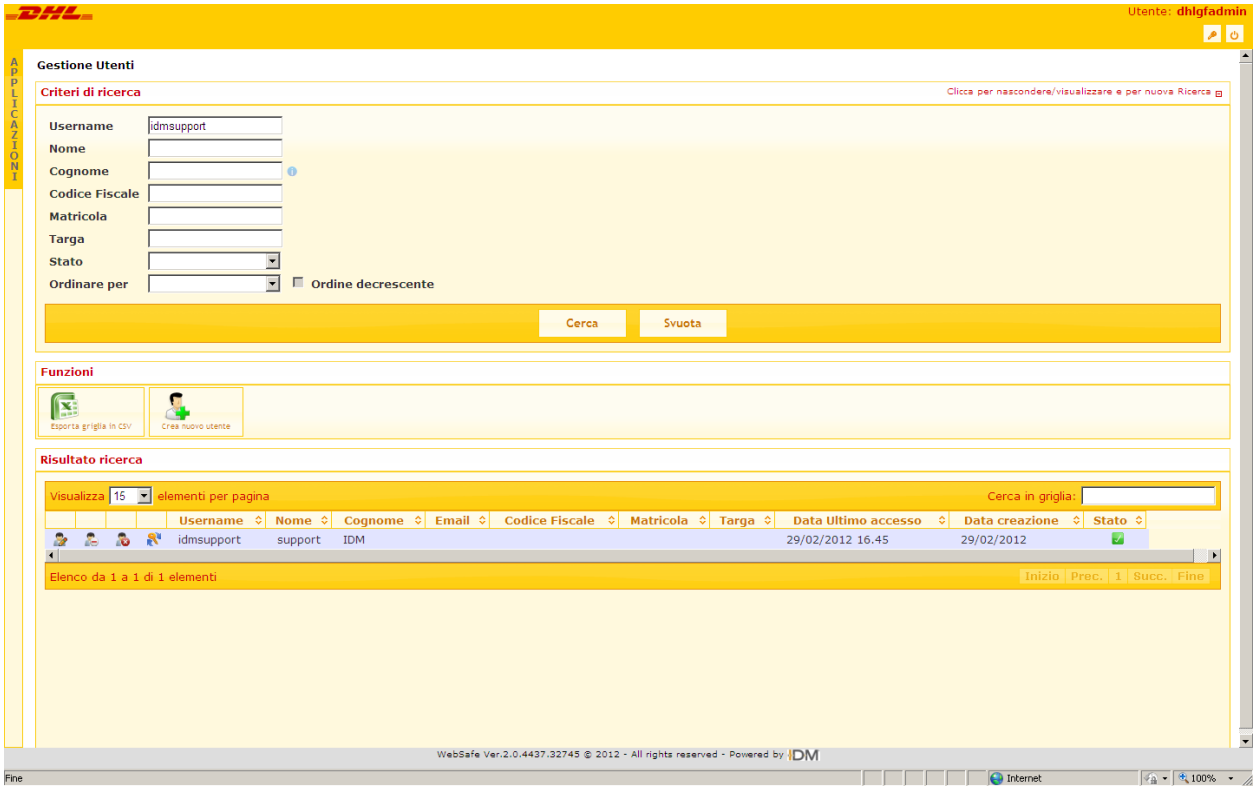


Figure 8 Privilege

New / Edit Personal Data and Additional

For create or modifying new user these button should be clicked. By choosing the create new user or modify user option new window will be open to insert or modify data as it shown in figure.

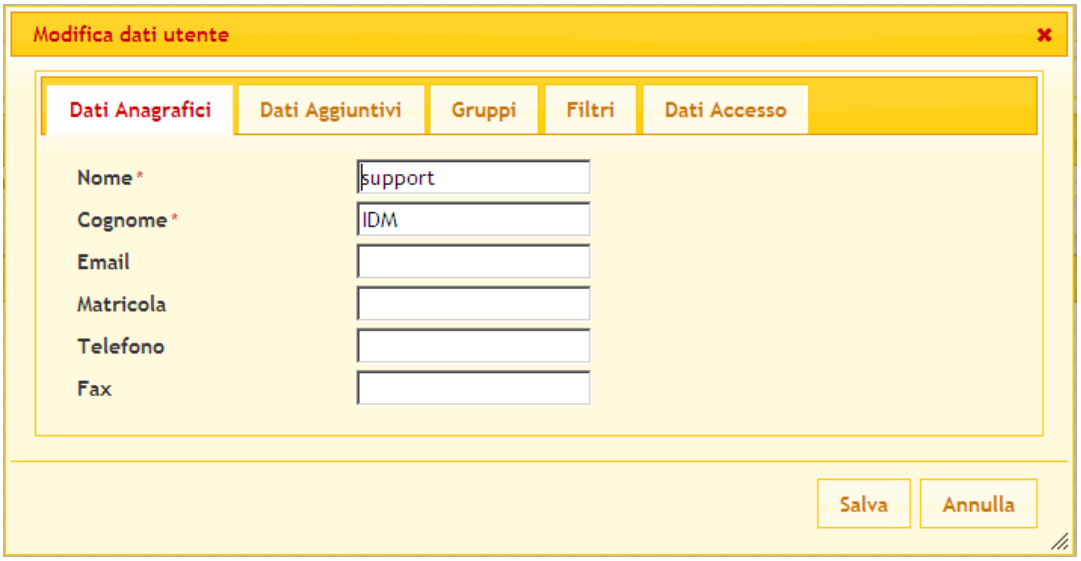


Figure 9 Modify personal information page

New / Edit Membership Groups

Admin's of the application have the option to assign and decide each user's ability within the application in terms of access to data and meta data for realize these option and controlling sensible data admin can choose and assign just special data to the user and more than that can filter user. Means within the chosen application which data can be seen by the users. For realizing these options some functionality has been created like application, group, action, active membership of the group.

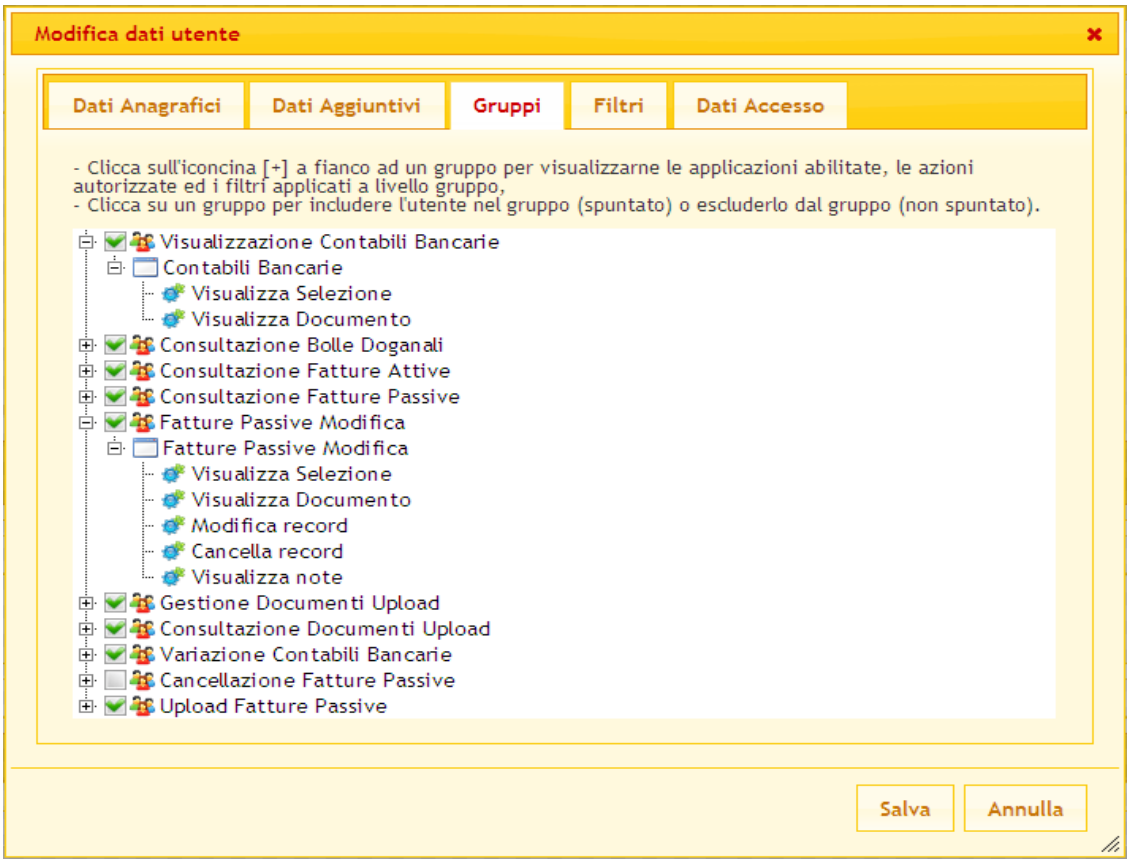


Figure 10 Group selection

6.5. More Function

- Change your password from non-administrator.
- IpFiltering (Customer or Client Application +).
- Security Profile (access attempts, password expiration, the last password used, expires after user inactivity, etc.).
- User registration for first access.
- Forgot password.
- Members administrators related to functional areas.
- Password recovery
- Grid: Fast overview and sorting on multiple columns
- Opening the document mode FullDoc
- Opening the document mode SinglePage
- Edit with lookup table of reference
- Management notes
- View Detail
- Export selection grid with columns
- Manual loading of documents

To sort on multiple columns, click on the first column and then pressing the Shift key, click on the second column.

Figure 11 Log in

Figure 12 Recovering password

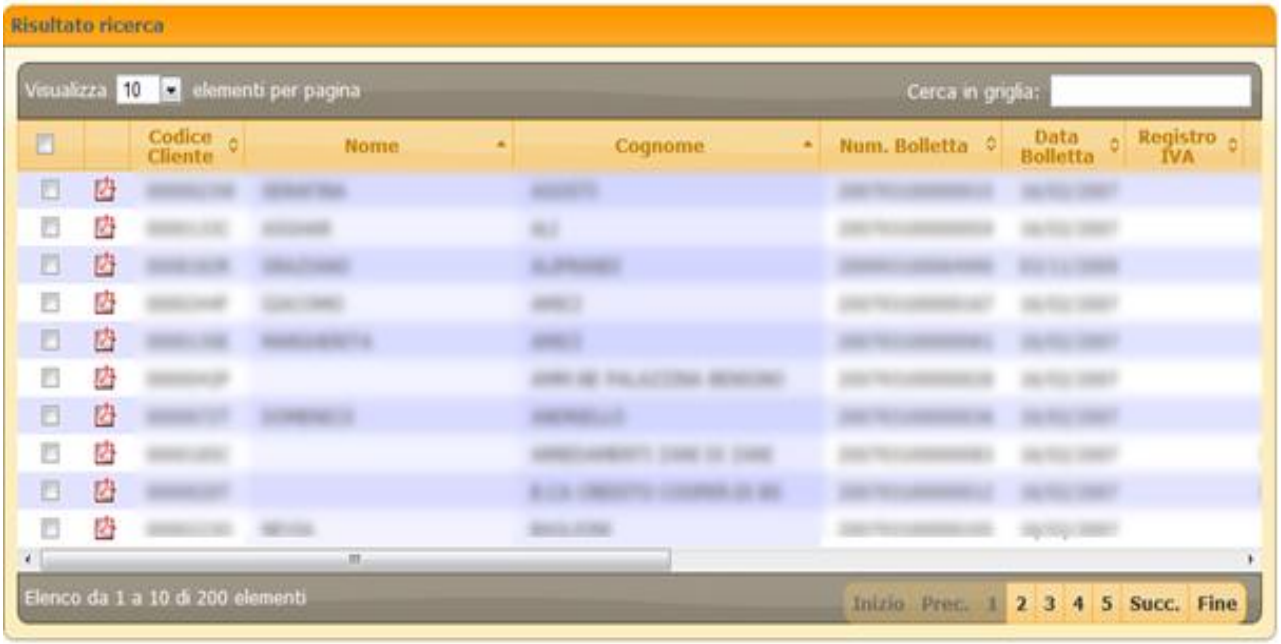


Figure 13 Searching results

To open a document, just click the icon. It loads the entire document in a popup window.

Used to display heavy documents. Clicking on the icon opens the popup representative following

Figure 14 Display for heavy documents

The top bar to navigate through the document pages.
After clicking on the edit icon the following window appears. Click the "Search ..."

Figure 15 Data modification

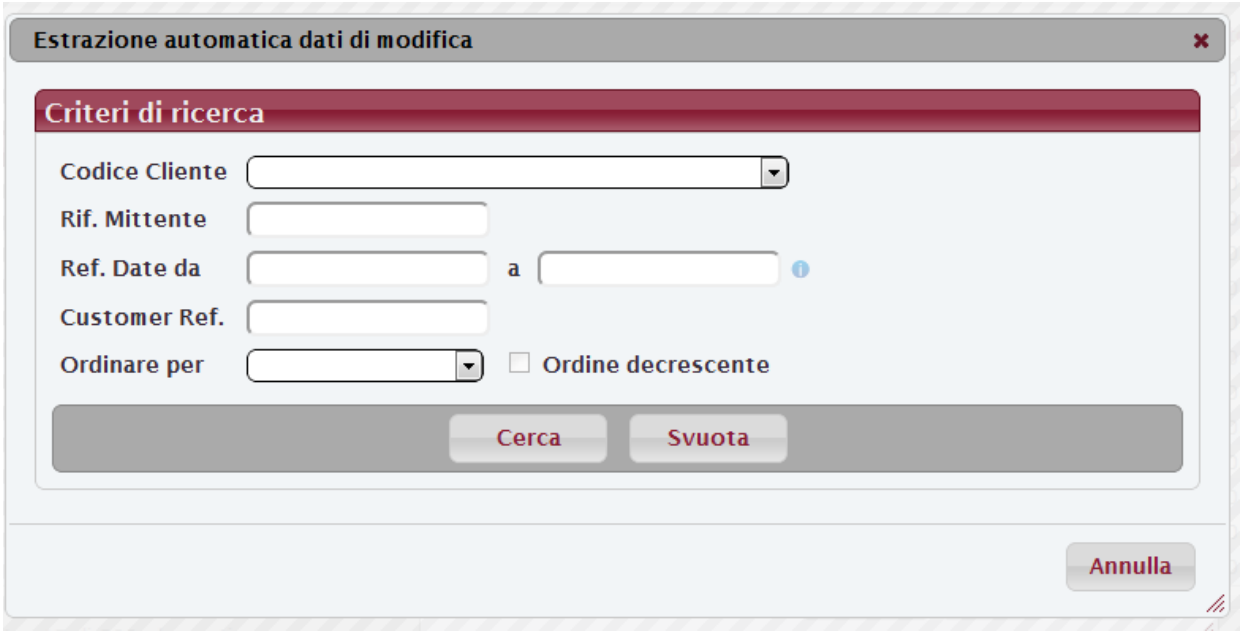


Figure 16 Extract modified data

Enter the search criteria and click on "Search".

Figure 17 Result of the modified data extraction

Click on the button on the appropriate line to pass data to the edit form icon shows the values of the selected row in the corresponding fields of the form

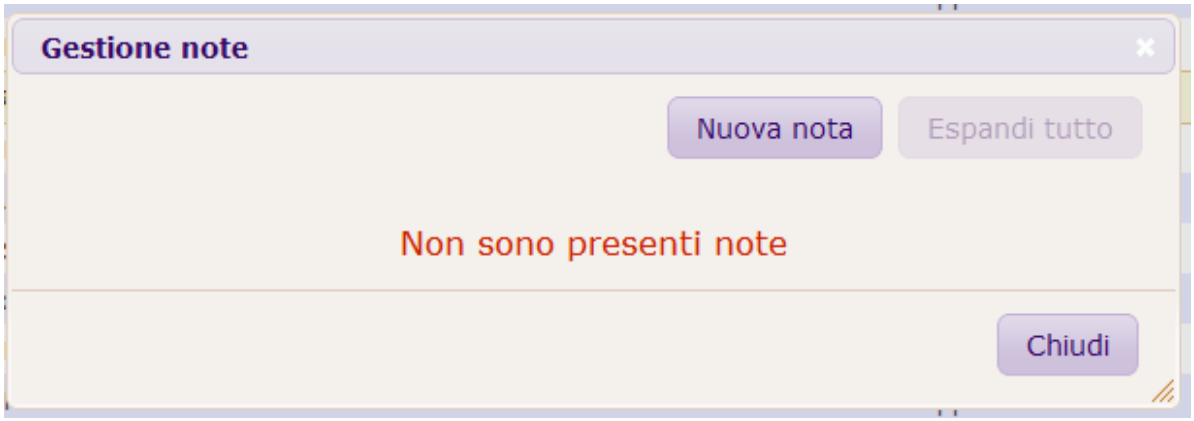


Figure 18 Reminding note

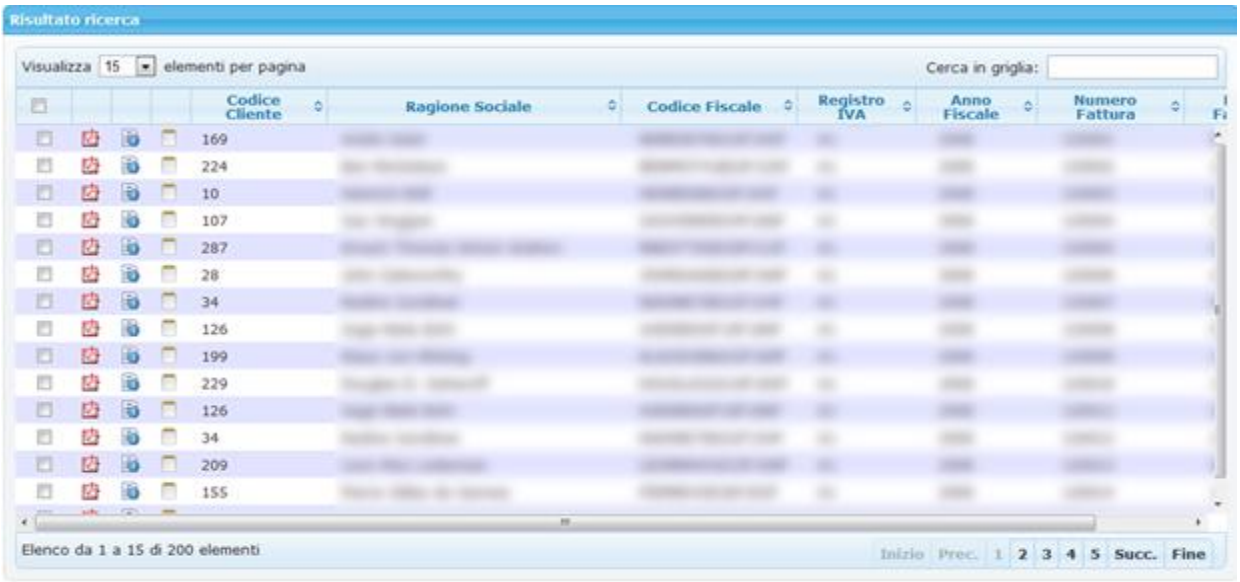


Figure 19 Searching results

click on the icon  It opens the window detail.

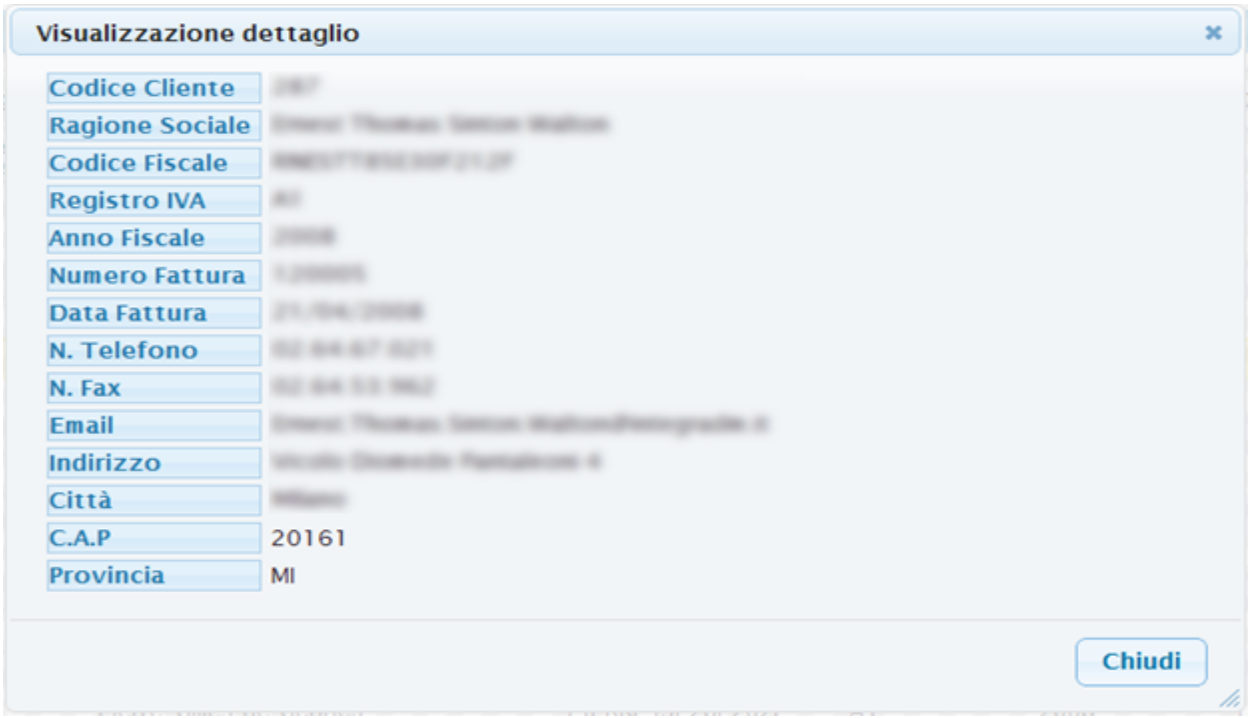
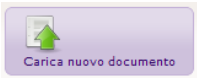


Figure 20 Detailed visualization

By clicking on the icon 

it opens the following:

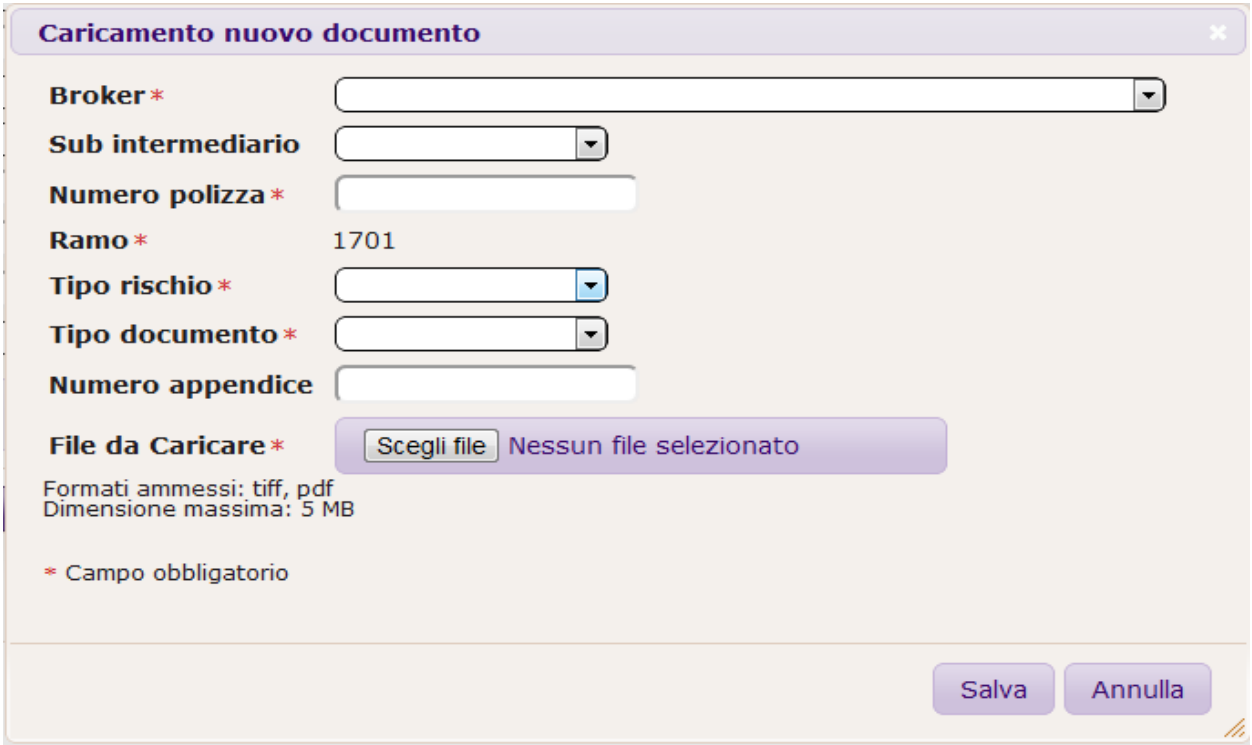


Figure 21 Uploading new document

Going on the application of consultation requests upload you can check the status of requests.

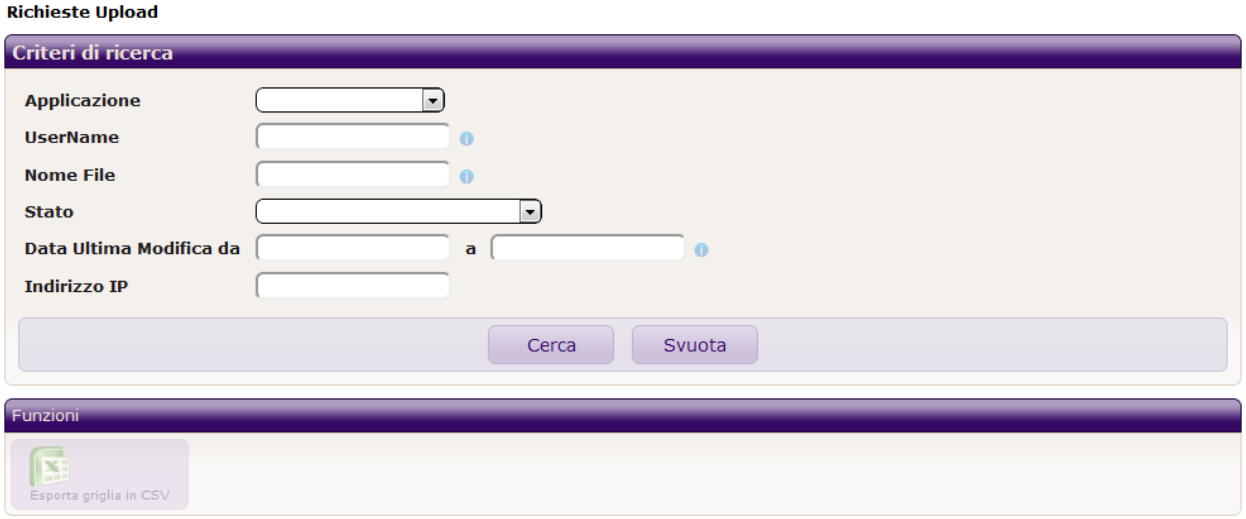


Figure 22 Searching between uploaded documents

The grid of the results is as follows:

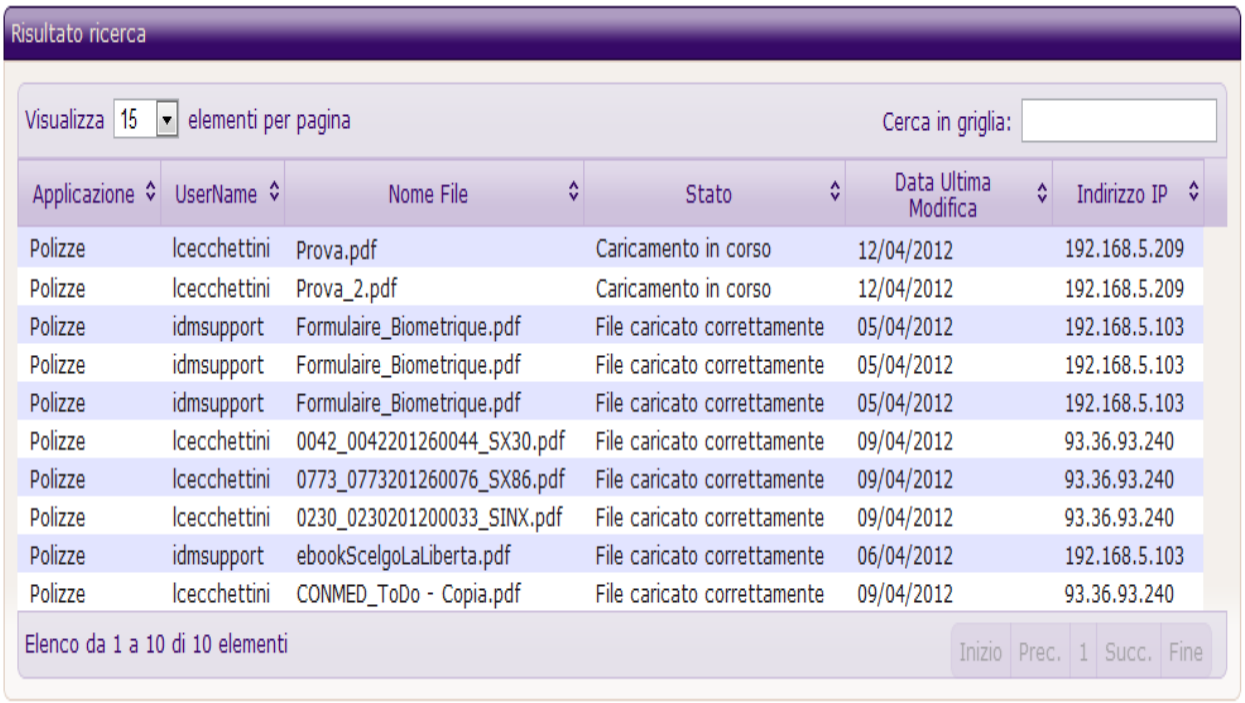


Figure 23 Result of searching for uploaded documents

- Send by Mail

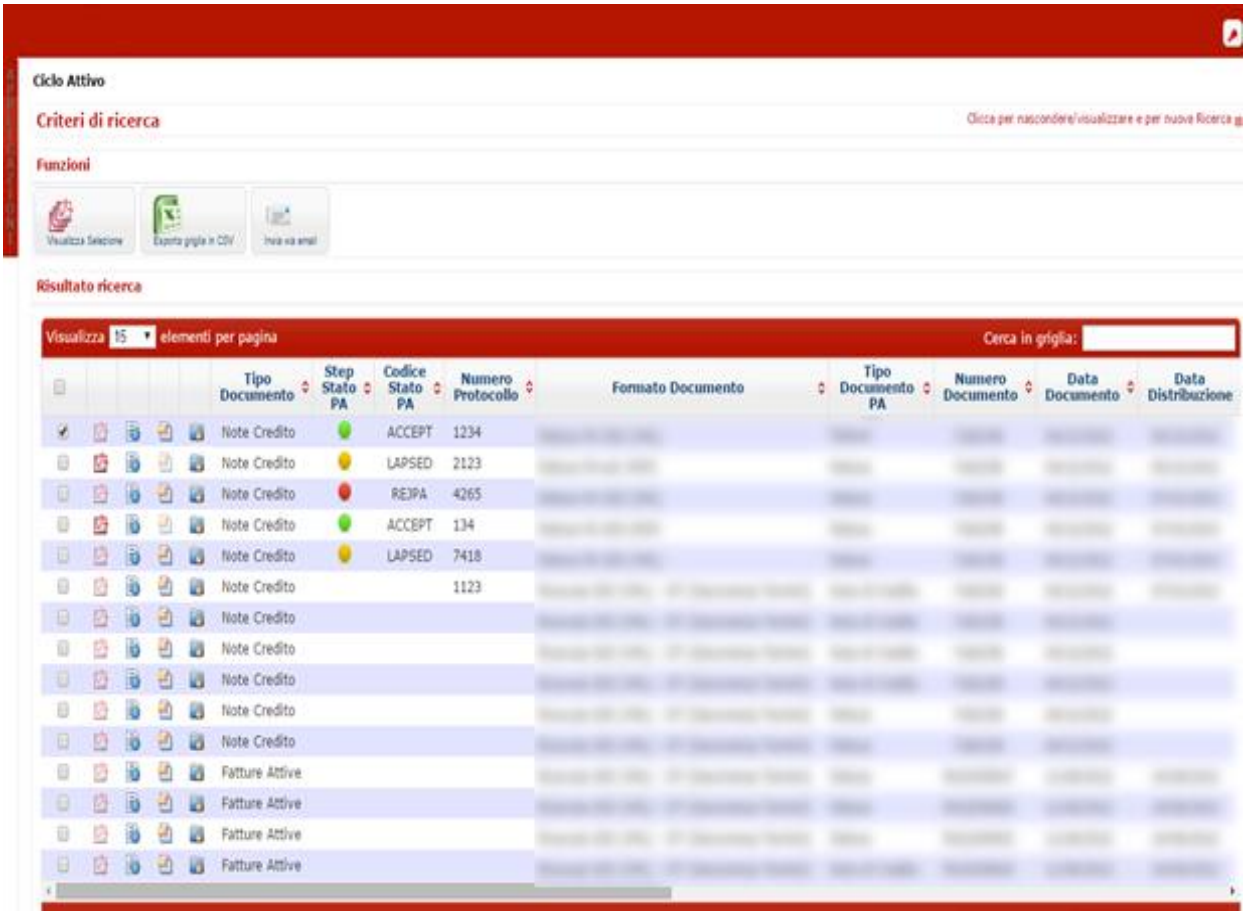


Figure 24 Sending requested functions by email

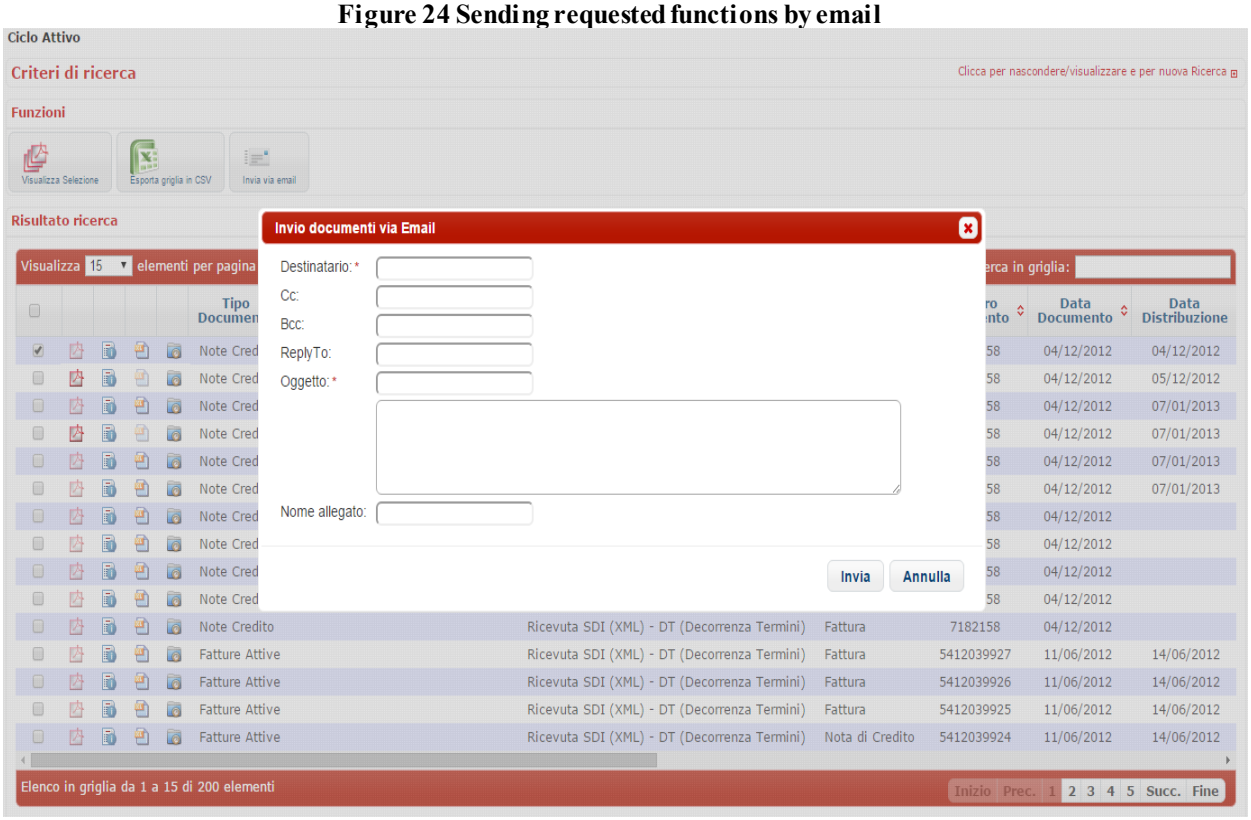


Figure 25 Entering Email details

- Send FAX

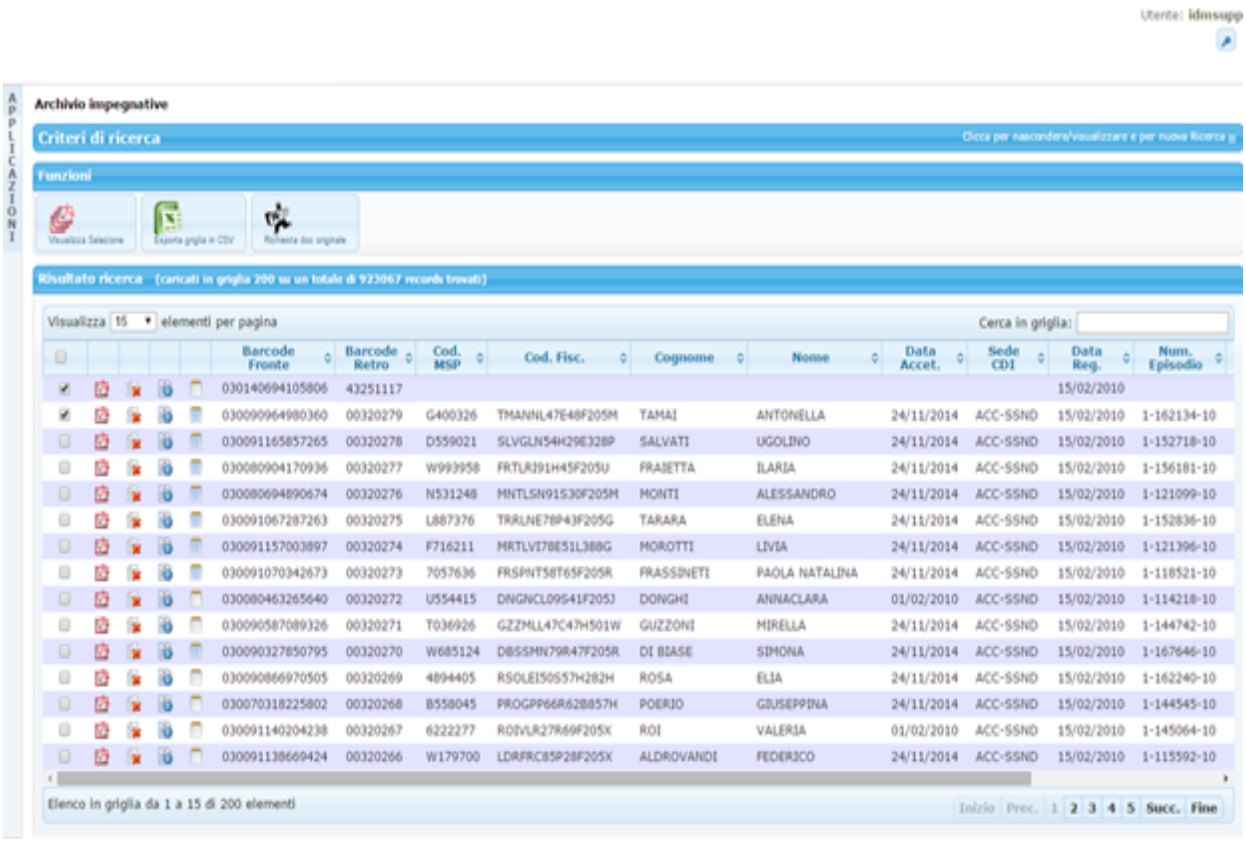


Figure 26 Sending requested functions by Fax

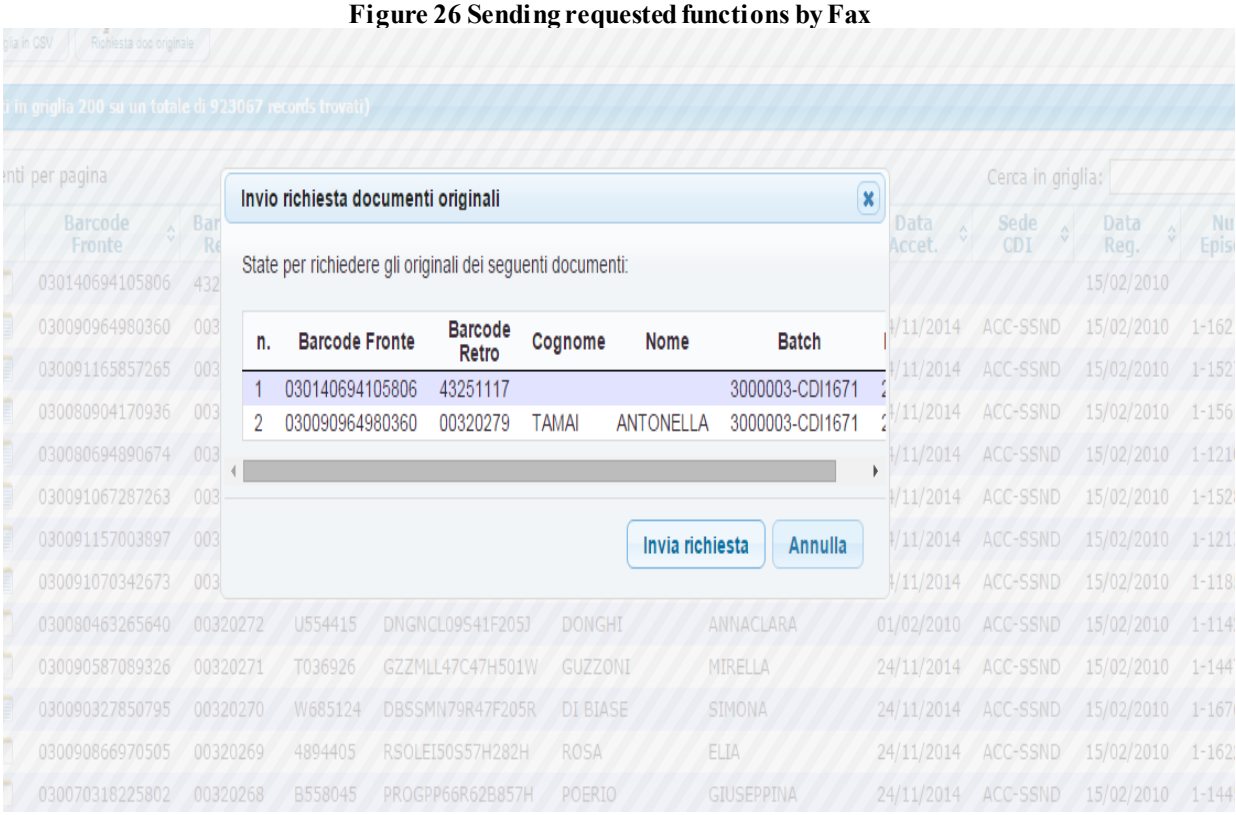


Figure 27 Entering Email details

- Master Detail

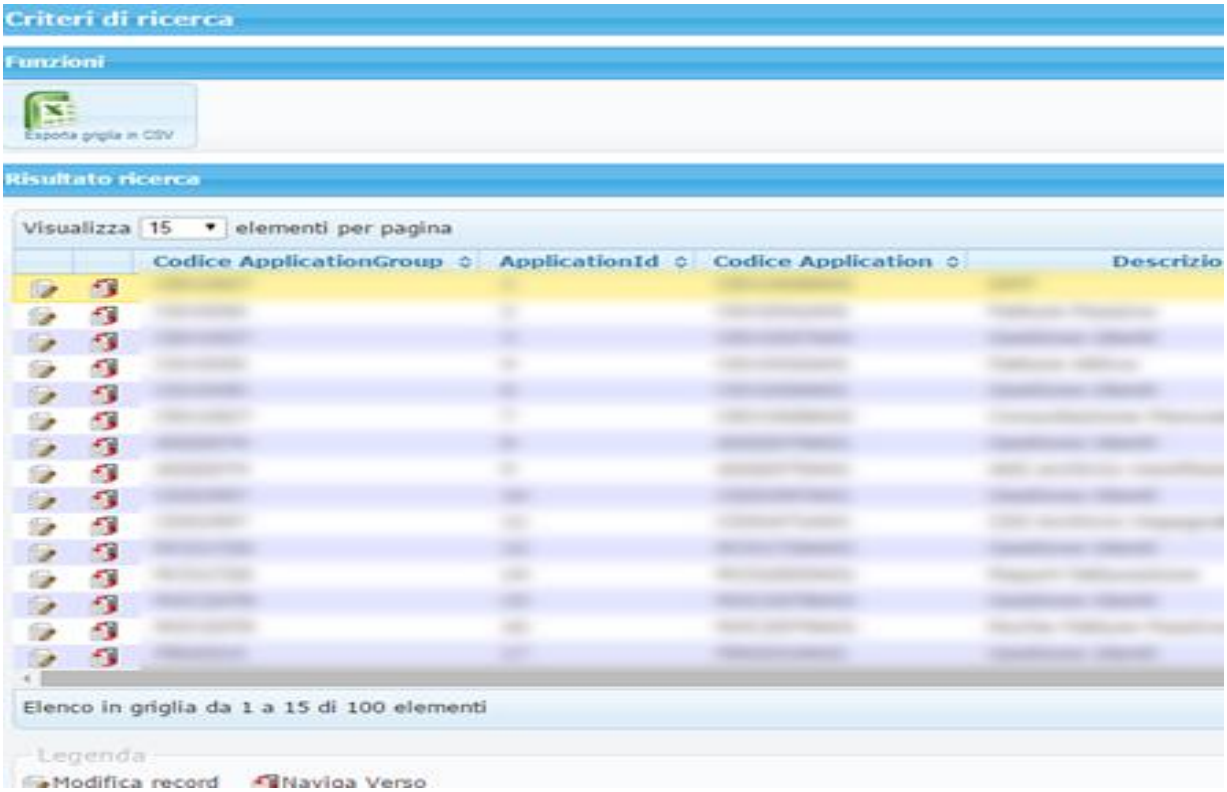


Figure 28 Master detail page of data

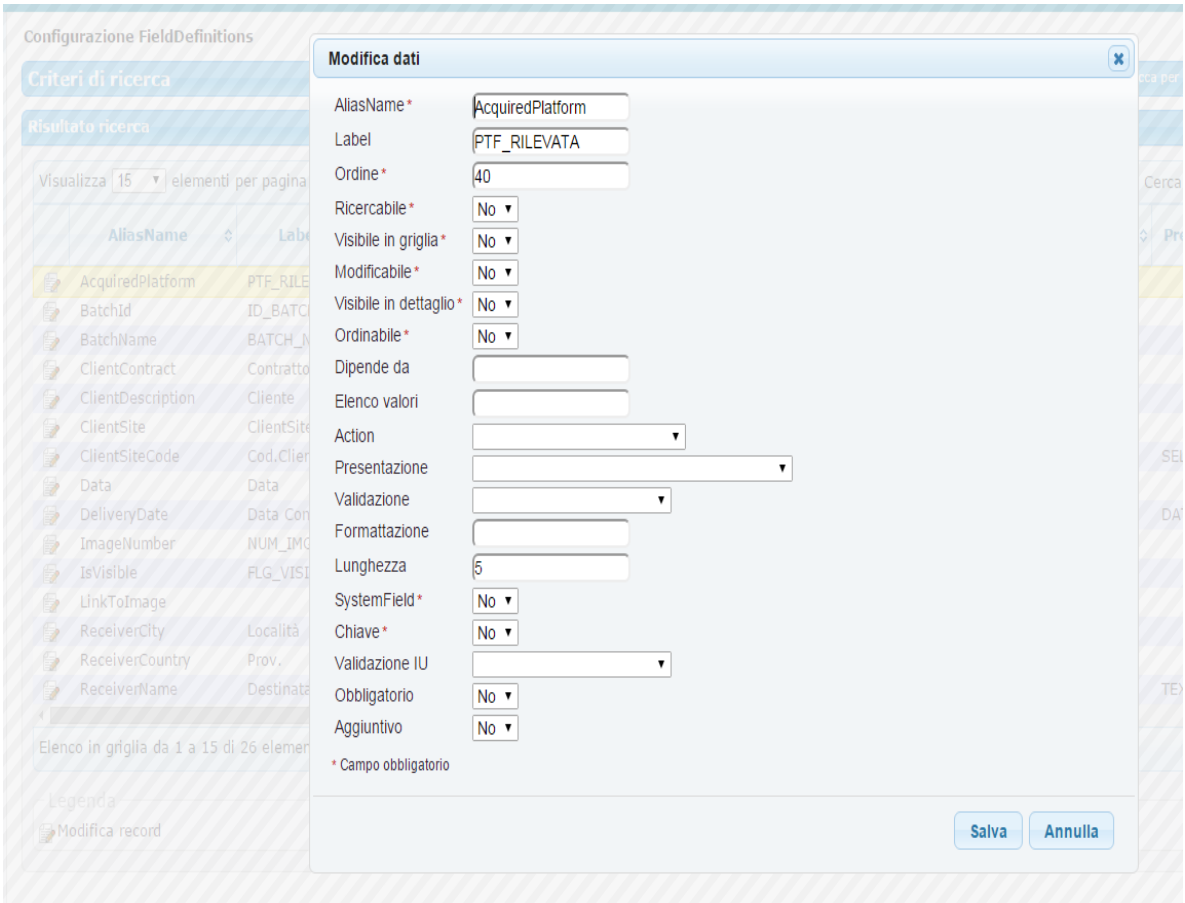


Figure 29 Modification of data in master page

7. Conclusions

7.1. Summery

This dissertation empirically investigated the use of different methodologies of Software Development and Document Management System as an approach to improving services and virtual environments usage for clients. As we address in chapter one the main motivation by doing this search is that in different fields so many people have the problem of easy and fast access to the information and different document types. Based on the past research different type of document classification has defined and the needed of having a good User Interface was explained. For solving these problems, a software should be design to support document spaces, and help people in keeping track of their documents. This support will also decrease the users cognitive load for keep their document spaces well-organized. Our idea was to build a system which can track paper documents on the desk or storage and link them to their digital versions on the computer.

Electronic document management systems give the better access to digital information respect to common user interface through a standard Internet browser technology.

There are so many reason why user prefer Document management system, one of the significant motive is the distributed functionality and scope of digital information available that can be accessed almost immediately after implementation. (Prathap Nayak*, 2013)

By working through the proposed workflow, it became so clear that DMS can be use within several process in industry business. Therefor implementing DMS in functional departments has so many advantages as mentioned within previous chapters. Some application areas, very indispensable in the printing industry, DMS can be appropriately introduced are introduced here:

- Commercial printing: storage of several files in a structured manner for different jobs so that they can be accessed quickly and efficiently, through the intranet/Internet; operator-user manuals; access to archived imposition templates, images etc.

- Newspaper industry: documents can be stored and retrieved according to the publication date or other similar parameters through the intranet/Internet

- Pre-press: Parameters Work, database for images, customer files, job tickets, control quality of work performed. They could be recovered instantly possibility of extended and effective research.

- Functional departments in printing industry: Document Management system will be useful for the access, knowledge sharing, document management, such as vouchers, invoices, customer quotations, e-mail, etc.

- logistics: job status, the incoming jobs, tasks assigned to different workers, e-mails and requests in the department can be tracked

- Marketing department: online display of document status, quotes, pending bills, orders and contact customers by e-mail

- Managers: They can monitor the performance of each functional department, issuing notes, sanction or dismissal decline

- Human resource: monitor employee records, employee performance review and audit trails

- Administrator: able to monitor employee behavior regarding use of the software and the abuse, the activities carried out at different times with the documents; You can configure roles for individual users to access the software and its use depending on the user

7.2. Future Work

It became obvious that Document Management System (DMS) have matured in recent years and now offer significant cost savings and opportunities for improvement of the workflow. The main advantages to have an DMS are lower general costs, improvement of the work flow, a significant reduction in the number of lost documents, a better adherence to the audit rules, search utility, the use of more physical space, well-managed l 'use of electronic space, lower printing costs, better safety on access to documents, disaster recovery. (mashari, 2002)
In previous years the use of XML as a standard data exchange format for electronic commerce and document management applications became popular.

This would provide better search results, faster, and smarter. It would also provide a common language to reduce the time and cost to develop interfaces. Document management is not a single entity or technology, but rather a combination of elements. (laudon, 2006)And the use of information and different users in a business process, combined with the technology that enables interaction. With all these advantages, it is a good move towards an office with less paper, implementing DMS in the printing industry and the creation of publishing eco-friendly technology.

References

A. Veloso, W. M. (2006). Multievidence,. 9.

Ali-Babar, M. (2008). The application of knowledge-sharing workspace paradigm for software architecture processes.

Boehm, B. (2002). "Get ready for agile methods, with care," .

Bohner, M. C. (2005). "The impact of Agile Methods on software project management, ".

Buckland, M. K. (1997). “What is a “Document”.

C. Riemenschneider, B. H. (2002). “Explaining software developer acceptance of methodologies: a comparison of five theoretical models,” .

D. Mougouei, N. F. (2015). “S-scrum: a secure methodology for agile development of web services.” .

Dahiya, D. (215). Enterprise Systems Development: Impact of Various Software Development Methodologies.

Desai, T. W. (2007). An approach for text categorization in.

Dixit, A. &. (2011). “Umbrella: A New Component-Based Software Development Model”.

e, e. e. (2009). SCRUM, "it's about Common Sense, .

el., B. B. (2000). "Spiral Development: Experience, Principles, and Refinements".

el., e. (2009). "Manifesto for Agile Software Development," .

el., N. M. (2013). A Comparison Between Five Models Of Software Engineering.

Fitzgerald, K. C. (2013). "Toward a conceptual framework of agile methods: a study of agility in different disciplines,".

Gao-feng, G. (2009). Research on the Implementation Method of Document Management in PDM System.

Ginsburg, M. (2000). ntranet document management systems as knowledge.

H. L. Kim, H. G.-M. (2004). “Ontalk: ontology-based. 9.

H. Smuts, A. v. (2009). A framework.

Hediyeh Baban, S. M. (2010). Online Document Management System for Academic Institutes. 5.

Hediyeh Baban, S. M. (2013). Online Document Management System for Academic Institutes.

Herley, C. (2014). “Security, cybercrime, and scale,” Communications of the ACM.

Hof, C. P.-J. (2015). Secure Scrum: Development of Secure Software with Scrum,.

Hof, H. J. (2010). “User-Centric IT Security - How to Design Usable Security Mechanisms,” .

Hof, H.-J. (2013). “Towards Enhanced Usability of IT Security Mechanisms - How to Design Usable IT Security Mechanisms Using the Example of Email Encryption,”.

Ikeda, K. K. (2007). Data model and architecture of a paperdigital. 5.

K. Beck, M. B. (2013). “Manifesto for agile software development,”.

K. Schwaber, D. J. (2015). “SCRUM development process,” in Business Object Design and Implementation.

Karlm. (2006). "Software Lifecycle Models', KTH . .

L. Williams, A. M. (2010). “Protection poker: The new software security,”.

laudon, k. &. (2006). Management information systems: managing the digital firm, New Jersey: Pearson Prentice Hall.

Livermore, A. (2010). "Factors that significantly impact the implementation of an Agile software development methodology, ".

Livermore, J. A. (2008). “Factors that Significantly Impact the Implementation of an Agile Software Development Methodology”.

Lohiya., D. (2011). Agile software development methodologies & and correlation with Employability skills, .

M. Huo, J. V. (2004). "Software quality and Agile Methods,".

mashari, a. (2002). Enterprise Resource Planning Systems: a research agenda. Industrial Management & Data Systems.
Mehta, M. &. (2012). “Manifestation of Agile Methods for Prompt Software Development : A Review”. .
P. Dourish, W. K. (2002). Extending document.
P.Abrahamsson, 0. S. (2009). "Agile software development methods: Review and Analysis," .
Prathap Nayak*, A. R. (2013). EDMS based workflow for Printing Industry.
Rashidah, M. (2012). An Integrated Document Management System for Managing Self Programme Accreditation Using Scrum Approach.
Rlewallen. (2005). "Software Development Life Cycle Models".
Santos, M. d. (2013). “Improving the Management of Cost and Scope in Software Projects Using Agile Practices”.
Sommerville, I. (2004). "Software Engineering", Addison Wesley, 7th edition.
Srikant Krishnan Nary Subramanian, 2. (2015). Evaluating Carbon-Reducing Impact of Document Management Systems.
Turk, L. V. (2012). “Drivers of agile software development use: Dialectic interplay between benefits and hindrances,” Information and Software Technology, .
Y. J. C. Byeong Ho Kang, Y. S. (2007). Does Multi-user Document. 7.
Z. Azham, I. G. (2011). “Security backlog in scrum security practices,” in Software Engineering (MySEC).