PROPOSAL FOR A DOCUMENT MANAGEMENT SYSTEM IN THE MODERN UNIVERSITY

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Abstract: Researchers and practitioners recognize the importance of a Document Management System in enterprise architecture management, project management and management in general. The role of a Document Management System for university's purposes is growing – it can support requirements analysis, decision making, knowledge management etc. We started the paper with an analysis of electronic documents existing in a company, and the interaction between DMS and the saved files. Another important problem is the movement of documents and interference with different levels of DMS. In the final part, the authors propose a new architecture to support all tasks in a project management context.
Keywords: Document Management System, Database, Modern University, Technological Flow, Engine

Introduction

Technology has registered an amazing advance in recent years so that almost every activity in the company can be electronically monitored. As we already know, electronic documents from an organization are divided into:

- Documents developed in professional editors or processors (MS Word, Open Office);
- Source files or binary files obtained from the company's activity (program files like pas, .c, java etc.)
- Graphical application files (Maya, 3D Studio Max), executable files (exe, see Figure 1).
- Electronic copy of documents on paper, obtained by scanning or shooting.
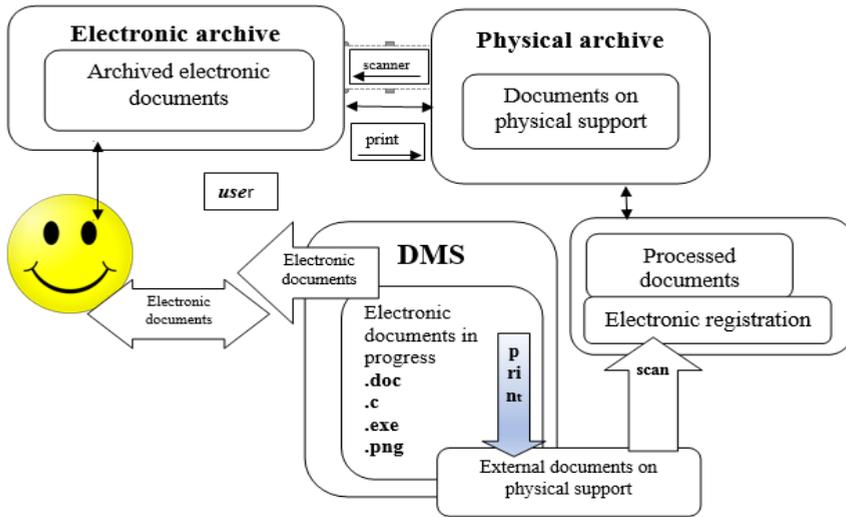
Figure 1. Types of electronic documents from a company

As we already know, a DMS (Document Management System) is a software system (or a software application set) that typically provides storage, versioning, metadata, security, indexing and quick retrieval capabilities of documents [1].

DMS manages the digital assets of the organization (documents, procedures, sketches, plans, projects, source codes, how-to), paper documents (scanned documents), internal workflows, and records management.

Problem Statement and Background

A DMS allows the user to store documents in a structured way and manage the entire life cycle of a document along with its properties / features. The life cycle of a document is presented in the figure 2.
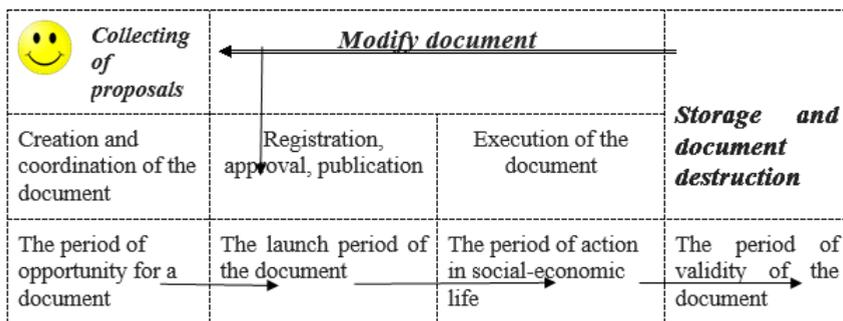

Figure 2. The life cycle of a document

The Document management is a technology and discipline that manages a computerized file system.

By allowing users to characterize documents generally stored in files, document management systems allow users to store, retrieve and use these documents more easily and more powerful [2].

Documents currently implemented in universities are mostly common files, isolated and lacking interoperability mechanisms with external systems or available open data sources.

That is why our proposal is to move these documents into a complex application Semantic and to integrate all these applications in the patterns of relational databases or Semantic Web technologies.

The actors affected are all those working in universities, professors, staff or students but professors are the main beneficiaries of services of such a system (it is a system created for them).

University's employees will be covered by a variety of benefits (stronger collaboration, automated operations, web of information accessing of precise information), which are administered by different offices, both inside and outside the university.

A document management system represents an absolutely necessary solution for a company [12]. The advantages of a DMS can be schematized as in Figure 3.
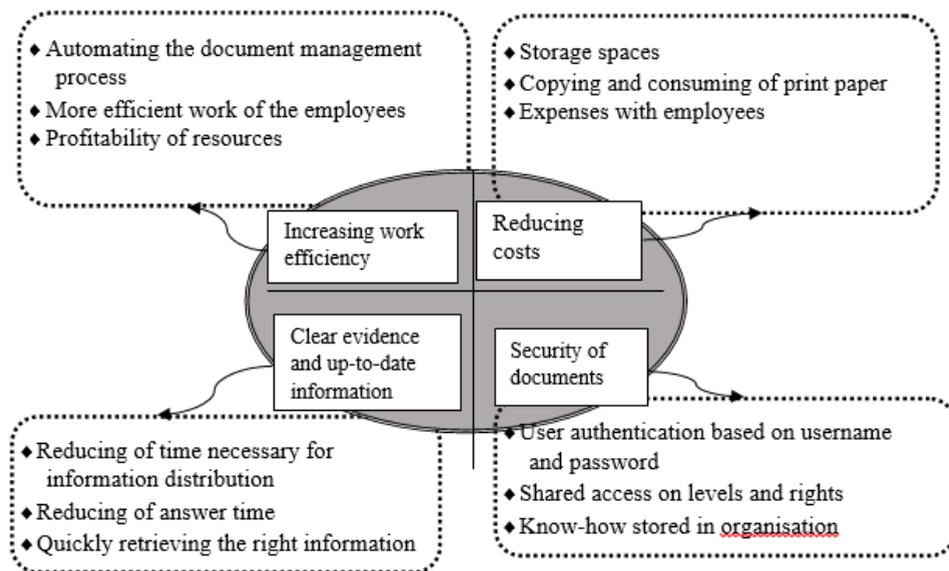

Figure 3. The advantages of a DMS

The circulation of documents within a DMS consists in their successive movement from the time of their creation or entry into the patrimonial unit, through its various ways, and until they are stored for archiving (see figure 4).

The necessity for document circulation is given by the fact that the data from the same document is required for several compartments / persons in the same patrimonial unit and one copy cannot be made for each user.

This circuit must take place in a predetermined order, and it is not allowed to hold the documents by one compartment or another in an unjustifiably way.
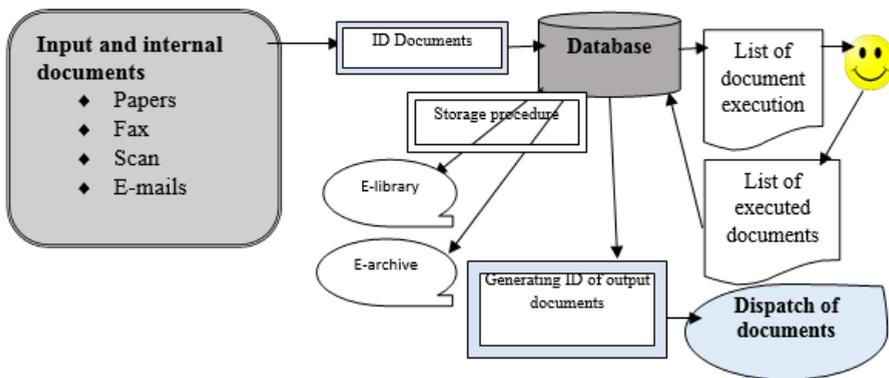

Figure 4. Movement of documents

State of the Art

With the help of link [3] we can find the best Document Management Software for our company or university. There are a lot of applications which help document automation, document generation, document files management or complete digital document solution.

With Zipper's Document Automation, documents are automatically processed, streamlining document flows from an organization, customer service, and relationships with vendors and business partners.

All documents entered into the company are collected using a unique platform (letters, complaints, orders, contracts, etc.), classified, extracted the requested information, validated and centralized [4].

The paper [5] is dedicated to see the advantages of electronic document management systems. It assesses the effectiveness of these systems implementation. The analysis and selection of software tools for the documents management systems development are carried out.

Document Control Software is an Integrated online Document Control Software SystemAutomate which manages and optimizes every aspect of your quality process. [6]

Electronic document management and other associated technologies allow educational institutions to deliver their educational services beyond the walls of the institutions. Using tools like document management software helps them improve communication, information dissemination and also collaboration both on and off premise [7].

Nowadays, the universities and colleges and all institutes of high-education are full of paper. Papers, final exams, financial aid forms, student's records, and documents fill cabinets and rooms. When one of these documents is needed, finding it can be a challenge for whoever has to look through all the filing cabinets, hoping the document was put in the correct place [8][17].

Components of DMS

The documents, whether internal or external, come into the company's information circuit and involve careful monitoring and rigorous control so that decision-making can be made at the management level and at the department level quickly.

They are included in the DMS along with the other components described below. Components can be set on three levels, depending on the degree of complexity (see figure 5). We will briefly describe the role of the components.
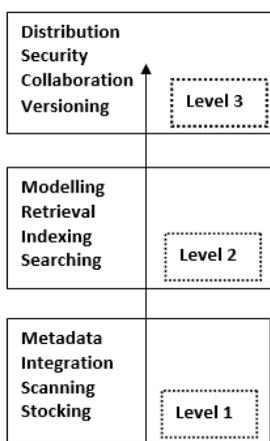

Figure 5. Levels of a DMS

Metadata

They are also called attributes, they are stored for each document and divided into two categories:
- General metadata - date of the document, author, date of the last change, author of the latest version, document size, current version, internal number - unique, registration number, document register;
- Specific metadata - depending on the category of documents in which the file was [1]

Integration component

Many of DMS integrate with other software systems (ERP, CRM, specific systems) so users can retrieve their documents directly. Such integrations are also available for the Office suite (Word, Excel, Visio, Microsoft Project) and e-mail (Outlook, Lotus). Integration often uses standards such as ODMA, LDAP, WebDAV, or SOAP. DMS systems also offer programmable interfaces and APIs that can write code sequences specific to the company's needs [1]

Scanning component

Scan generally involves billing and document processing on paper using scanners or multifunction printers. Optical Character Recognition (OCR) is often used to convert images into text. Optical Mark Recognition - OMR is sometimes used to extract ticks or bookmarks from type forms. [1]

Indexing component

The use of indexes and a database capable of managing large data is essential in retrieving documents quickly. Indexing can be simple - a unique number assigned to each document - or complex, allowing complex searches using metadata combined searches. Indexing is especially designed to support fast document searches. Indexing should be done by search criteria. [1]

Storage component

Storing electronic documents and digital copies of documents on paper becomes the primary business. By their nature, document management systems use large and very large storage capabilities, and use

database systems capable of managing a large amount of data. Centralized document storage also provides a unitary back-up of all documents managed by the system. Systems store documents in two ways:

- BLOB file - Storing documents in the database;
- File Server - Storing documents on a file server and storing the pointers to the files in the database [1]

Retrieval component

DMS systems provide complex search criteria, metadata searches, full-text search. Searches use combined criteria between general medals and specific metadata, Boolean expressions and search operators [1].

Distribution component

A published document must be in a format that blocks the easy editing of the document. DMS systems ensure the distribution of documents to their recipients (and only to them) based on groups, roles, access rights, and document flow (information).

The distribution mechanism must ensure that the receiving and reading of the distributed document is audited by its recipients. [1]

Security component

Document security must ensure secure access to documents and encryption of authentication data. Some systems also encrypt the contents of the files in the database to block their opening outside of the system.

DMS can also include additional components to block opening documents outside the organization (for example: a document word cannot be opened if it was copied using a memory stick) [1]

Component of workflow modeling

Workflows are a complex problem and some DMS have modules included for modeling. Other systems use specialized software for flow and process modeling. The workflow is designed to pass documents between users in a structured way.

Collaboration

Collaboration must be implicitly inherited from the electronic nature of DMS systems. Access to change a document must be blocked for the rest of the users while a particular user changes the document [1]

Versioning

Versioning is the process by which documents are blocked and returned to the document management system. Versioning allows users to find their previous versions of the document and continue their work from a certain point in time. The procedure is useful for documents that change over time and need changes.

The number of historical versions stored in the DMS is configurable, as more versions are stored, the more storage capacity needs to be. [1]

Searching

Document search within the document container stored using attribute values (metadata) or full text search. Documents can be found by multiple criteria or by content. [1] Search can be done in a centralized or distributed model.

By making a parallel between data organization systems in centralized and distributed models, a schema will result and will be presented in the next figure (Figure 5). There are detailed aspects of document flows in the two models.
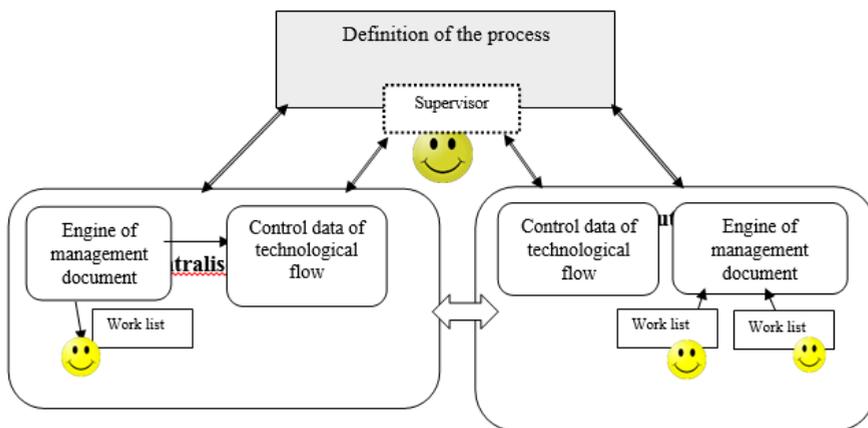

Figure 6. Organizational models of service process flow

Because the retention period of documents is very high, up to 50 years (for payrolls), and liability of legal persons and physical tasks on this line is negligible, I found it necessary to address this problems to take into account the legislation in force. Here are some of the important laws below.

1. The Electronic Signature Law

The Electronic Signature Law "establishes the legal regime of electronic signatures and electronic documents as well as the conditions for the provision of electronic signature certification services and complements the legal provisions on the conclusion, validity and effects of legal acts." (https://www .certsign.ro/certSIGN/resources/documentation/legislation/law-445-2001-signature-electronics)

2. The Law on Archiving of Documents in Electronic Format

Law no.135 / 2007 on archiving electronic documents "establishes the legal regime applicable to the creation, preservation, consultation and use of electronic documents archived or to be archived in an electronic archive." (http://www.dreptonline.com/law/lege_arhivare_electronica.php).

3. The National Archives Act refers to the attributions of the national archives and has as its main objective the "Administration, supervision and special protection of the National Archives Fund of Romania" (http://www.dreptonline.ro/legislatie/legea_arhivelor_nationale _16_1996_republicata.php) carried out by the National Archives, budget unit within the Ministry of the Interior.

4. The standard of archive deposits

It refers to the technical and functional characteristics of storage and storage facilities [1]

Every company needs a complete scanning, archiving and electronic document management solution. This document management solution should make the law and safely through centralized management of information.

Conclusions

In nowadays time, reducing of costs and efficiency are being coordinated by any person involved in the business environment. A DMS can provide greater efficiency in the use of financial resources, time and space, as well as an increase in the quality of services offered to clients.

An intelligent Electronic Management of Documents solution can provide an impressive return on investment, allowing users to focus on what is really important.

The documents have an incredible power in governmental activity and pass a major development that will mark government activities and reform them into different entities. [15]

That is why the control and distribution of essential documents in a systematic manner has become increasingly important and, similarly, the need for a secure access to these documents has become an imperative.

Most of the organizations have a vast amount of information [17]. The administrative process is based almost entirely on written documents, so the rational management of this area is an essential purpose of the whole organization [16].

To meet the growing competition challenges, every participant in the economic life is looking for new solutions in getting information of any kind. Current information is now very easy due to the evolution of information technology. Adopting a document management application requires companies to make a considerable effort in purchasing computing and programming, but these efforts will be justified by increased efficiency.

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