# The "Mediateca": application for knowledge management and a repository of learning objects

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The "Mediateca" is a web application of documentary management and consult developed starting from Zope application server and Interbase database server. The analysis and design of this application have been created starting from Unified Modelling Language (UML), which is an industrial standard set up by OMG group. Besides, this language is graphic in order to display, specify and document each part of the software development. The creation of the "Mediateca" comes from two needs of Educational Technology Unit (UTE-UV): first, managing in a adequate and organised way not only external information (papers, reports, webs, etc.), but also the UTE's own work; second, as we are teachers of Educational Research Methods, who use ICT (Information and Communication Technology) in our teaching, innovating and researching, we need a shared area where place the materials we are creating for. In addition, a main objective of PROFORTIC project is the creation and evaluation of tools which facilitate the exchange of experiences and materials among teacher innovation groups.

**Keywords** knowledge management; repository of learning objects; ICT; Zope; UML

## 1. Introduction

The "Mediateca" arises as a need from Educational Technology Unit (UTE) for different reasons. First, as a research group we needed a system of storage and management for documents that increased the efficacy of our work. Besides we needed a system that facilitated the collaborative elaboration of our own documents. Second, as faculties of research methods who use ICT (Information and Communication Technologies) in our teaching we needed a place where setting materials as we were developing them for classroom (presentations, databases, problems, etc.) And third, but not less important, it was a main objective of PROFORTIC project to create a set of tools which make easy the exchange of experiences and materials among groups of faculties. These applications are demanded by teachers [1]. For this reason, we consider a priority that the application developed in open source can be easily used use by groups that do not have enough money for software. Visual-File S.L has contributed to the creation of the "Mediateca" and this enterprise has carried out its development. The process of development for this first version starts with several meetings to agree the requirements and functionalities of the "Mediateca". At this time it is in a evaluation phase of this version to improve and adapt it to the functions that we believe it should cover.

## 2. Technical Description of the Mediateca

Mediateca is a management web application and documentary consultation developed from Zope applications server and Interbase databases sever. The analysis and design of this application has been carried out from UML - Unified Modeling Language, which is an industrial standard promoted by OMG group, a graphic language to visualize, to specify and to document each one of the parts of the software

development. It is shown a diagram of use cases more representative which was carried out during the analysis phase of this application (Fig.1).

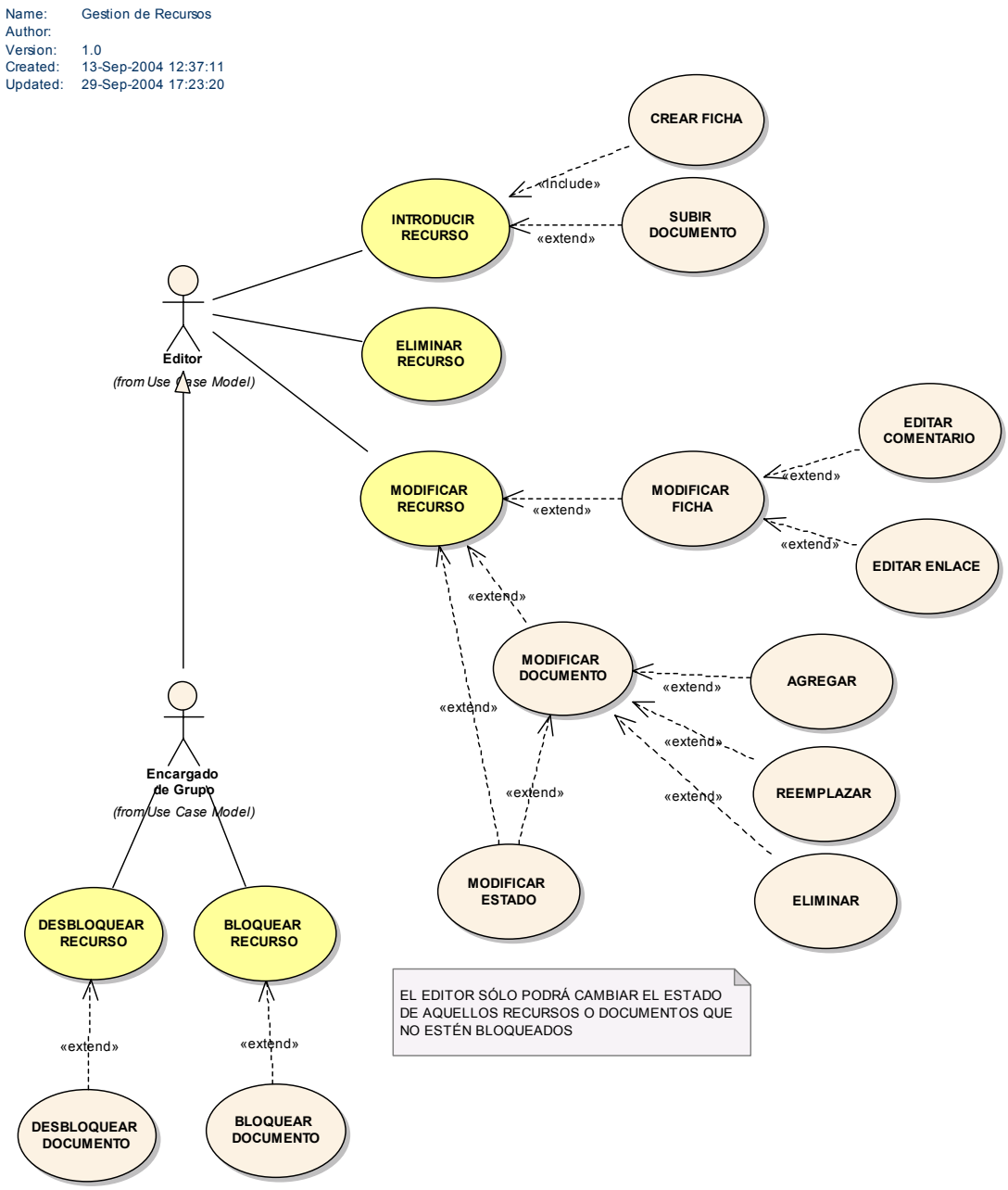


**Fig. 1** *Case Diagrams of Resources´Management..*

Next, main characteristicts of both servers, which are the key-components for the implementation of the applicattion, are described:

### 2.1. Development environment: ZOPE

**Zope** is an Open Source application server which let develop and maintain web applications in a easy way. It is not only a *framework*. Zope is distributed with an Open Source licence y it is written in Python. Main characteristics:

- ✓ Open Source.
- ✓ Multiplatform.
- ✓ Own servers included (HTTP, WebDAV and FTP).
- ✓ Three levels : data, business logic and presentation.
- ✓ Users Management integrated into the application.
- ✓ Code reuse.
- ✓ High level
- ✓ Commercial support.

Zope includes a web interface from which all objects and parameters of our application can be manager with an appearance similar to a file explorer (like Konqueror o Nautilus). It also incudes a FTP and WebDAV server which can be integrated with other web development tools (Quanta, Jedit or our favourite system, even DreamWeaver). It is possible to use it with other servers we are using, for example, Apache.

### 2.2. BD Server: Interbase

Interbase is a database engine, with which we can interact through SQL, equipped with great performance features as capacity and as speed, and multiplatform server. Nowadays, the last version is the sixth (v.6) which is an evidence of its development. A great advantage is to create only one file to set the database and its tables, however, if a database of multiple files is created, it can be one of 32TB.
INTERBASE is endorsed by BORLAND (what means, in a way, some prestige). Its value for money is unbeatable, overall when its version 6 came up as Open Source project. The database, also has a LINUX version, what becomes in a candidate in order to be able to work with web servers.
Its handling is easy and any peculiarity that could not be supported by SQL, can be added through UDF functions. Nowadays, it is one of the quickest databases.

## 3. Structure

The application allows any type of resource. To create files or record cards (meta-data), the same types of documents and fields which are used in Endnote but the possibilities of the creation of new files or record cards and the introduction of new fields have been added. So, it is more dynamic. When a user inserts a resource, the user must assign a visibility level to the resource. We have established four levels:

1. Public: anybody who access to the Mediateca, can consult it.
2. Visibly: the resource is only visible for the members of the group.
3. Private: Only who has insert the resource, can visualize it.
4. Locked: We consider this option to avoid posible fraudulen uses of the Mediateca. Only the manager´s group has possibility of locking or unlocking a document. We hope not to use this option.

This concept of visibility refers to the possibility to access to the resource, visualize, save, add other resources linked (for example, pdf reports with other pdf files which are annexes- figures, tables, etc-),, add comments on it and add links to web pages

The structure at user's level is hierarchical and these levels are:

1. Administrator: Managing the creation of the groups, the allocation of a manager to the group, eliminating a group and replacing or eliminating the resources of the group eliminated.
2. Manager's group: Managing the request of becoming a member of a group, discharging a user and assigning him/her a level into the group, laying a user off and being able to lock the documents.
3. Editor's group: inserting a resource (creating record card or file and loading a document), editing a resource (changing status, adding links and documents linked, deleting a resource).
4. Consultant: This figure can only visualize the resources which are visible for his/her group and commenting on them.
5. Visitor: This figure can only visualize the resources of the Mediateca which are public.

The working structure has essentially two agreement levels with the access and visibility: the working or innovating group and the whole web. It allows creating associations or dependences among the different groups, managing these topics in an autonomous way in each case.

## 4. Use and Evaluation

The tool is oriented to the collective creation of knowledge with a greater emphasis that other options -as BSCW- in a characterization of the same ones according to standards of means coming from the libraries management environment. A creation-checking diagram is being developed for the improvement of the tool [5], attending to the needs derived from the action of five groups of innovation-research that act inside their working area ([4], [6], [3]). Nevertheless, it is important, in this period, to bear in mind that this application is going to be used also by not university teachers. Perhaps, as being always acting as if one were still at work, the types of resources predetermined and their fields of record cards or files do not use a common language at non-university levels. For that reason we think that in the next version the resources should be presented grouped by categories with explanatory labels of the meaning of the fields and to distinguish among optional, obligatory and recommended fields in the record cards or files of each resource. On the other hand, we note the possibility to determine a series of topics to fill in the key words in an automatic way and even to establish relations of synonymy among the topics. All this options make easy the searches; but these listings never would be closed. In relation to interface, some of the current users have note that it is "cold", that one do not know the other users of the same group, "you have a feeling of solitude", etc. To avoid this, we are thinking about the possibility of the creation of a notice board for each group and the possibility to know which other users belong to the same group. At this moment, users can only visualize the manager's group and the administrator.

## 5. Conclusions

The use of the Mediateca is simple and makes easy the collaborative work. It allows us sharing documents and to rationalize its storage as well as its recovery. As it is a web application, we can access wherever we were: office, classroom, at home, etc., what is an advantage when one has different places of work. We think that the application fulfils all the requirements of a repository of learning objects [2] and it will make easy the exchange of resources among the teachers.

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## References

[1] B. Gargallo and J.M. Suárez, (Dir.). Observatorio de Nuevas Tecnologías en la Escuela Valenciana. Informe para el IVECE (2003).

[2] G. Richards and M. Hatala. Interoperability Frameworks for Learning Object Repositories. En A. Méndez-Vilas, J.A. Mesa y J. Mesa (Eds.) *Advances in technology-based education: towards a knowledge based society. Proceedings of the II Internacional Conference on Multimedia and Information & comunication technologies, m-ICTE 2003*. Vol 1, 366-372. Consejería de Educación Ciencia y Tecnología: Junta de Extremadura, Badajoz. (2003). http://www.todowebextremadura.com/papers/619.pdf.

[3] M. Barajas and M. Owen. Implementing Virtual Learning Environments : Looking for holistis approach. Educational Technology & Society, **3**(3) (2000)

[4] S. Britain and O. Liber. A pedagogical framework for evaluation of Virtual Learning Environments. Bangor. University of Wales: http://www.jtap.ac.uk (1999)

[5] T. Winograd, J. Bennett; L. De Young and B. Hartfield (Eds.). Bringing design to software. Reading, MA: ACM Press.(1996)

[6] M. A. Pereira "My reflective practice as research", Teaching in Higher Education, **4**(3) (1998)

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