

OMNIS/2 Integrating Libraries with Digital Multimedia Database

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Abstract

Nowadays more complementary information is stored in the electronic media. There is an increasing demand for the integration of traditional digital library systems and multimedia systems. An advanced Meta system or retrieval systems are needed for these integrations of traditional library systems. For that the OMNIS/2 system is presented in this paper which enhances existing digital library system by additional storing and indexing of user-defined multimedia documents, automatic and personal linking concepts, annotations, filtering and personalization. The OMNIS/2 system forms the multimedia storage layer, linking layer and personalization layer. OMNIS/2 is part of the Global Inventory Project of the G7 countries. This general approach ensures the integration and transparent combination of digital library systems. Users will be able to use the personalization feature to create their own view on the documents and to “work” with digital library systems by themselves. Most of the digital library systems are mere retrieval systems that can be enriched to interactive multimedia DL-systems and are combined into one virtual personal digital library. The Meta system OMNIS/2 which provides the environment in which the anchor and linking concept is successfully used in conjunction with the object oriented document model.

1.1 Introduction

Many digital library systems exist which store a variety of information. This information is usually available and stored in many different media types. The system as a whole emerged into established tools and the users in a simplified view received systems with powerful retrieval capabilities, but still miss features that would improve their ability to work with documents in digital library systems as it is common with books printed on paper (i.e. adding references, marking pages and annotating text) [1]. Some of these ideas were approached by some systems over the last decade, but a cross platform solution was always out of scope. This led us to the development of the OMNIS/2 system [2] which is a Meta system for various existing digital libraries.

The OMNIS/2 system can provide online access to historical and cultural documents whose existence is endangered due to physical decay. The major areas which offer digital libraries great exploitation are: Information retrieval, multimedia database, data mining, data warehouse, on-line information repositories, image processing, hypertext, World Wide Web and wide area information services (WAIS) [fox] [3].

The following are some of the advantages of digital libraries:

- Users can access the information everywhere
- Reduction of bureaucracy by access to the information
- The information is not necessarily located in same place
- Understanding the catalog structure is not necessary
- Cross references to other documents speed up the work of users
- Full text search
- Protection of the information source
- Wide exploration and exploitation of the information

The OMNIS philosophy is based on the "document" which is the unit for the archiving process and retrieval results. Each OMNIS document represents e.g. a catalog entry and contains information in three different sorts of attributes.

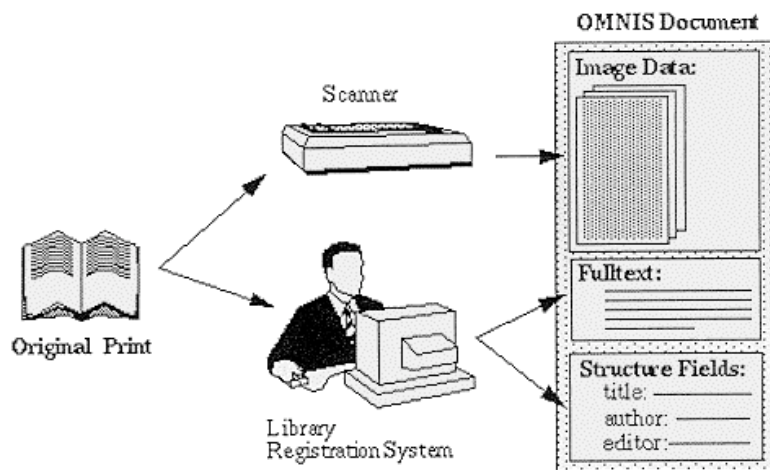


Figure 1.1.OMNIS/2 Document

- 1) **Structure Fields** describe the catalog entry in a relational way. Fields like author, title, etc., provide structured information as known from traditional literature retrieval systems. Structure fields are the basis for relational queries and may be accessed by the user. Only a small part of each catalog entry is stored as OMNIS structure fields in Myriad databases.
- 2) **Full text** contains the whole catalog entry as a text body. It is the basis for comfortable full text queries and may be accessed by retrieving users. A document's full text attribute is an unstructured sequence of words stored in Myriad databases and represents a superset of the document's structure fields.

- 3) **Image Data** in some pixel format may be attached to each document. These images are stored as BLOBs (Binary Large Objects) [7] in TransBase databases and can be shown to the user.

1.2 OMNIS System Components

OMNIS is intended for retrieval and archiving from multiple remote locations. The atomic unit for the archiving and retrieval process is the "document" which may include several catalog records and provides information in different forms: as attributes, as full text form and as image data.

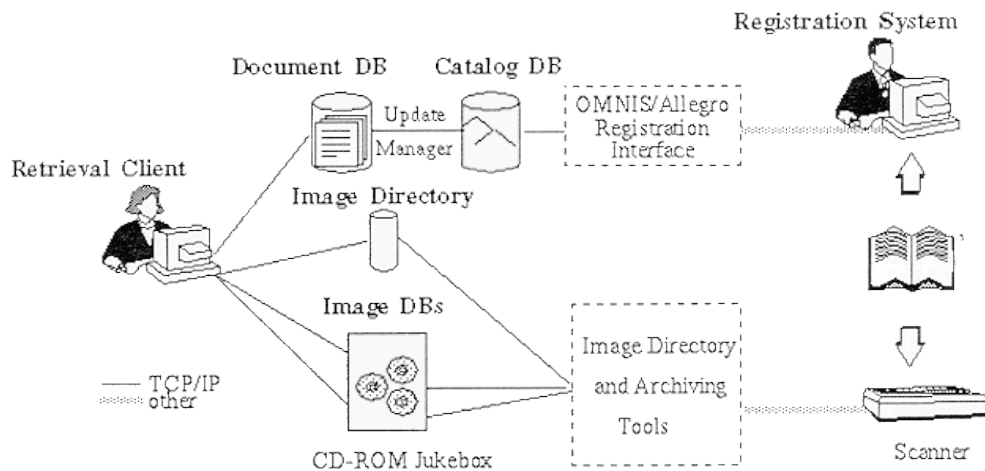


Figure 2.OMNIS System Components

The OMNIS system components that are catalog and document management, distributed images servers and retrieval interface are described below.

1.2.1 Catalog and Document Management

The catalog server deals with organizing, storing and providing textual catalog entries. Six registration centers spread all over Germany (Munich, Berlin, Wolfenbuttel, Dresden, Gotha, Halle) are participating via the Internet.

1.2.2 Distributed Image Servers

The distributed image databases allow decentralized image management [4]. Images are scanned with 1-bit color depth (black-white) and resolutions of 300 dpi, compressed with loss free TIFF G4.

1.2.3 Retrieval Interface

High-speed network transfer allows quick and easy retrieval, especially for the display of pixel images, via the WWW. Digitized key-pages may be requested and displayed at the clients' desktop in a few seconds. The display function allows a variety of image operations, e.g. selecting a portion of image for display, scaling of images, etc. Full text retrieval allows easy and comfortable on-line search.

1.3 OMNIS System Architecture

OMNIS/2 is an integration of the digital library system OMNIS and the multimedia database system MultiMAP. The goal is to create a stand-alone, interactive digital multimedia library system. The full text retrieval capabilities of OMNIS and the storage capabilities of multimedia documents in MultiMAP including parts of the database scheme are incorporated into the OMNIS/2 system, which enables the user to interactively create, store and search for multimedia documents in digital libraries.

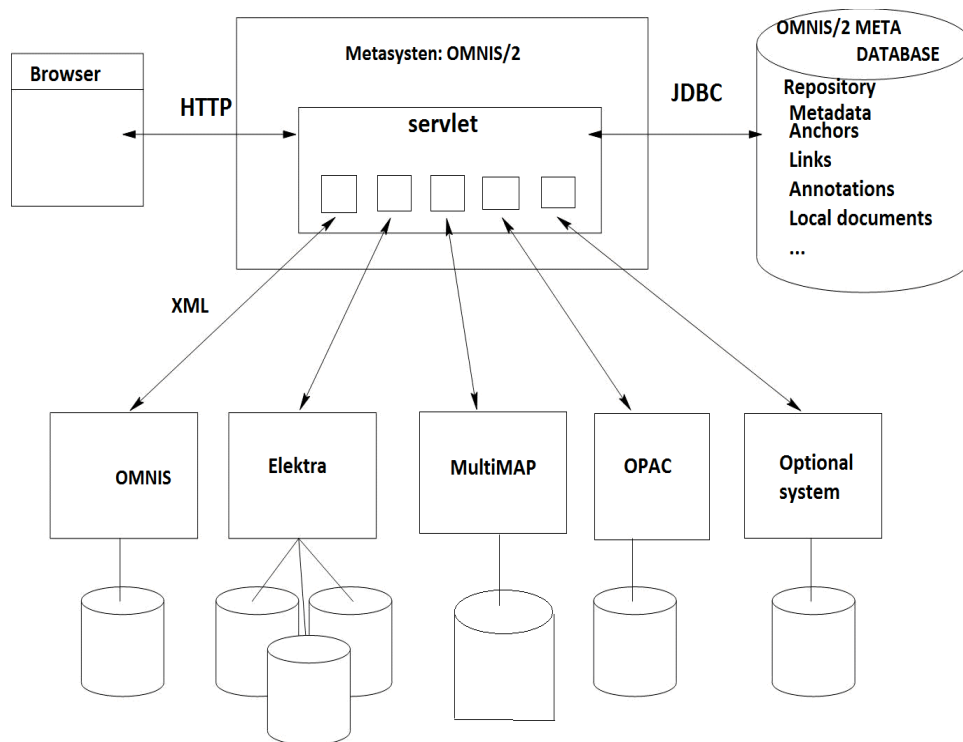


Figure 1.3 Architecture of OMNIS/2

The architecture of OMNIS/2 is shown in Figure 1.3. The system is modeled as a three-tier architecture where the databases are separated from the web server in a layer of its own. There is no difference in the handling of local documents and the handling of results from connected external systems. This enables OMNIS/2 [5] to search various

other systems and to automatically link all documents, to annotate them, to extend them with multimedia components and to personalize them. The original documents themselves remain in the original database systems and are never modified. They are represented in the OMNIS/2 database simply by their address and Meta data. The linking, including the anchor positions, is stored in OMNIS/2 exclusively and is included dynamically into the retrieved documents at run-time. In the same way documents can be annotated with user-related, group-related or general annotations. To create user-defined multimedia documents or to enhance existing ones, OMNIS/2 is equipped with an easy to use authoring tool. The ability to integrate various other systems gives OMNIS/2 the characteristics of a Meta system. It is also possible to look at OMNIS/2 as a stand alone system since it offers features to create, store and search for its own multimedia documents.

1.4 Conclusion

The digital libraries provide many advantages to the information infrastructure. But there are still many issues to be addressed, such as migration, intellectual property rights, etc. To ensure the longevity of digital collections and to save them for the future, continual maintenance will be required, i.e. integration of new media, new formats, and migration of data and so on. It is not possible to create a user defined link in any document of a digital library system to another document in another digital library although the source document and also it is not possible for users to work with the libraries as they are retrieval systems only. The OMNIS/2 system enables a user to make use of various information sources, i.e. digital library systems, and which combines them into one virtual personal digital library.

Reference

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