

## INTEGRATING WEB AND GIS SERVICES INTO ARCHIVE AND COLLECTION MANAGEMENT SYSTEMS

ABSTRACT

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Archive and collection management systems based on information technologies are nowadays widely in use and have proven to provide valuable support for the management of objects in the cultural heritage domain. At the same time the Internet and the world-wide-web have become one of the most important channels to provide access to these objects next to their physical presentation in museums and archives. However, very often there is no direct connection between the databases holding the scientific description of all objects and their public, visitor centred presentation on web sites. In this paper we discuss the technical possibilities and their implications to modern collection management systems provided by modern Web technologies and also how to integrate geographical information to such solutions. Based on a concrete example, our collection management solution IMDAS-Pro, we will demonstrate how easily it is possible for an ordinary user to manage collection objects together with geographical information and to publish information about objects on the Web.

### INTRODUCTION

The Institute of Information Systems and Information Management develops new and integrated methods designed to organise and manage the constantly growing flood of data and to selectively filter out the desired information. For this purpose, the institute's experts combine Internet technologies with collection management systems to create extensive Web information systems, developing tools for analysing and processing content. The great strength of the Institute is the tight intermeshing type of media - for today the digital world no longer consists of numbers, text and pictures alone, but also increasingly offers audio, video and map data. The result leads us to new technologies and methods that help us search for and, above all, find content both on the Web and in multimedia museum and archive data. The systems are tailor-made to the client's needs and stand out due to their clear structure and a high level of user friendliness. The possible applications range from libraries, museums and television archives to computer-assisted training and e-technologies.

During the last years archive and collection management systems based on information technology found their way into the field of cultural heritage. More than 10 years ago the Institute of Information Systems and Information Management started analysis projects in the field of cultural heritage. Aim was to find out and document the work flow within cultural institutions regarding the cultural objects they are dealing with. Results of these projects were very detailed documentation documents including not only the main work processes but also concrete descriptions of necessary functions and user interfaces.

Before a museum object has been registered, inventoried and scientifically documented, it must go through many departments. Within a "perfect" museum the first station of an

object is the incoming department where a rough description of the object is done (registration). Further on the object comes to the scientists where it is going to be researched, analysed and inventoried. Especially the scientific treatment and documentation must be the "living" part of a software program that should assist the museum staff in their daily work. This main part of a "museum program" will increase by the usage and possibilities of state of the art technologies. Starting with "only" textual descriptions some years ago modern museum programs are including multi media descriptions (pictures, films, graphics) nowadays as well.

### SERVICE ORIENTED COLLECTION MANAGEMENT SYSTEM

The IMDAS-Pro software package (Rußegger, Preininger and Müller-Straten 2000) - that was developed at the Institute of Information Systems and Information Management and is based on very detailed research work in the cultural heritage sector - can greatly speed up these time-consuming organisational procedures. The great strength of the documentation system for museums is its flexibility - it can be used to record dinosaur bones just as well as to catalogue Picasso's paintings.

The development concept of IMDAS-Pro is to provide a very strong documentation system in combination with a service oriented architecture (SOA) by using add-on services such as web content management system or a GIS service. The combination and not the complete integration of services support the user with a set of very powerful and well integrated set of tools. Therefore the user may choose tools and software fitting well into his work flow. The offered add-on services can be easily fed with the data of the IMDAS-Pro database, so that it is not necessary to know much about data structure and storing mechanism. This concept is a very time and cost saving one because you do not have to switch the software tools.

Living in a world and time that seems to grow together by the usage of Internet on the one hand and where the interests of people increase on the other hand the necessity arises that even cultural institutions must open their archives and have to appear before the public. Therefore the Internet and worldwide-web have become one of the most important channels to provide access to these objects next to their physical presentation in museums and archives. Based on the knowledge and experience of the members of the Institute of Information Systems and Information Management in the field of cultural heritage and in the field of information technology the following concept was developed to offer a flexible and easy to use system to present data - stored in a database - on different

Information Systems (GIS). Geospatial data is part of the data flow. It is a known fact that geographical information is identified in about 74% of the data flow of the workflow process. Organisation such as OGC (Summary Report [...] 2000) increased the integration of geospatial data information in the last few years. OGC is a not-for-profit association dedicated to new geospatial technical and commercial approaches to interoperable geo-processing (Open GIS Consortium, Homepage).

The Geographical Mark-up Language (GML) specification (OpenGIS® Geography Markup Language (GML) 2002) defines the features and syntax that GML uses to encode geographic information in XML.

GML supports the definition and data exchange in services. GML is a well established format, so sites do not need to support proprietary data formats and GML is extensible and XML-based, which makes it easy to manipulate, change, add to its contents and integrate it in a (web) service infrastructure. GML will have a significant impact on the ability of organizations to share geographic information with one another, and to enable linked geographic datasets. The format can embed links associated with features from other domains such as cultural heritages. Geospatial technologies applied and used in collection management tools such as IMDAS-Pro provides an additional spatial view of the collection itself. The power of GIS lies in the ability to link cultural objects on a map to a content management

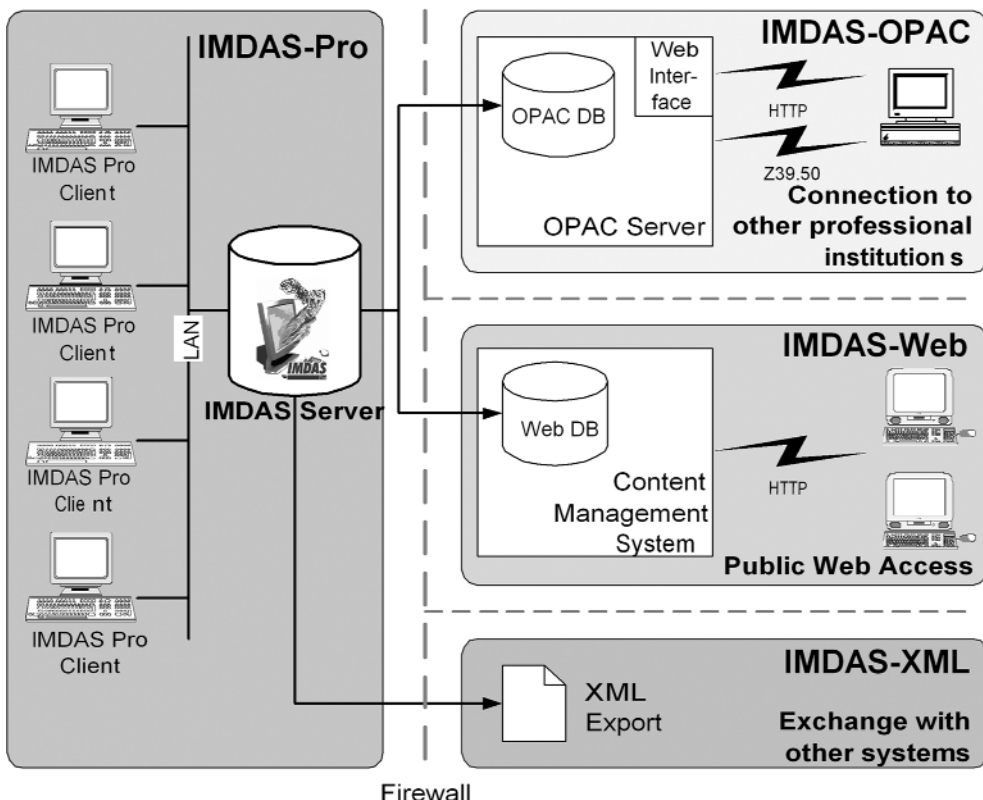


Figure 1 IMDAS-Pro components

output devices. One of these devices might be for instance a web page with the museums data.

The concept shows an add-on service to any data entry software that is able to export data in a structured, defined way. These exported local data are stored in a server database (in the graphic: IMDAS server) from which the data can be disposed to the output devices. One of these devices is an OPAC server that can be used for very special, scientific and detailed search and retrieval functionalities. Another device could be the presentation on web in the form of web pages with administrative and cultural information or even virtual exhibitions to different themes. An example for the usage of this web concept you can have a look on the project web site <http://iis.joanneum.at/dominico/>.

#### INCORPORATING GEOGRAPHICAL INFORMATION

Another important concept is used in the field of cultural information systems in combination with Geographical

management system, combining the graphical display of data with content query and analysis functionality. This helps the scientist to analyse, maintain and deduce information from the objects of the collections. One of main advantages is the integrated of the GIS component within the collection management tools such as IMDAS-Pro.

The IMDAS GIS module includes basis GIS features such as zoom in, zoom out, panning, measure the distances between two points, layer management, import and export of geographical data. Advanced features are e.g. the generation of objects on the map by using the geographical coordinates of the underlying thesauri and time related search are supported too. The result of this type of query returns different coloured objects according to their age. So it is possible to show the development progress of e.g. cities. Museum relevant data can be displayed along with the objects (e.g. excavation area boundaries). A selection of one or more objects in the map is

equivalent to the selection of one or more objects in IMDAS-Pro. Afterwards these objects can be combined to a special IMDAS-Pro group.

#### CONCLUSION

The application and service structure described in this paper is an example the new service oriented approach. The sound combination of visual representations (images, symbols, maps) and intelligent collection management based on IMDAS-Pro improves the usage and value of the cultural heritage objects. A sometimes underestimated issue in the area is that this additional local information, or more precisely the semantic information which is implicitly contained in the local information, can simplify the usage of this content by humans, e.g. for navigational purposes.

IMDAS-Pro offers different components (in a service like manner) which are independent from the local documentation systems of the institutions. This concept enables a customized solution for each user and user group. However, we believe that this solution of combining already existing types of information systems into easy to use applications will lead to new type of content and collection management systems.



Figure 2 Screenshot of GIS component within IMDAS-Pro

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