

# Information technology infrastructures and services for creating a library's unified information system

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## **INFORMATION TECHNOLOGY INFRASTRUCTURES AND SERVICES FOR CREATING A LIBRARY'S UNIFIED INFORMATION SYSTEM**

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### **Introduction**

Library facilities, like all other organizations in modern society, have begun to automate library services by using information technology tools and methods. The process, still in evolution, is being carried out in many and increasingly diversified ways. In fact, some libraries have started to make use of information systems (such as Aleph 500, Dobis-Libis, SBN, etc.). These systems allow both users and library staff (the administrators and the managers of libraries) to exploit many new library services. Other libraries are, instead, experimenting with partial systems created exclusively for library staff (such as, for example, the owner systems for cataloguing or lending).

On the other hand, many libraries often provide the same services using different information systems (i.e. different hardware and/or software), that consequently require different modes of fruition.

There is, actually, a considerable difference both in what the library services have to offer and in the modes of fruition of the services themselves.

Obviously, the telematic connection with libraries (i.e. the library network) is useful for the remote fruition of library services. However, considered the different systems now available, such a network creates serious problems in terms of information technology infrastructures, such as the transport protocols, access methods and interoperability services.

At this point, one of the most pressing problems to solve is to create unified infrastructures capable not only of connecting library facilities to a network (library's unified network), but also to create a library information system (library's unified information system). The latter must be characterized by services accessible through modes that are shared and accepted by each entity of the information system. In this way, each different library facility becomes a different node of the network. Each information system provides users and other information systems with their own library services.

This paper also discusses some interoperability services by means of which is possible to create a library's unified information system. The paper analyzes and discusses the technologies for data based cooperation and application based cooperation, according to how appropriate they are in the library system. Important issues, such as those relating to legacy systems, will also be taken into account. Finally, the potential of a common graphic interface in cataloguing procedures will be discussed.

### **Characteristics of a Unified Network**

A network of computer may assume different levels of complexity; for example, it can be constituted by only single computer as well as by networks of computer, and so on. We are interested in a network whose nodes are complex structures. In particular, in each node of such a network there is a different informative system.

For such a network, the essential elements to take into consideration are the following:

- the interconnection between the nodes, that is the protocols and the physical infrastructure for transporting and handling of the data;
- the interoperability services available to all the nodes of the network;
- the services for the application cooperation, that is the methods and protocols to make the applications running on the network interacting between them.

All these elements become critical points when an open scenario is considered. In fact, the presence of proprietary systems on the market make very difficult to solve the several problems arising by considering the interconnection, the interoperability and the application cooperation levels of services.

The first step in the direction of solving such problems is to consider only open network, where the necessary standards are given and shared.

The second and resolving step is the creation of an organizational structure whose finality is to draw the technical, organizational, administrative and legal lines to which every user of the network must fit in. Such a structure must provide essentially a general architectural solution for the aspects regarding the cooperation among the administration's information systems. It has to guarantee every authorized user (citizen or administration) the access to the information system data and procedures of all the administrations belonging to the unified network, independently from the technologies adopted by each node of the network.

Thus, a unified network is a network of networks, that must guarantee the autonomy of each administration in the following fields:

- architecture of the information system;
- management of the users;
- management of security and privacy;
- services offered to citizen and others administrations.

The transport and interoperability are essential in order to provide the users (citizen and administrations) with many of the services that a unified network wants to make available. However, the main function of a unified network is the cooperation among

the application processes of all the administrations operating in a well defined domain. In our case, we are interested in the domain of:

- supervision and management of cultural assets;
- access systems to information, documentation and services.

In order to obtain such an applicative cooperation it has to evolve from a unitary network towards a unitary information system. The latter can be defined as a virtual system constituted by the information systems component of each single administration such that, interacting through specific application procedures, have the purpose of improving the services offered to the citizen and to the community in general. This means that all the libraries, connected in a unified network which is even a unified information system, will be able to offer all the services, now available only to a restricted portion of users, to all the potential users in a wider range, improving at the same time the quality of the services themselves.

### **The application cooperation**

As it has already noted, the real innovative and relevant aspect in a unified network is the application cooperation level of services. One of the possible definition of cooperation is that given by the Italian Authority fo Information Technology: "to cooperate substancially means to share and modify information belonging to various domains through specific application procedures". Of course, this can be accomplished only by a network architecture corrisponding to the model described in the previous section. The application cooperation can be activated on domain and services of great interest for the community. Among them, there are surely the following:

- supervision and management of cultural assets;
- access systems to information, documentation and services.

In order to obtain the application cooperation, an architecture based on the concepts of Application Ports and Domain Designated Ports [1] must be realized.

Library services can be offered in an advanced way by defining a domain on libraries. This is a large services area, where a cooperative effort among libraries can be carried out. The relevance of the unitary network in this case will be evaluated on the basis of the social impact due to modernization (i.e. service quality, openness, and so on), even under the contribution to the development of the less rich regions, allowing the professional increasing of the operators in a substantially uniform way, thus reducing the gap between industrialized regions and less fortunate regions.

One of the main characteristic of the domain of libraries is the requirement for managing and processing documents, essentially based on the hypertext model (Internet technologies). The services offered in this application domain are dedicated to both specialized users and general users. In fact, for general users, the possibility of viewing the documents requested by means of a research mechanism is a very great improvement in approaching the library services. On the other hand, the application cooperation makes easier the work of the operators of each single library connected to the unified network, allowing the improvement of the efficiency of all the bureaucratic procedures needed for the correct management of a library.

The application cooperation in the library domain is based on two essential functions: the export of services and the access to any other domain that provides useful services for its own work process. Thus, the library domain has to define what kind of services can be exported and the user profile. This seems to be the real critical point towards the realization of a unitary network, requiring a high level of organization. In particular, as it has been already realized by the U.S. Interagency Management Council, there are two roles to be played:

- the directing strategy, to be assigned to an Authority for Information Technology,
- the harmonization of the legislation, to assigned to the Public Operations Department;
- the planning and managing the cooperation action, to be assigned to a Application Cooperation Center.

Such a level of organization, while on one hand it is necessary to the successfully realization of the unified network with the application cooperation services, on the other hand it represents the main obstacle to the effective realization of this ambitious project.

### **Bibliographic References**

[1] Unified Network: Feasibility Study, <http://www.aipa.it>