Chapter I
OpenDLib:
A Digital Library Service System

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ABSTRACT

This chapter introduces OpenDLib, a digital library service system developed at ISTI-CNR for easing the creation and management of digital libraries. It discusses the motivations underlying the development of such a system and describes it by presenting (i) the characteristics of the huge kind of content it is capable of managing, (ii) the set of functions it natively provides its digital libraries with, (iii) the powerful and flexibility of its component-oriented architectural paradigm as a key feature for addressing different application scenarios, and (iv) the technologies the system development relies on. The authors hope that understanding the OpenDLib foundational principles will not only inform stakeholders and decision makers of the features implemented by this existing system, but also assist researchers and application developers in the understanding of the issues, and their possible solutions, that arises when building digital library systems aimed at serving such a broad class of application scenarios.

INTRODUCTION

Digital libraries (DLs) are complex systems whose lifetime span approximately crosses the last 15 years. Along this period, a lot of focused and from-scratch developed systems have been realized to serve the needs of specific communities. These systems are tightly bound to the characteristics of the single scenario they have been conceived for and the results are hard to maintain along time. In addition to them, a few general-purpose digital library systems, that is, software systems designed to be easily used for realizing digital libraries suitable for certain application contexts, have been conceived. Such second class of systems systematizes the techniques and the software needed to implement digital libraries with certain characteristics, resulting in a product that communities can use to build their digital libraries.

OpenDLib is an example of such a second class of digital library systems with an architecture explicitly designed to support plug-and-play expansions. The design and development of OpenDLib was initiated in 2000 as a response to a pressing request for software that could enable different user communities to create their own DLs. We decided to design general purpose software that could be customized to meet the needs of the different application scenarios. At that time we called this software a digital library service system to stress that it is a system that manages digital library services and makes them publicly available (Castelli & Pagano, 2003). The role of OpenDLib is analogous to the role of a database management system for a database, that is, it supports the creation and maintenance of distributed DLs. A DL can be created by instantiating OpenDLib appropriately and then either loading or harvesting the content to be managed. Our initial aim was to design a software tool that could provide a number of core DL functions on general content and that could easily be expandable. A DL is a very expensive resource, therefore it must be maintained over time even when new technologies that enable new functions are developed or when new kinds of usages are proposed. To satisfy this dynamic scenario, the DL must grow over time along several dimensions, for example, services, metadata formats supported, hosting servers, user communities, and so forth. OpenDLib was designed to support this powerful notion of evolution.

BACKGROUND AND REQUIREMENTS FOR A DIGITAL LIBRARY SYSTEM

The systems developed in the digital library area until now were mainly dedicated to support digital repositories for satisfying the needs of single institutions. Among such systems, usually called "digital repository systems," Fedora (Lagoze, Payette, Shin, & Wilper, 2005), DSpace (Tansley, Bass, & Smith, 2003), and EPrints (Millington & Nixon, 2007) represent the most popular and adopted ones.

Fedora is a repository system specifically designed for storing and managing complex objects. It is implemented as a set of Web services that provide full programmatic management of digital objects as well and search and access to multiple representations of such objects (Payette & Thornton, 2002). Fedora is particularly well suited to work in a broad Web service framework and act as the foundation layer for a variety of multitiered systems, service-oriented architectures, and end-user applications.

DSpace is an open source digital repository software system for research institutions (Tansley, Bass, Stuve, Branschofsky, Chudnov, McClellan, et al., 2003). It enables organizations to capture and describe digital material using a submission workflow module, or a variety of programmatic ingest options, to distribute an organization's digital assets over the Web through a search and retrieval system and to preserve digital assets over the long term.