Interfacing ‘Discovery Layer’ on to an OPAC: A Case Study
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Abstract
The paper is a prototype of the effort to introduce the ‘Discovery Layer’ for the Online Public Access Catalog (OPAC) of National Law School of India University (NLSIU), Bangalore, India. The new look of OPAC aims at embedding the user centric web 2.0 technologies which in turn can deliver the improved search and retrieval services. Users are provided with new services such as social tag annotations (folksonomy), user opinions, organization of search results, integration of repositories under OAI-PMH (Open Archive Initiative– Protocol for Metadata Harvesting) and tag-based similarity searches. The initial implementation was well received by the user community. The paper provides the success story of the effort in this regard at NLSIU.

Key-words: Web 2.0, OPAC, Library 2.0, VuFind, NLSIU library, OAI-PMH

Introduction
One of the hottest topics in the library automation arena is creating a vision of the next round of catalogs. The catalogs have lagged behind the interfaces on the Web. The most biting indictments of all librarians is that on finding library OPACs unfriendly, users often go to places like Amazon.com to look for books of interest, and then flip over to the catalog to see if those titles are owned by
their libraries (Breeding, 2007). It is clear that today’s typical library users are Web-savvy and have very high expectations from the web technologies used in libraries. In response to their demands, we need to offer interfaces on our OPAC that match or exceed those found on the social networking environment.

According to Michael Casey “Library 2.0 is a user-centered model for library services that encourages users participation in the creation of both the physical and digital services, supported by the consistently evaluating services” (Casey, 2006). Web 2.0 technologies are user-centered and widely spread, providing collaborative, interactive and communicative infrastructures; and services for the creation and consumption of content. These technologies change the way the users select and organize available information. In particular, information is not created and classified only by experts or creators but also by the users. The concept of Library 2.0 is the generation of a social network interface, where the users exploiting RSS (Rich Site Syndication) feeds, wikis, tags, MashUps, Cloud, etc., that not only search for books and other material, but also communicate and share knowledge.

Libraries worldwide have started rethinking and reworking their catalogs in order to increase the attractiveness and efficiency of their core information product—the OPAC. The OPAC is the library’s main tool for locating material inside it. Until now, OPAC systems are tied directly to the library’s main catalog restricting the user to search/browse the collection and status. In the last few years, the diffusion of digitization and digital library repositories has urged libraries to digitize their content and provide this content directly to their users through the various digital library systems (Lorcan, 2006). Furthermore, in order to encourage users to organize and access the existing resources according to their needs, libraries have enhanced their services using Web 2.0 technologies (Golder, 2006).

In this article the authors have made an attempt to share their experience on the test bed created to deploy VuFind at NLSIU library with the sample bibliographical data. The article aims at describing the retro conversion of bibliographical database, importing of data to VuFind and linking of repositories on OAI-PMH to VuFind.

**Discovery Layer**

Mita Williams was the first to use the concept ‘discovery layer’ in connection with OPACs. The discovery layer concept involves the intrinsic use of user experience and other factors for ranking the output. The concept—discovery layer—is not new; use contextual information from the user’s profile, search
history, plus aggregated information from members of the user’s community, to guide searching and to influence relevance of search results. Different people have viewed the concept in different ways. Some of them have been given below:

Keene (2008) explains the ‘discovery layer’ as - an application or service which sits on top of a library’s catalogue, electronic holdings and other records to provide a unified and modern experience.

Sourceforge.net (2010) describes Discovery Layer as a data mining & reporting tool that chooses different databases as sources and with the application of defined search statements, renders the output via browser. Its focus is to work with all major databases by using an abstraction layer.

Brooks (2007) explains ‘the discovery layer’ encompasses processes and protocols by which web services can be discovered either by searching through their metadata (discovery), or by determining the metadata of a web service that is already defined (introspection).

Software Options for Discovery Layers

Many libraries in the developed countries are investing in enhancing their Integrated Library Systems (ILS) to provide a better search experience for users. The existing catalogues are alleged to be unfriendly and unforgiving of both user error and changing user needs. There was a long overdue demand for a solution. At last we are moving towards a possible solution by way of discovery layer which seeks to provide a search experience that is simpler to use, but at the same time gives users more options to refine their searches and browse library resources.

The Commercial Software options include Innovative Interfaces’ Encore, Ex Libris’s Primo, AquaBrowser and Endeca. VuFind, Blacklight, eXtensible Catalog and SOPAC are Open Source alternatives. A list of software options, and the libraries that have implemented each, can be found at http://digbig.com/5bbmnr. The cost of implementation varies widely, which depends on software license, staff time invested, level of customization and adoption of open source solutions.

VuFind is one of the popular, powerful and easy to implement solutions. Hence the authors have tried to implement and study its implications on the NLSIU OPAC.

Brief Overview of VuFind

A constant theme in the current phase of the evolution of library automation involves the widespread perception that catalog interfaces must improve. The
online catalogs delivered with many of the ILS products fall short of what's needed in this era of web savvy library users. This emphasis on new interfaces currently drives the development agenda of many of the commercial companies involved in library automation. But these commercial vendors are not alone. Libraries themselves have joined the movement, devoting their own efforts toward developing and using the products in the open source model. In this context, VuFind is the end product of the effort by a team at the Falvey Memorial Library at Villanova University.

License and Appended Software(s)

VuFind was released as an open source product on June 20, 2007 at SourceForge. The terms of the GPL (GNU General Public License) allow others to freely download and make use the software and to participate in its development. VuFind makes use of a number of open source components. The search features of VuFind rely on Solr, which delivers an integrated suite of search services based on Lucene, a lower-level open source search engine. Solr and Lucene both fall within the Apache Software Foundation family of open source technical infrastructure components. Other components that comprise the application include the Java Development Kit (JDK), Apache Web server, the PHP scripting language, the MySQL relational database management system, the YAZ Z39.50 toolkit, and the GNU Aspell library of spell check functions.

VuFind utilizes faceted searching. Facets divide a single set of items into smaller sub-sets based on the commonality they possess. Faced searching provides a way for a user to quickly narrow down a very broad set of loosely related items into smaller sub-sets. Popular examples of the use of facets can be found on Amazon, Ebay, and many other online shopping sites, as well as some library catalogs and article databases.

VuFind @ NLSIU Library

NLSIU library has the bibliographic and digital resources in several pockets. It was a tedious process for the users and the service providers to search and identify the resources by logging into different URLs or locations. Further, the compilation of results to provide a holistic approach on the area of search was more time consuming. NLSIU Library was serving its users from the resource available at the following locations/sources.

1. **OPAC**: served by the home grown library management system. Even without adhering to library and web standards, it was serving the needs of library and to some extent of the user requirements.
2. **Institutional Repository**: The student summer projects, thesis, moot court submissions, faculty publications, etc., were on DSpace.

3. **Institute Publications**: The articles published in institute journal; course materials and course outlines of regular as well as distance education programs; institute policy and procedures; question papers and institute reports – are available in PDF formats. These documents are made available to the requesters by the library staff by calling from the centralized repository.

4. The databases subscribed from commercial vendors.

5. The resources available through open archive initiative; the repositories of the other institute and organizations pertaining to law; and the Electronic Thesis and Dissertations (ETD) database.

**Deployment**: The authors have made an attempt to study the literature pertaining to product introduction, implementation and comparison of open source discovery tools. The discussion with the experts and the literature study helped the authors to zero-down to VuFind. The studies by Bauer (2009), Bisson (2008), Breeding (2007 & 2009) and Whitehead (2008) provided suitable inputs to identify the following steps to create a presentable test bed of NLSIU’s new OPAC.

1. **Migration into VuFind**
   
   — **Data Capture**
   
   For the current study the data has been taken from the existing bibliographical database of NLSIU library automation software. NLSIU is using the home-grown library management software which does not have the facility to exchange in any bibliographic standard format. Hence the data was initially captured in Microsoft Office Excel to enable it to be converted into ISO2709 format.

   — **Data conversion to MARC21 communication format (ISO2709)**
   
   The data in MS-Excel format was converted to MARC21 using the freeware MarcEdit (ver 5.2). The conversion involved the following steps:
   
   • Converting the .xls (Microsoft Office Excel format) file to .txt (text) format separated by “TAB”
   
   • With the option “Delimited Text Translator” the .txt file was converted to .mrk with UTF-Encoded and Delimiter as TAB
   
   • The columns in the .xls files were mapped according to corresponding Marc tags. Ex: if title appears in the field 3 (column 3), map it to 100$a in the MarcEdit program
   
   • The records were saved to .mrc extension
A snapshot of the Excel data sheet and MarcEdit intermittent screen are shown below:

![Excel data sheet and MarcEdit intermittent screen](image)

**Fig. 19.1:** The screen shots of data in MS Excel converted to the MARC 21 Format using the MarcEdit software

2. **Installation of VuFind:** Based on the literature study and the interaction with the experts, the author decided to install VuFind 1.0.1 on Ubuntu 10.04. Following steps were followed during installation:

- Before starting the installation, the system was updated to the latest version with the command in command prompt `# apt-get dist-upgrade`
- Java Standard Development Kit (JDK) was installed. The use of Java class called MARC4J, a Solr plug-in.
- The dependencies were installed, after the installation of JDK. The web browser Apache, database MySQL, PHP5 with PEAR, LDAP and XSL are installed through command prompt.
- With the system environment set for the installation of VuFind, the software was downloaded from [http://downloads.sourceforge.net/vufind/vufind-1.0.1.tar.gz](http://downloads.sourceforge.net/vufind/vufind-1.0.1.tar.gz). The file was uncompressed to `usr/local`.
- The permissions were changed to meet the requirement for Smarty (downloaded to desktop from [http://smarty.net/download.php](http://smarty.net/download.php))
compilation, cache directories to the web server user and to allow the web server to create file in the respective directories.

- The environment variables were set to install the uncompressed VuFind software located in /usr/local.
- The path of Smarty was set and the VuFind was restarted to access the VuFind OPAC.

![VuFind screen shot](image1.png)

**Fig. 19.2:** The screen shots of VuFind executed in local host after installation

### 3. Customization

- The library name, logo and the library image was changed/configured in home.tpl to reflect the requirements of NLSIU library.
- The sites identified to integrate with the VuFind search were linked in the file layout.tpl.
- As a security measure the port number of Solr was changed in solr/jetty/etc/jetty.xml file.
- The config.ini was configured to display the narrow search options.

![NLSIU OPAC screen shot](image2.png)

**Fig. 19.3:** The screen shots of NLSIU OPAC 2.0 after Customization
4. Import of MARC21 records: To import the MARC21 bibliographical records from MarcEditor, following were the key steps performed:

- Add the required MARC tag with Metadata in /import/marc_local.properties (Sample tags – College = 850a; Library = 852a; Department = 852b)
- The Metadata added are defined in the file located in solr/biblio/conf/schema.xml
- To declare the Metadata in the search, the configuration is made in searchespecs.yaml located in web/conf/searchspecs.yaml
- To view the Metadata fields added, defined and declared, the fields are mapped in web/conf/facets.ini

Importing of records

- The bibliographic data file converted using MARC Editor to .mrc was used as the sample data to be imported to VuFind
- The records were imported with the command ./import.sh
- The VuFind was restarted to view the imported records

![NLSIU OPAC 2.0 search results](image-url)

**Fig. 19.4:** The screen shots of NLSIU OPAC 2.0 search results
Presentation of NLSIU OPAC 2.0: A demo of the new NLSIU OPAC 2.0 was given to the library committee to take the administrative sanction to test the OPAC in the real environment. The NLSIU OPAC 2.0 was made available to the user community under local host. The information about the OPAC 2.0 was shared with the selected community of users. The features, functionalities and the facilities available were shared among the community identified for the study. The feedback from the users was collected informally. The users’ opinions are listed below:

- A single simple federated search box helped the user to search different data sources alike.
- Ability to refine search by subject, title, topic, language, format, date helped the users to have more precision in their search.
- Ability to search either the NLSIU catalogue or all the information identified
- Ability to request library for document, purchase /addition of resource, share of resource, etc. without human intervention found to be useful by the user community.
- Users created username and password helped the users to have their own search history.
- Links to users library account with the ability to save, organize and retrieve records were found useful by the users.
- Compliance to tag, bookmark and share the resources were the factors which excited the users much.
- Social networking technologies / tools attracted the young users.
- Compliance with interoperability issues with other applications such as eLearning and Institutional Repository were appreciated by the users.

As indicated, this paper is aimed at sharing the experience of experimental deployment of VuFind as a test bed to provide a new look to NLSIU Library OPAC. The authors adhere to the privacy of data of NLSIU Library. Within the policy statement defined by the University, the authors have presented the information as detail as possible. One of the authors, who is working with NLSIU Library further aims at implementing the VuFind as a permanent tool to provide access to the bibliographical data, digital, OAI resources and other non-book materials under a common URL.

Future Perspective

The experience gained during the test bed has made the authors to draw the following guidelines for NLSIU Library to progress in the implementation of
Web 2.0 technologies:

- The University should frame guidelines to capture the digitally born documents/materials like students project reports, course materials, in-house journals, faculty publications, etc. which are the source to display the richness of Institutional Repository. The results of these resources will enhance the results in OPAC 2.0 and spread the intellectual output of the organization beyond the walls of NLSIU.

- The home-grown library automation software should follow MARC21 standard in describing the bibliographical data. This will help in overcoming the process of retro-conversion. NLSIU Library should make an attempt to bring the interoperability and web standards in ILS. Moreover, the authors opine that Standards and Policies are the tools to bring the best practices into any system.

- The discussion with the database vendors (both publishers and aggregators) to provide permission to integrate the bibliographical data elements till description level with the VuFind will greatly help the users in locating the subscribed e-resources at single location. Additionally, the authors feel that this will greatly increase the database usage for academic curriculum and research activities.

- NLSIU Library administrators should prepare the detailed list of resources available in Open platform pertaining to the Law and allied subjects. The resources should be tuned with the involvement of research professionals, domain experts and teaching community. Further more, the resources should be listed / configured in the search operations of the discovery tool. This will help the NLSIU community to feel the deep search in the information ocean.

- NLSIU should constitute a technical committee to study the strength, quantity and quality of information resource to be involved for implementation. Based on the data the committee is required to provide suitable guidance pertaining to hardware configuration, platform (Operating system to be used), category of users, privileges for the categories and to define modus operandi.

- NLSIU Library should frame ‘information literacy program’ to educate the users about the Web 2.0 technologies, OPAC 2.0, participation of users, the accessibility and services.

- NLSIU OPAC 2.0 should enhance its horizons by bringing the eLearning, Content Management System and Campus Management System, in turn, widening traceability and accessibility. This will make NLSIU library a real ‘Information Resource Center’.
References


