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## **The Search for a New OPAC: Selecting an Open Source Discovery Layer**

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## **The Search for a New OPAC: Selecting an Open Source Discovery Layer**

Kate B. Moore and Courtney Greene

### **Abstract**

In early 2011, an Indiana University Libraries task force was charged with selecting an open source discovery layer to serve as the public interface for IU's online catalog, IUCAT. This process included creating a rubric of core functionality and rating two discovery layers based on criteria in four main categories: General Features and Functionality; Authentication and Account Management; Export and Share; and Search Functionality and Results Display. The article includes information about our rubric and the two discovery layers reviewed, Blacklight and VuFind, as well as a discussion of the priorities of the task force. The article concludes with future steps and anticipated highlights for IUCAT.

### **Keywords**

Online catalog, next generation catalog, discovery layer, open source, Blacklight, VuFind

### **Introduction**

In this article we will discuss the process through which the Indiana University Libraries OLE Discovery Layer Task Force determined which discovery layer was best suited as the new public interface for our shared online catalog, IUCAT. This process included creating a rubric of the core functionality necessary for a better search experience in the online public access catalog (OPAC). The rubric rated the search functionality, display of search results, the ability to export and share records, the management of user accounts, user authentication, as well as the general look and feel of the discovery layer. Our rubric for rating core functionality and background information concerning the decision-making process will be discussed, together with descriptions and examples of the two open source products reviewed, Blacklight and VuFind. We will conclude with a brief discussion of future steps and anticipated highlights of the future IUCAT.

### **Background**

State-wide, Indiana University has eight campuses, and the Indiana University Libraries (IUL) system includes libraries at each campus location: Bloomington, Gary, Kokomo, New Albany, Richmond, South Bend, and two Indiana University-Purdue University campuses, at Indianapolis and Fort Wayne. In addition, Indiana University, Purdue University, and Ivy Tech Community College jointly oversee a library location at Columbus. Collectively, the Indiana University Libraries hold extensive print and electronic collections: well over seven million books, journals, maps, films, and audio/visual materials in over nine hundred languages; hundreds of databases, and many thousands of electronic journals and electronic books; and extensive locally developed digital content (Indiana University Bloomington Libraries, 2009). These collections are currently accessible through the shared SirsiDynix Symphony catalog, IUCAT.

Like many academic libraries, our statistics show that use of our library catalog is down (Martell, 2008). User dissatisfaction with the library catalog interface also manifested itself through feedback collected in several ways: focus groups, a LIBQUAL study completed in 2008, and in regular, annual surveys administered by University Information Technology Services (UITS), the unit overseeing all campus' computing services. Due to this data, the IU Libraries made a commitment to improving the overall user

experience in the catalog by providing improved access to catalog data through new discovery tools with powerful, user-friendly interfaces.

Around the same time the IU Libraries began focusing on improving the user experience in IUCAT, the Kuali Foundation began the first phase of a project funded by a grant from the Andrew W. Mellon Foundation to research, plan and design a community source library management system (Collins, 2010, p. 98). This project is now known as Kuali Online Library Environment (OLE) for which Indiana University is the leading partner, together with other institutions such as Lehigh University, the University of Michigan, and consortia such as OhioLink, the Florida consortium, and the Triangle Research Libraries Network (Kuali Foundation, n.d.-a). The infrastructure is currently in development and IU Libraries plan to transition to the OLE system in 2013. While OLE will support crucial library workflows such as cataloging, acquisitions, and circulation, the project does not include the development of a public interface; each institution will be free to select and implement a discovery layer as appropriate (Collins, 2010, p. 99). It was determined that any new interface for IUCAT should also be open source, and like Indiana University's involvement in Kuali OLE, reflect a "governance model in which the entire library community can collaborate to own and govern the resulting intellectual property" (Kuali Foundation, n.d.-b).

In early 2011, the process of selecting an open source discovery layer for IUCAT commenced with the appointment of a task force, charged by the Indiana University Libraries Council of Head Librarians to create a rubric of core functionality required by all campuses in a catalog user interface. The task force would then use this rubric to review and rate two open source products, VuFind and Blacklight, to determine which would best support discovery for IU Libraries. The final rubric included criteria that maintained the current functionality of IUCAT as well as new features and functionality, including relevancy ranking, the ability to assemble custom views, the inclusion of other data sources alongside or integrated within the catalog, and faceted searching, among many other requirements.

A single, agreed-upon definition of what a discovery layer comprises has yet to be settled on within the profession, but there has been some discussion of what features or functionality distinguish a discovery layer (or next generation catalog) from a traditional catalog. Sharon Yang, in her 2010 and 2011 articles evaluating discovery tools and online catalogs for next generation catalog (NGC) characteristics, used the following check-list of features, drawn from several sources (Yang & Wagner, 2010, pp. 694-695); (Yang & Hofmann, 2011, pp.269-271):

- *Single point of entry for library resources*
- *State of the art web interface*
- *Enriched content*
- *Faceted navigation*
- *Simple keyword search box with a link to advanced search on every page*
- *Relevancy*
- *"Did you mean ...?"*
- *Recommendations/related materials*
- *User contribution*
- *RSS feeds*
- *Integration with social networking sites*
- *Persistent links*

The IUL discovery layer task force hoped to improve the user experience in the catalog by selecting a product with a more robust ability to search, browse and manipulate catalog data, with an interface comparable to those now common in widely-used commercial products. To speak plainly, we had in mind a product that would support discovery in the most basic of senses, that is, the ability to reliably retrieve information, like a known title, from the catalog, as well as provide the ability for advanced users to conduct more complex searches.

The discovery layer interface will eventually overlay two separate and distinctive systems; first the existing SirsiDynix Symphony integrated library system (ILS) and later Quali OLE. Any discussion of discovery layers must be qualified by the fact that their functionality is ultimately dependent upon the existing ILS currently in place. During the process of evaluating both VuFind and Blacklight as candidates for the IUCAT interface, it was important that the task force bear in mind that while the new interface could provide some upgrades to the features and functionality for users, some variables would remain the same: the data within the catalog, for example.

### **Developing a Rubric**

As previously mentioned, in early 2011, the process of selecting a discovery layer for IUCAT commenced with the appointment of a task force. The membership of the task force reflected the geographic distribution of the IU campuses, and a diversity of functional areas. The task force was to deliver a report and recommendation to the IU Council of Head Librarians by early June.

The compressed schedule for the process - just four months - meant that the group had no time to lose. To develop the rubric, the group first worked together to compile a “laundry list” of features, drawn from our own experience using commercial products and discovery layers at other libraries, as well as from reviewing the library literature on discovery layers and catalogs. Items included existing functionality that was considered essential to carry forward, and additional features that would either expand IUCAT’s capabilities, or bring them up to a level the group considered acceptable in the current technological environment. Once this initial list reached a critical mass, we sorted the items into broad categories, of which six emerged: Search Functionality; Search Results; Export and Sharing; Account Management; Authentication; and General Features and Functionality. For each of the six, a sub-group of the larger task force expanded and refined the listing, then ranked the criticality of each criterion (as required, highly desired, or desired). If a feature was considered essential and necessary before the discovery layer could be unveiled to the general public, it was determined to be required. If a feature was considered important but not critical to successful implementation, it was rated as highly desired. Features that were considered to be inessential but appealing were ranked as desired.

The six groupings were later compressed into four: General Features and Functionality; Authentication and Account Management; Export and Share; and Search Functionality and Results Display. Once completed, the rubric included over sixty required criteria, over twenty highly desired criteria, and four desired criteria, spread throughout the four main groupings. Examples of required criteria include: faceted searching; an appealing and mobile-optimized interface; ability to sort results by a variety of different methods, including relevancy, a “Did you mean” functionality, and the ability to limit searches by a number of criteria, including format, medium, publication year, and language. The entire rubric is available online via IU Scholarworks, Indiana University’s institutional repository: <http://hdl.handle.net/2022/13621>.

At the same time we were creating our rubric, the group reviewed information from the two candidates' project sites and investigated mature installations at other institutions: for VuFind, Villanova, the University of Michigan, and Purdue University; and for Blacklight, University of Virginia, Stanford University, and the University of Wisconsin's Forward project. While there were local test implementations of each candidate application available to view, these local implementations were essentially out of the box configurations and contained only a subset of the total database of records. Thus they ultimately proved to be less helpful to the review process than the time spent looking at other universities' catalogs.

### **Products Evaluated**

VuFind was developed at Villanova University with the goal of being able to "create a richer and simpler search experience for their users" (Houser, 2009, p. 95). Written in PHP, it uses Apache Solr to index MARC records (Denton & Coysh, 2011, p. 303). Houser's article, "The VuFind Implementation at Villanova University" (2009) chronicles the process of development leading up to the initial launch in August 2008. Functionality supported by VuFind includes faceted browsing, the inclusion of enhanced content, integration of social networks, ability to index non-MARC records, and personal recommendations (Houser, 2009, p.99). At the time of writing approximately fifty live installations, and about half again as many beta or test installations were noted on the VuFind project site, including the National Library of Australia, the University of Michigan, Yale University, and HathiTrust (Falvey Memorial Library, Villanova University, n.d.-a).

Blacklight was developed at the University of Virginia (UVA) Library as an open source OPAC replacement with the added goal of making "a strong case for the support of open source, web-services-based software development at academic libraries" (Sadler, Gilbert, & Mitchell, 2009, p. 113). In their chapter, "Library Catalog Mashup: Using Blacklight to Expose Collections," (2009) the authors go on to highlight the project's emphasis on flexibility, noting that Blacklight "is now best thought of not as a discrete piece of software but as an infrastructure project that can be used to support all kinds of applications only one of which is an improved library catalog" (p. 115). The primary design goals for the project include features commonly associated with discovery layers: relevance ranking, faceted browsing, open source design principles, the ability to include siloed materials, customizable interfaces for specific user populations, and re-mixable data (Sadler, 2009, p. 62).

There are about a dozen implementations of Blacklight noted on the project site, with UVA, Stanford University, Johns Hopkins University, and WGBH, Boston's public broadcasting station, being the heaviest contributors to the code base (Project Blacklight, n.d.) Of those, WGBH Open Vault is the only project that is not a library catalog; it instead is a media archive providing access to video, audio, images, searchable transcripts, and resource management tools (WGBH Educational Foundation, 2011; Beer, 2010).

### **Evaluation of High-Level Priorities**

During the final stage of the group's work, the products had to be reviewed against the criteria set forth in the rubric. Using information from the two candidates' project sites as well as reviewing mature implementations of VuFind and Blacklight, the task force found that many of the required criteria set forth in our rubric were already met by both candidates, or could be implemented with some in-house programming. While discussing the findings of each sub-group of the task force, it became apparent that several of the criteria from our rubric were considered absolutely essential, and thus it became

necessary to rank Blacklight and VuFind based on these high-level priorities, as an aid in articulating the philosophy and specific needs of the IU Libraries:

- Maintain baseline functionality present in current IUCAT interface;
- Seamless transitions for users (authentication, account management, export and share records);
- Meet user expectations for easy-to-use, attractive interface with powerful search and browse capabilities;
- Robust development community which prioritizes collaboration on a shared code base;
- Scalable, flexible architecture that accommodates the multi-campus/multi-library structure of IU and has the potential to accommodate future needs;
- Increased ability to manipulate and share catalog data and to integrate non-MARC metadata.

### *Maintain Current Functionality*

Both systems provided baseline functionality already present in our catalog, including Unicode compatibility, the ability to include other data sources (Google Books, HathiTrust) within the bibliographic record display, guest access to search, a Print/Email/Save function, truncated searching, and the ability to text call number and item data to phones with the major providers. [See Appendix A] Both systems also offered comparable upgrades to our current search functionality and results display as well as an increase in our current abilities to export and share records.

### *Seamless Transitions for Users*

Currently, due to the different methods of authentication that are available on each IU campus and that are required by our SirsiDynix system, users may be required to log in multiple times in order to be considered authenticated by IUCAT. It was the opinion of the task force that the system chosen should integrate with technologies enabling single sign on for login to IUCAT services, including account management and services, as well as off-campus access to online resources. The task force found that like other open source discovery layer interfaces, both Blacklight and VuFind are dependent on the functionality of the underlying ILS to provide authentication and account management services; while we identified these “My Account” services as crucial to the success of the project overall, we recognized that any limitations in this area would need to be addressed locally with policy and procedure changes, and additional programming. Similarly, importing holdings information from an ILS into either system requires some expertise; in some cases, another institution may have already developed a process and shared code that can be implemented to achieve similar results in the local ILS. If this is not the case, then the code must be written locally. Because we did not have authentication credentials for the mature installations of VuFind and Blacklight that we tested, we could not fully determine how users were authenticated in either system. Regardless, the requirement for a seamless transition for users relies primarily on other systems working in conjunction with either discovery system.

### *Meets User Expectations and Accessibility*

Both systems also provide users with an attractive interface that better emulates commonly-used search engines. Karen Schneider expressed the growing frustration with the library catalog across the profession in a series of posts on the ALA Techsource blog in 2006; titled “How OPACs Suck.” The series of three blog posts addressed the increasingly obvious discrepancies between baseline functionality available within library catalogs and that provided by commonly-used search engines such as Google, Ask.com and others (Schneider, 2006a). In part two, “The Checklist of Shame,” she pointed out that

“users will come to your catalog with user behavior learned from such search engines as Google” (Schneider, 2006b). As Schneider and others have pointed out, user expectations for ease of use are increasingly driven by standards set for search by the commercial market. Luther and Kelly (2011) describe it as follows: “The challenge for academic libraries, caught in the seismic shift from print to electronic resources, is to offer an experience that has the simplicity of Google--which users expect--while searching the library's rich digital and print collections--which users need” (p. 66).

While no user studies were found to have been published on Blacklight, there is already a fairly extensive body of user study literature on VuFind. Yale University has made available two reports on usability studies conducted on their implementation, called Yufind. The tasks from Bauer’s study (2008) have been widely adopted in other user studies, and one of these, a follow-up study by Peterson-Hart and Bauer found that undergraduate users particularly noted “the simplicity of search, facets, and links to Google Books” (Peterson-Hart & Bauer, 2009, p. 2).

Ho, Kelley, and Garrison (2009) analyzed search logs for the Western Michigan University implementation of VuFind and found that most users conducted simple searches. Only about 35 percent of these basic searches were narrowed using facets or dropdowns – nor did participatory social networking features such as tagging, favorites, or commenting see much adoption. Few used these “Web 2.0 ‘bells and whistles’ ... not surprising, as an online catalog is ... not a social network” (Ho, Kelley, & Garrison, 2009, p. 90).

Jennifer Emanuel conducted a usability study on the CARLI (Consortium of Academic and Research Libraries in Illinois) implementation of VuFind at the University of Illinois at Urbana-Champaign in spring 2009. Emanuel conducted tests with faculty, graduate students, and undergraduates, who had a generally favorable reaction to VuFind, specifically noting the layout of information, and visual elements (Emanuel, 2011, p. 49). Interestingly, when asked to choose between the two, all but one participant expressed a preference for VuFind over Amazon, mentioning that VuFind “provides much of the same information” minus the commercial focus (p. 50). Overall, participants rated VuFind’s ease of use as 1.92 (on a scale of 1 [easy] to 5 [difficult]), but significant differences in the rating appeared within groups, with undergraduates rating it significantly more difficult (2.8) as faculty (1.6) (p. 50).

Denton and Coysh (2011) from York University found that their ten student participants approved of VuFind’s interface and the “rich search results” (p. 308). Because the hit list contained “almost all the basic information users needed,” they surmised that the need to continue through to the detailed record screen might be obviated for many users (p. 308). Results highlighted the importance of reliable relevancy ranking, resulting in modifications to the default relevancy configuration which they described as “poor” (p. 317). A final item of note was the complaints about the lack of a left anchored title browse search (p. 317).

There has been little discussion within the literature of accessibility specifically as regards NGC or discovery interfaces – this appears to be an area that has not yet been fully assessed. Peggy Shaughnessy’s article (2007) discussed the importance of ensuring that any next generation catalog is accessible to persons with disabilities, focusing on problems with screen readers & AJAX. This helpful article includes a chart with information about discovery layers and accessibility testing, but of course there have been many entrants into the market since that time.

The Indiana University Adaptive Technology and Accessibility Center (ATAC) recently conducted an evaluation of the current SirsiDynix IUCAT interface, which revealed a number of accessibility issues,

many of them critical. While we were distressed by the findings, we were not surprised by them - many of the issues cannot be corrected due to the way the ILS functions, for example, misuse of list elements (ul, li) for layout purposes, and other elements of page structure not optimized for use with screen readers. Thus, a high priority requirement in our discovery layer rubric was in relation to accessibility, that the interface be readily accessible to persons with disabilities, defined as being ADA compliant and compatible with major screen readers and other commonly used accessibility software. Follow-up consultations with the ATAC will be an essential part of the implementation process.

### *Open Source Development and the Role of the Community*

One of our top priorities for the new interface for IUCAT was a robust development community which prioritizes collaboration on a shared code base. To borrow from the Open Source Initiative mission statement, the open source software development process “harnesses the power of distributed peer review and transparency of process” (Open Source Initiative, n.d.). Since changes are made both in-house, and as part of a larger community, customization can be highly localized to take into account the specific needs of a particular institution or interest group, and upgrades and improvements can often be integrated more quickly than in commercial systems. This flexibility comes at a cost; namely, development expertise and the time of staff to implement and maintain the open source system. Open source software has often been described as “free like a puppy,” meaning that even though the applications themselves are free, implementing and maintaining these products requires a long-term investment of time and money, proportional to the complexity of the system (Huckabee, 2006).

The crucial importance of the specific development community for an open source product is in distributing the cost of development and support – sometimes implicitly, through contributions of code, and sometimes explicitly as in the case of the Kuali OLE community source project, where partners contribute financial resources. Commercial products also require investment, thus another benefit of open source or community source development is “retaining control of our own destiny through community ownership of the intellectual property rights” – that is, the end product is owned by the community, not a vendor (Kuali Foundation, n.d.-c).

With an application as complex as either VuFind or Blacklight, strong support for shared development across the community is key - as local modifications are made to improve the product, it is preferable for them to be regularly integrated into the central code (often referred to as the “trunk”) so that the product as a whole moves forward, and all members can benefit. When individual institutions make considerable changes, and these are not integrated into the trunk, they are separated from the overall forward movement of the project and this creates multiple, or “forked” versions of the product.

There is more than one example of this type of highly customized version, or build, within the VuFind community, and there have been some concerns raised that VuFind may have “fundamental architectural issues mostly based on the inability to easily separate local code from core code” (Dueber, 2010). Blacklight’s structure separates local customizations in a way that permits updates to the core code to be applied separately, as needed (Low, 2011). The Blacklight community has also been praised for their “disciplined community complete with project management, the[ir] insistence [on] regression testing before code submissions [are] included into the base, and regular conference calls” (Morgan, 2010).

### *Future-Proof Architecture*



Both VuFind and Blacklight rely on Apache Solr for indexing, but each uses a different underlying programming language to create its interface: PHP for VuFind, and Ruby on Rails for Blacklight. The choice of Ruby on Rails for the front end application of Blacklight enables customization to a very granular degree, allowing for diversity of displays for a particular format, item, or screen within a single OPAC implementation. Sadler (2009) explains as follows:

Because of the separation [of indexing and interface], it is easy for someone to change the behavior and presentation of a specific kind of object without needing to change or even know about the behaviors of other objects, the indexing process, or the underlying data models or business logic of the application. (p. 58)

A guiding principle of the development of Blacklight was to allow for a highly customizable user experience, even within a single installation. In a blog post, Roy Tennant (2009) highlighted what he saw as the two most notable outcomes of this approach: object appropriate behaviors, or “the opportunity to treat each class of object differently, and therefore offer behaviors appropriate to that type of object,” and the ability to support specialized interfaces for particular audiences, because there remains “a variety of searching tasks that are not well-served by general purpose tools” - searching for music, or images, for example.

This approach almost certainly owes much to the collaboration at the University of Virginia between library staff and digital humanities faculty and staff that led to the evolution of Blacklight. The inspiration for development of Blacklight was drawn from Collex, a system for building digital collections and exhibits that can be searched and browsed, and which supports community building and interaction through Web 2.0 features like tagging, feeds, etc., used by the digital humanities community NINES (NINES, n.d.; Nowviskie, Sadler, & Hatcher, 2007). In their chapter “Adapting an Open-Source, Scholarly Web 2.0 System for Findability in Library Collections” Nowviskie, Sadler and Hatcher (2007) explain:

digital tools ... originating in scholarly projects (that is, from the community the Library has typically served) can feed back into our most fundamental cataloging and retrieval systems in illuminating ways ... the 2.0 versions of digital humanities and library science can (and should!) operate hand-in-hand in sharing novel approaches to issues of access and interpretation. (p. 61)

The diversity of purpose of Blacklight installations bears this out. WGBH’s OpenVault was previously mentioned, and provides access to a variety of media. North Carolina State University Libraries make archival collections available through their Historical State project. The UVA Art Museum Numismatic Collection highlights Blacklight’s flexibility in making data discoverable, providing access to images and detailed metadata for approximately five hundred ancient Greek and Roman coins; this project also showcases the ability to customize displays and searches based on content, as the facets (denomination, dynasty, deity) and data fields (mint, die axis) reflect the uniqueness of the collection (Sadler, Gilbert, & Mitchell, 2009, pp. 118-120).

There is a particular interest at Indiana University in expanding opportunities for discovery of our music and film/video collections, both those available in physical format and those available in digital (or streaming) format. For example, the Variations/FRBR project, a joint effort between the Indiana University Digital Library Program and the William and Gayle Cook Music Library funded by an IMLS National Leadership Grant, addressed issues relating to discovery for sound recordings and music scores (IU Digital Library Program, 2010). One appealing possibility opened up by discovery interfaces like

Blacklight is the ability to create customized search views based on a variety of criteria, including format. This can be observed in UVA's Virgo, which provides both a Music Search and a Video Search (University of Virginia Library, n.d.). The Music Search allows users to limit using standard facets, like language, and by facets specific to the subset of materials, like instrument. Enabling customized format views was a significant motivator in our decision making.

### *Multi-Campus Environment*

As mentioned earlier, Indiana University Libraries is comprised of multiple campus libraries as well as subject-specific libraries on several of these campuses (e.g. the William and Gayle Cook Music Library on the Bloomington campus). While all libraries share a unified catalog, some campus and branch libraries currently utilize different default search interfaces and limiters. The flexibility of Blacklight not only creates the potential for each campus or branch to individually set their own default interface but also to determine what information their users see in their catalog. While this is also possible with VuFind, the underlying architecture of Blacklight seems better suited to our interest in pursuing multiple customized views and for balancing priorities across our system.

### *Integration of non-MARC metadata*

Both VuFind and Blacklight are able to index non-MARC records. For example, Villanova University includes records for their digital collections in their VuFind catalog (Falvey Memorial Library, Villanova University, n.d.-b; Katz, 2011). As illustrated in the previous section on future-proof architecture, there are several instances of the inclusion of non-MARC data in Blacklight projects, including WGBH Open Vault and the UVA Art Museum Numismatic Collection.

## **Recommendation**

After compiling the criteria necessary for our new discovery layer and reviewing VuFind and Blacklight implementations, we had to make a difficult decision. While either open source candidate system was capable of fulfilling our requirements at a baseline level, the task force recommended Blacklight based on our assessment of its strength in the two areas we believe to be the most crucial to the long-term success of the project:

- The existence of a robust development community which prioritizes collaboration on a shared code base; and
- A scalable, flexible architecture that accommodates the multi-campus/multi-library structure of IU and has the potential to accommodate future needs.

Based on the unique characteristics of Indiana University, our collections, and anticipated future endeavors, Blacklight is the better choice for us due to its robust development community and its underlying architecture. Because we wanted the granularity that is available in Blacklight in order to highlight the diversity of our collections, and because we have the technical support for the development and modification of code, we believe Blacklight will best meet our institutional needs and expectations. Differently situated libraries may make a different decision, based on their own high-level priorities.

## **Next Steps**

The IU Libraries OLE Discovery Layer Task Force submitted its report in June 2011, and as mentioned, the full report with rubric is now freely available via IU Scholarworks, Indiana University's institutional repository (Greene et al., 2011). Implementation of the selected discovery layer will take place over the 2011-2012 academic year, with a transition to the new interface as the primary access point to our OPAC in summer 2012, still overlaid on our existing SirsiDynix ILS system.

Implementation of the Blacklight interface began immediately following the approval of the task force recommendation in summer 2011. The process of acquiring domain knowledge, articulating priorities and requirements, and assessing products with the end goal of making a recommendation was indeed a major undertaking. However, it pales in comparison to the scope and scale of implementing an extremely flexible and powerful indexing infrastructure with a highly customizable user interface in a way that not only meets the needs, but also satisfies the expectations of a broad range of user groups, internal and external. There is no unit, department, or staff member within a library whose work is not impacted by the library catalog, directly or indirectly. Our external users rely on the catalog for information about collections and for account services. Our internal users use the catalog in their daily work, whether their jobs are in technical or public services. These user groups have very different – and sometimes conflicting – needs that must be balanced. There are limitations of resources, and of the underlying system, which materially affect the project itself.

Indiana University Libraries is also experiencing an even larger, truly fundamental, transition to open source in the realm of our ILS and other business practices. This places us in a period of uncertainty as we begin implementation of the Blacklight interface of IUCAT on the core of our current SirsiDynix Symphony ILS, knowing that in as little as two years, implementation of the IUCAT interface for Quali OLE could require the same or additional effort on the part of developers, and library staff.

While there is every indication that Blacklight will maintain the same baseline functionality of our current system, a new OPAC interface is a major endeavor for any university, and has spurred much reflection on the part of the authors as to what exactly “discovery” is and whether any current system can fully solve the known problems facing libraries and their users in this area. Marshall Breeding wrote in his article “The Birth of a New Generation of Library Interfaces” (2007a) that, “A library interface that does not provide equal access to the content of [ejournal and ebook collections] stands incomplete in today's reality” (p. 35). On the other hand, arguments can be made for maintaining separate systems. Accurately calculating relevancy for data structured in such diametrically different ways has been acknowledged as a challenge in this area. Further, presenting a user interface that reflects the diversity of results, yet that can be interpreted by novices and experts alike, also poses a challenge to any unified system for discovery.

Almost all proprietary discovery layers include a centralized index of articles and other resources, access to a web service (often called an API) that retrieves and ranks results from multiple sources, or both. Inclusion of proprietary indexing data from vendors in an open source system is similarly dependent upon a vendor API; effectively negating the ability at this time to rely exclusively on open source products or data sources for this functionality. Any library that wishes to include such data would be required to enter into a contract with a vendor to obtain it. Therefore, while Blacklight is able to include non-MARC data within its indexes, it is not possible to index proprietary articles from aggregator and publisher databases at this time.

This stands as a major impediment to achieving all of the characteristics Marshall Breeding (2007b) describes in his influential *Library Technology Reports* on next generation library catalogs. However,

some libraries that have implemented an open source discovery layer like Blacklight or VuFind have rectified this issue by implementing a proprietary system alongside their catalog. An example of a library using Blacklight for their library catalog who has taken this approach is the University of Virginia, whose next generation catalog (called Virgo) displays results from ex Libris's Primo discovery product alongside catalog data within their discovery layer. This remains a possibility for Indiana University, though it means that our implementation of Blacklight must allow our multiple campuses to determine which proprietary system fits best for their mission. While the Bloomington and Kokomo campuses launched EBSCO Discovery Service in fall 2011, other campuses have not yet contracted with vendors.

## **Conclusion**

The rubric developed by the task force includes many of the generally agreed upon characteristics of next-generation discovery layers, as well as criteria that is specific to the needs of a large and diverse system such as Indiana University. Many of the criteria within the rubric will be relevant to other libraries who are investigating the acquisition of a new discovery layer, whether they are looking at open source or proprietary systems. When the Indiana University Libraries OLE Discovery Layer Task Force recommended Blacklight for the future interface of IUCAT, we did so taking into account the technical expertise and time necessary for a thoughtful implementation of a new system that could dramatically affect the outlook of our students, faculty, and staff on the service we provide. With this commitment of time and effort, we stand on firm ground not only to upgrade our current OPAC and implement the core functionalities and features as they have been defined in the task force's rubric, but also to continue moving toward better discovery for our users; without it, the decision to implement an open source system would not have been the best fit for our university. Other libraries that are investigating discovery layers will need to weigh the benefits of open source versus the technical expertise and time required to implement these systems.

We place our faith in our implementation team to fulfill the requirements, as defined by the criteria and rubric within our recommendation document, with the belief that the system is robust enough to allow us to achieve the desired outcomes. Discussion early in the selection and acquisition process to identify and prioritize high-level objectives is absolutely critical for any library investigating discovery layers and will help determine which system is best suited to fulfill those needs. In addition, discussions with other librarians who have already implemented the systems being reviewed can be incredibly useful in the decision-making process.

The characteristics of resource discovery in the library world are continually evolving, and it is necessary to not only work to catch up with the current commercial search landscape of Amazon, Google, and the like, but also to be able to adapt to new and upcoming functionality and features not yet foreseen. This will require us to completely abandon the idea of "business as usual" – or, as stated by Eric Lease Morgan: "The 'next generation' library catalog is intended to be an evolutionary development" (Morgan, 2006).

By definition, an evolutionary development both requires and enables a leap. As systems become more robust and their capabilities expand, libraries must take the opportunity to revisit questions about how we present ourselves and our services. We must continually seek out and explore new methods of providing, sharing and promoting access to our collections, resources, and services. The selection and implementation of Blacklight will move Indiana University Libraries one step closer to our goal of not only meeting the needs, but also exceeding the expectations of our users. We are on the path to better discovery.

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**Appendix A: Selected Criteria from Indiana University Libraries**

<b>Selected Criteria from Indiana University Libraries OLE Discovery Layer Task Force Rubric for Discovery Layers</b>		
	Blacklight	VuFind
<b>General Features &amp; Functionality</b>		
OpenURL compliant	Yes	Yes
Unicode compatible	Yes	Yes
Integrate non-MARC metadata from local collections	Yes	Yes
Allow the inclusion of other data sources	Yes	Yes
The ability to assemble custom views based on one or more descriptors or set of descriptors (location, format, etc.).	Yes	Yes
<b>Account Management &amp; Authorization</b>		
Guest access to search	Yes	Yes
Account management services and access to personal information (holds management, renewals, materials checked out)	N/A*	N/A*
<b>Export &amp; Sharing</b>		
Export records to citation software	Yes	Yes
Print/Email/Save function	Yes	Yes
Text call number & item data to major cell phone providers	Yes	Yes
Provide RSS feeds for searches, new titles	Yes	Yes
Generate properly formatted citations for major styles	Yes	Yes
<b>Search Functionality &amp; Results Display</b>		
Faceted searching	Yes	Yes
Suggests alternate spelling for a search in English (“Did you mean...?”).	Yes	Yes
Ability to sort search results by relevancy, call number, date published (descending or ascending), date received, author A-Z or Z-A, or title A-Z or Z-A.	Yes	Yes
Allow for truncation	Yes	Yes
Display item format (text, icon, etc.) on the search result screens and the bibliographic record.	Yes	Yes
Ability to move forward and backward using browser buttons through search result screens, browse result screens (if available) and bibliographic records.	Yes	Yes
Ability to perform searches that can be limited to criteria such as home location, classification scheme, type of medium, format, collection, language.	Yes	Yes

\* Reliant upon the underlying ILS