




ExLibris®
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**Driving Innovation
through Collaboration:**
The Primo Open Discovery Framework

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Introduction

Two years ago, Ex Libris embarked on a new project to redesign the user experience (UX) of the Ex Libris Primo® discovery solution, employing the latest technologies, in order to put it at the forefront of library services.

This process included a lot of testing, interviews and usability tests, as well as close engagement with Primo customers and the Primo Product Working Group. The detailed design process and ongoing collaboration with the Primo community were to verify that the discovery solution would meet the needs of end users and libraries via a modern web experience. A significant effort was put into tracking and analyzing the customizations and changes libraries made over the years to their classic Primo interface. Given the flexibility of Primo, we found that customers had introduced many valuable customizations and features.

The goal of the Primo UX project was to embed as many of these customizations and functionality changes as possible in the new Primo interface. The solution design was intended to allow maximum configuration flexibility for supporting additional customer-led innovation. Following research and evaluation of different solution design options, we understood that adding numerous customization options would eventually lead to a dead end. No matter how much development effort was invested, it would be impossible to support all the needs of different libraries.

Libraries are similar to one another, but they also have key differences. While at the core, libraries tend to have the same general objectives, they also have specific local processes, operate different tools, employ staff with different skills, provide different types of user services, have different academic directives, and so on.

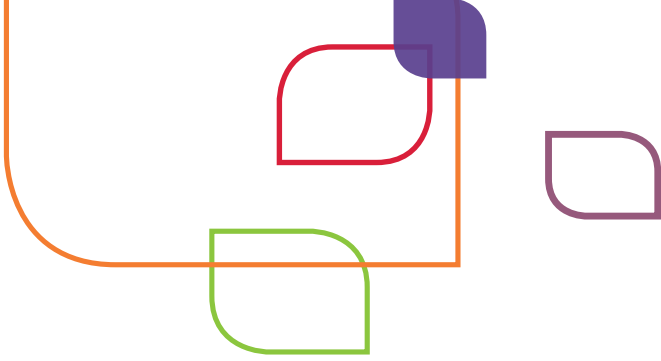
This white paper describes the novel approach we have developed for the new Primo user interface, its benefits for libraries, and why it can be expected to thrive especially in the strong Primo library community.

The Value of Community Collaboration

In today's world, collaboration can be a real asset. Development projects are often complex, need to be completed in short time spans, and require different types of expertise that are sometimes hard to find. So, as much as we may enjoy acting the superhero, it makes more sense to join forces for greater and faster success.

The library community is no different. However, while other organizations might be reluctant to cooperate, libraries have an inherent collaborative spirit, as well as long experience in leveraging mutual strengths to the benefit of the entire community. The advantages of such collaboration are well known – each library efficiently leverages its own skills and manpower, while also drawing on the strengths and knowledge of peer libraries.

Libraries cooperate in various ways: membership in organizations such as ELUNA and IGeLU, participation in library and technology customer community events, exchange of ideas and knowledge via product



listservs, collaborative forums and voting processes to influence product roadmaps, and so on. These types of activities are essential to creating an engaged and active library community, and for collaborating with vendors to make sure that libraries' needs are well addressed.

Yet, other than general-purpose platforms for the exchange of knowledge and code, there are limited tools to help libraries be more efficient in their collaborative development efforts.

When it comes to resource discovery, libraries have much in common, as they all serve patrons with similar needs. At the same time, in many cases libraries have unique user services, special collections to promote, distinctive workflows, and other peculiarities. And some libraries simply do not want to be completely dependent on their vendor's prioritization of development and plans, or they wish to advance without waiting for market maturity for certain features.

Not all libraries can put effort into developing and extending their discovery service, no matter how much they need or desire it. This is where the unique nature of the library community comes into play, as developments by one library can serve the entire community.

What is needed is a good framework for facilitating such collaborative development.

Customization, Configuration and What's in Between

One of the main challenges for software companies is to provide the best out-of-the-box functionality and design, while still allowing customization of the application to help customers make the product their own. This challenge is particularly daunting, as customizations must be manageable by the customer and not "break" when the core product is updated.

The existing technology options fall within a wide spectrum. On one end, very strict configuration screens where the administrator is given the option to choose different features and themes (the WIX web development platform is an example of such an approach). On the other extreme, open source technology allows users to manipulate the product for their own needs with no limitations, at least in theory.

The first approach (strict configuration screens) makes it easy for vendors to manage customizations, but considerably limits the extent of possible customer adaptations. The opposite approach (open source) often fails to deliver on its promise as such projects tend to suffer from high complexity, insufficient resources, and lack of clear product direction.

A New Approach: The Open Discovery Framework

At its core, an open framework is based on the idea that a full running application, with all the important functionalities, can also have unlimited options for extending its services, functionalities and design.

In the initial phases of designing the Primo framework for customization, a framework we wanted to be open to all, we explored the option of a customization menu with many different skins and features. However, through investigation and ongoing feedback from the Primo user community we learned that the variety of potential customizations is too great for a defined menu options. This brought us to the understanding that, instead of limiting customization options, we needed to provide a mechanism that allows manipulation of every element in the application, alongside consistent product upgrades that will not “break” user customizations.

The Primo Open Discovery Framework aims to meet this need by allowing libraries to extend or customize Primo with the minimum possible effort, by coding only the specific element they want to add. This open framework approach provides customers with a full discovery system based on state-of-the-art technologies and a modern user interface, which customers can still enhance and make their own.

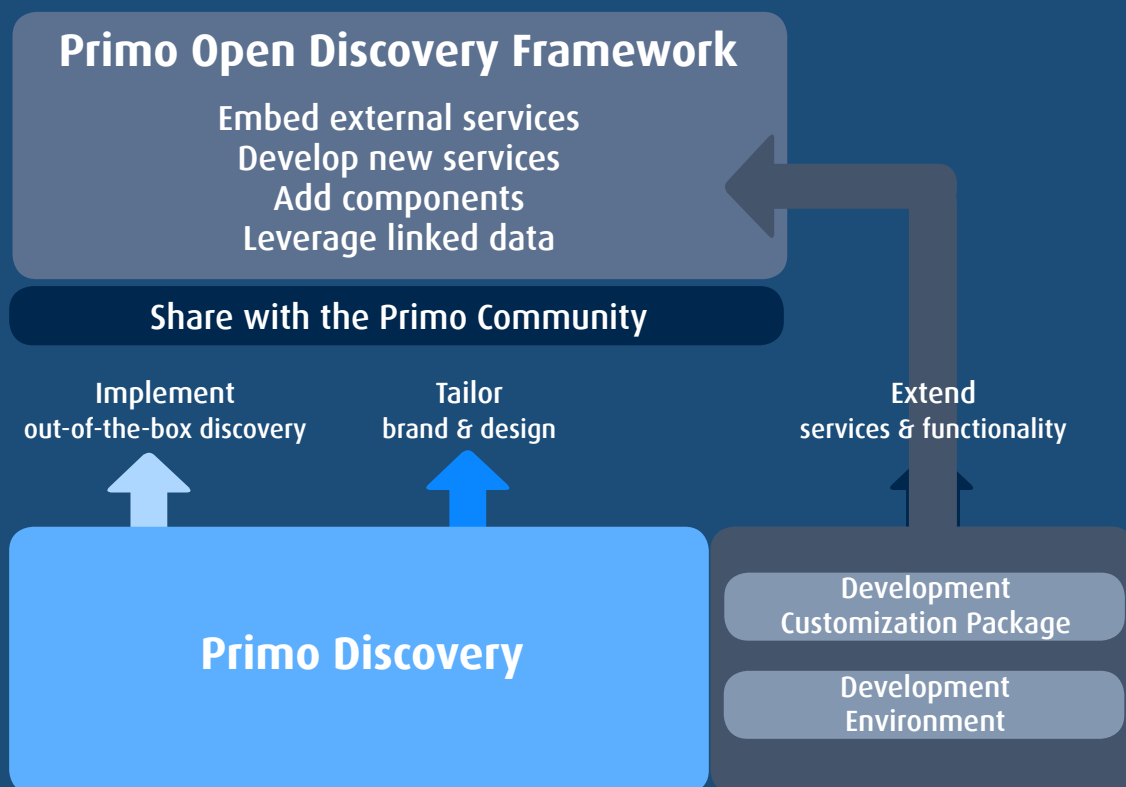


Figure 1: The Primo Open Discovery Framework

Such flexibility can also be found in open source projects; however, there are major differences between the two approaches. An open framework approach allows customers to benefit from a strong, fully functional solution from start, ongoing application support, well-maintained infrastructure, reduced in-house development costs, and greater certainty regarding the future direction of the product.

Open Framework: Technology and Design

To meet the challenges of providing a customizable application that is also manageable in the long term (i.e., maintained and enhanced through periodic product releases), it was necessary to find the right technology.

The key criteria that guided our technology selection were:

- A clear separation between the product code and the customization code
- Customization code that utilizes the product data model
- Technology backed by a leading industry company
- Supported by many UI frameworks (Bootstrap, ionic and angular material, etc.)
- A framework supported by all browsers and screen sizes

JavaScript can be used to easily accomplish client-side customizations, by manipulating the DOM (Document Object Model); however, as the DOM is not maintainable and might change frequently, JavaScript alone does not answer the above criteria.

For this reason, we created ID elements (which we call “prm-after”), which are actually placeholders that enable customers to add or override existing client-side components. Based on these guidelines and considerations, we came to the conclusion that AngularJS is the best-fit technology for the Primo Open Discovery Framework.

Framework Design

The selected design of the Primo Open Discovery Framework is based on three main components:

Primo Client: The Primo Client includes placeholders for most application elements. These placeholders are actually IDs that allow library developers to add features or override existing elements in the client. By using these IDs, libraries can ensure that their customizations will not be affected by upgrades.

Primo Development Package: The Primo Development Package allows users to configure all client-side elements, including:

- CSS
- Images
- HTML
- JavaScript

By using the standalone package customers can track their versions and share specific features or their entire set of customizations with others as a single package.

The customization package can also be used to facilitate the work of a consortium administrator or central office. In such environments, which have centralized administration of multiple libraries, the Primo Development Package can be used to create a common version of Primo, while allowing each library to make its own changes and customizations.

The development package can be downloaded from the Primo Back Office or from GitHub (<https://github.com/ExLibrisGroup/primo-explore-package>).

Primo Development Environment: The Primo Development Environment lets libraries develop customizations using the same tools that Primo developers do. They are able to change and extend the Primo client-side code using a proxy, enabling them to see their revisions running in any environment they choose, with no need to upload or deploy. This mechanism allows library developers to write and test their enhancements against their production environment without exposing changes to users.

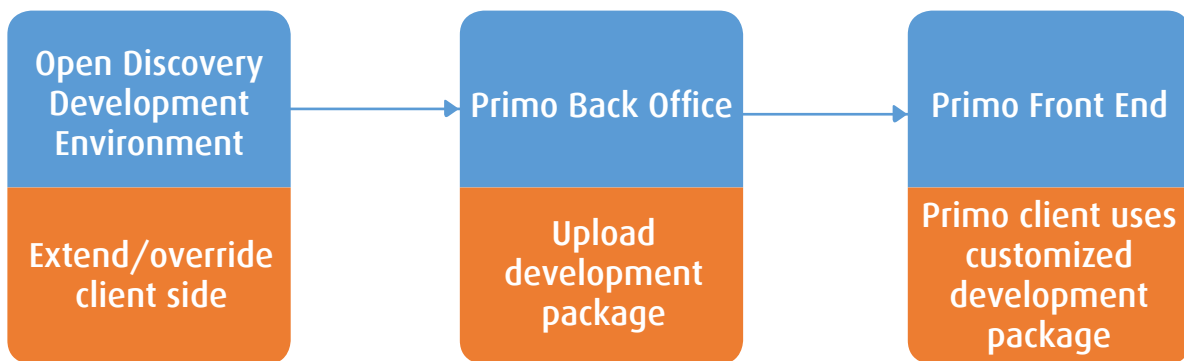


Figure 2: Framework Design

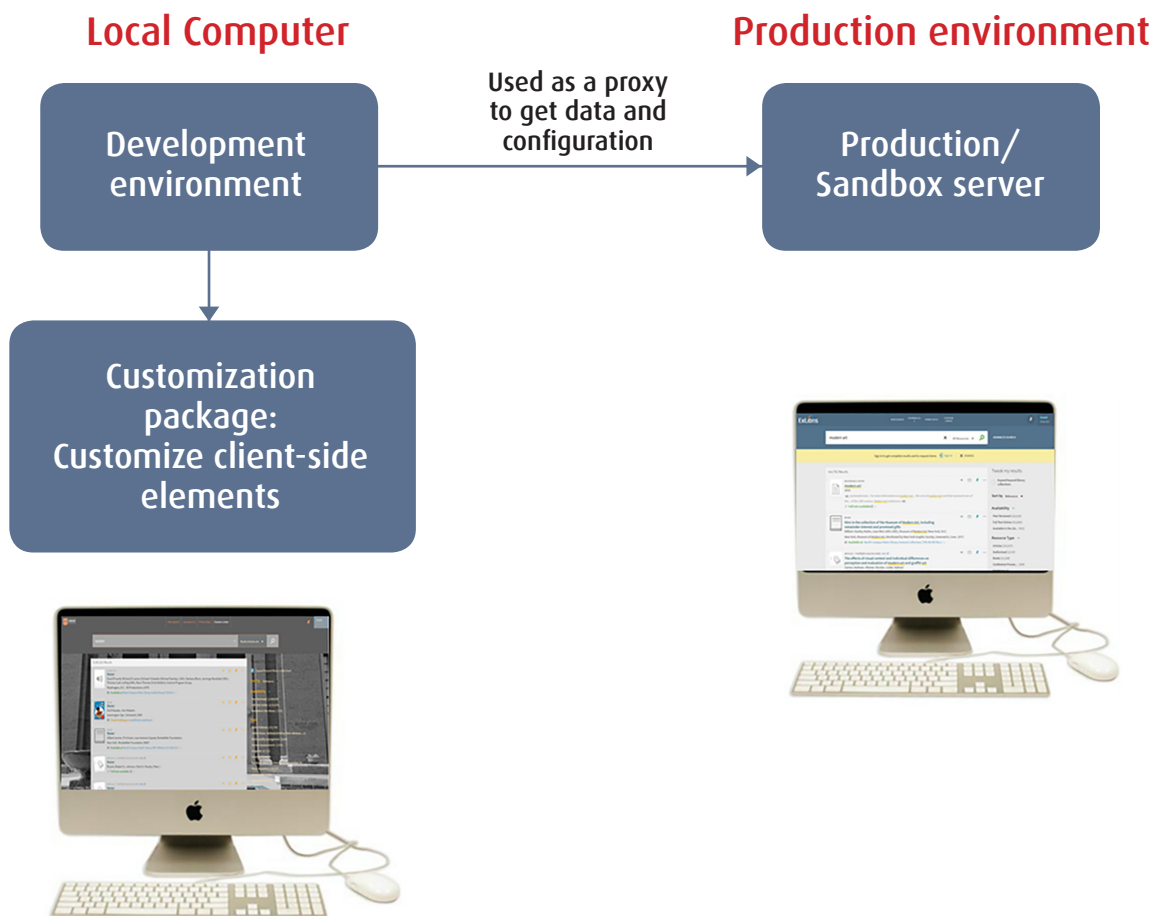
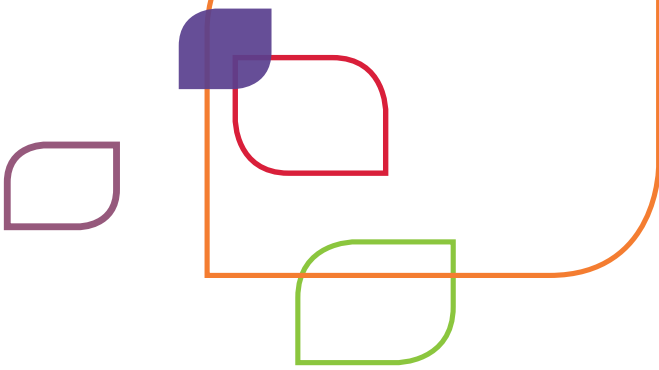


Figure 3: Develop locally without impacting the production environment



Once the environment is downloaded and installed (a one-time installation), the proxy environment is configured and coding can begin.

```
var SERVERS = {  
  local: 'http://localhost:8002'  
};  
  
/*Note that for SSL environments (https) define the server as: var PROXY_SERVER = https://your-server:443*/  
var PROXY_SERVER = 'http://primo-demo.exlibrisgroup.com:1701/';
```

Figure 4: Working with the Primo proxy environment

After coding, the changes and enhancements can be seen on the local server, but the production environment will not be affected until actual deployment.

The development environment is available on GitHub (<https://github.com/ExLibrisGroup/primo-explore-devenv>).

Leveraging the Framework: The Primo Community in Action

Even though the Open Discovery Framework is a new approach for Ex Libris, as well as for the Primo community, it has managed to obtain significant traction since its launch. As of the Primo August 2016 release, when these capabilities were first introduced, we have seen a great deal of code contribution and engagement from the Primo community. A key factor in this success was the collaboration with the Primo Product Working Group and the leading role this group took in engaging Primo customers and explaining the benefits of the new approach.

The first initiative for leveraging and cooperating around the Open Discovery Framework was the Primo Hackathon – a four-day virtual conference featuring live sessions (via YouTube) and recorded videos – initiated by ELUNA/IGeLU user groups, with Ex Libris participation. Daily sessions were led by customers, Ex Libris developers and Ex Libris product managers. The sessions covered various aspects of the new framework, including code customization, design of new features, service page customization, Primo’s new UI roadmap, and more.

The Primo Hackathon sessions are available for review here:

Day 1: Working with the open development framework to customize CSS

Day 2: Intro to JavaScript customization and design recommendations for new UI features

Day 3: Customizing the Services page and extending the application

Day 4: The Primo roadmap and lightning talk

The Primo Hackathon drew over 350 participants, with more than 60 files and code snippets shared via Slack (which is still available and actively maintained).

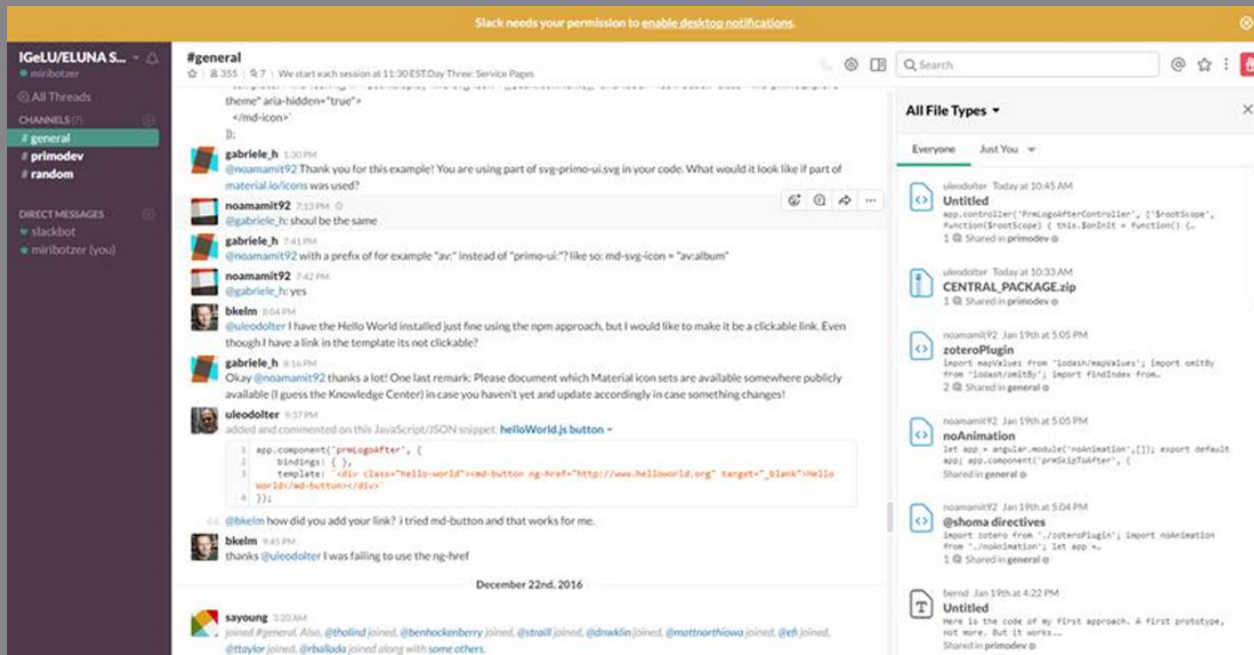


Figure 5: The Primo Hackathon on the Slack platform

A lot of the customization code can be found on the Slack platform, but we see more and more customers adding new features and sharing their code on GitHub. Below are a few examples of developments in the Primo Open Discovery Framework.

Search tips

Developed by: The Royal Danish Library

Goal: Add search tips to help patrons perform effective searches

Code on GitHub: <https://github.com/Det-Kongelige-Bibliotek/primo-explore-rex>

See live example here

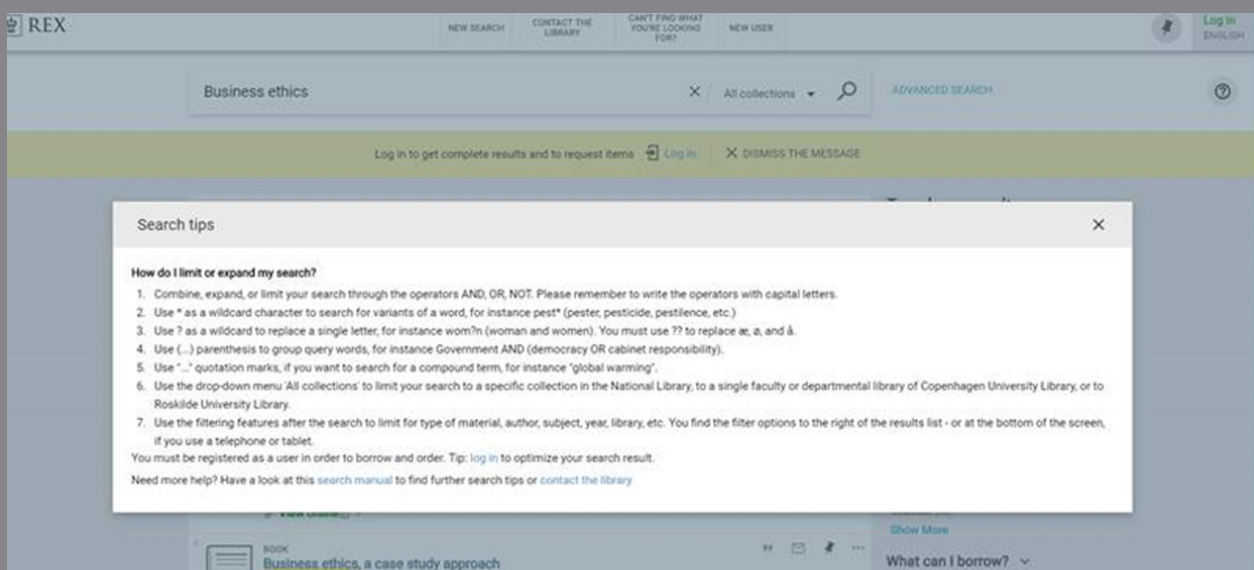


Figure 6: Enhancing the discovery experience with search tips, The Royal Danish Library

Altmetrics

Developed by: The Royal Danish Library

Goal: Enrich discovery by embedding the Altmetrics widget in Primo record pages

Code on GitHub: <https://github.com/Det-Kongelige-Bibliotek/primo-explore-rex>

See live example [here](#)

TOP Details

CITATIONS **Title** A Citation Analysis of Business Ethics Research: A Global Perspective
Is Part Of Journal of Business Ethics, 2016, Vol.136(3), pp.557-573
SEND TO **Language** English
VIEW ONLINE **Author** Chan, Kam >
Fung, Anna >
Fung, Hung-Gay >
Yau, Jot >

DETAILS **Subjects** Business ethics journal ranking >
School ranking >
Global pattern of business ethics research >

ADDITIONAL SER **Description** This study provides a global perspective on citations of articles published in ten business ethics journals between 1999 and 2012 and establishes three findings. First, the results indicate that Journal of Business Ethics and Business and Society are the two top business ethics journals based on the distribution of normalized citations received. Second, although North America, particularly the US, remains the top producer of business ethics research, it has been surpassed by Europe in terms of weighted normalized research citations received in 2012, implying a potential diminishing global role of US influence in business ethics research over time. Third, the top-ranked US institutions have reduced their business ethics research impact in recent years, while the European institutions have sharply increased theirs.

Identifier ISSN: 0167-4544
E-ISSN: 1573-0697
DOI: 10.1007/s10551-014-2533-9

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Links

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14

- Picked up by 2 news outlets
- Tweeted by 1
- 31 readers on Mendeley

Figure 7: Embedding Altmetrics in a Primo record page, The Royal Danish Library

Ask a Question widget

Developed by: Leeward Community College Library

Goal: Facilitate communication with librarians directly from the search page

See live example [here](#)

LEeward COMMUNITY COLLEGE LIBRARY **OneSearch**

NEW SEARCH E-JOURNALS A-Z LIBGUIDES CLASSIC CATALOG LIBRARY HOME HELP

Search anything Books, Articles & More - Leeward ADVANCED SEARCH

Guest ENGLISH

What is OneSearch?

OneSearch is a research tool that lets you search for information from most of the information resources available to users of the Leeward Community College Library.

The Basic Search:

- Books, Articles & More - Leeward** finds books and other materials in the Leeward CC Library collection, as well as e-books and periodical articles from the library's research databases.

Other available searches:

- Books & Media - Leeward** finds books, e-books, videos, and other materials in the Leeward CC Library collection.
- Books & Media - All UH** searches the collections of all University of Hawai'i system libraries, periodical article sources, the Trust Territory of the Pacific Islands Archives.

Does OneSearch include all available library resources?

No, it does not include some of our specialized research databases, and some content from our general-coverage periodical databases (details). For the library's full selection of research databases and online resources, see our A-Z Databases list.

Looking for information about the Leeward CC Library?

Ask a Question

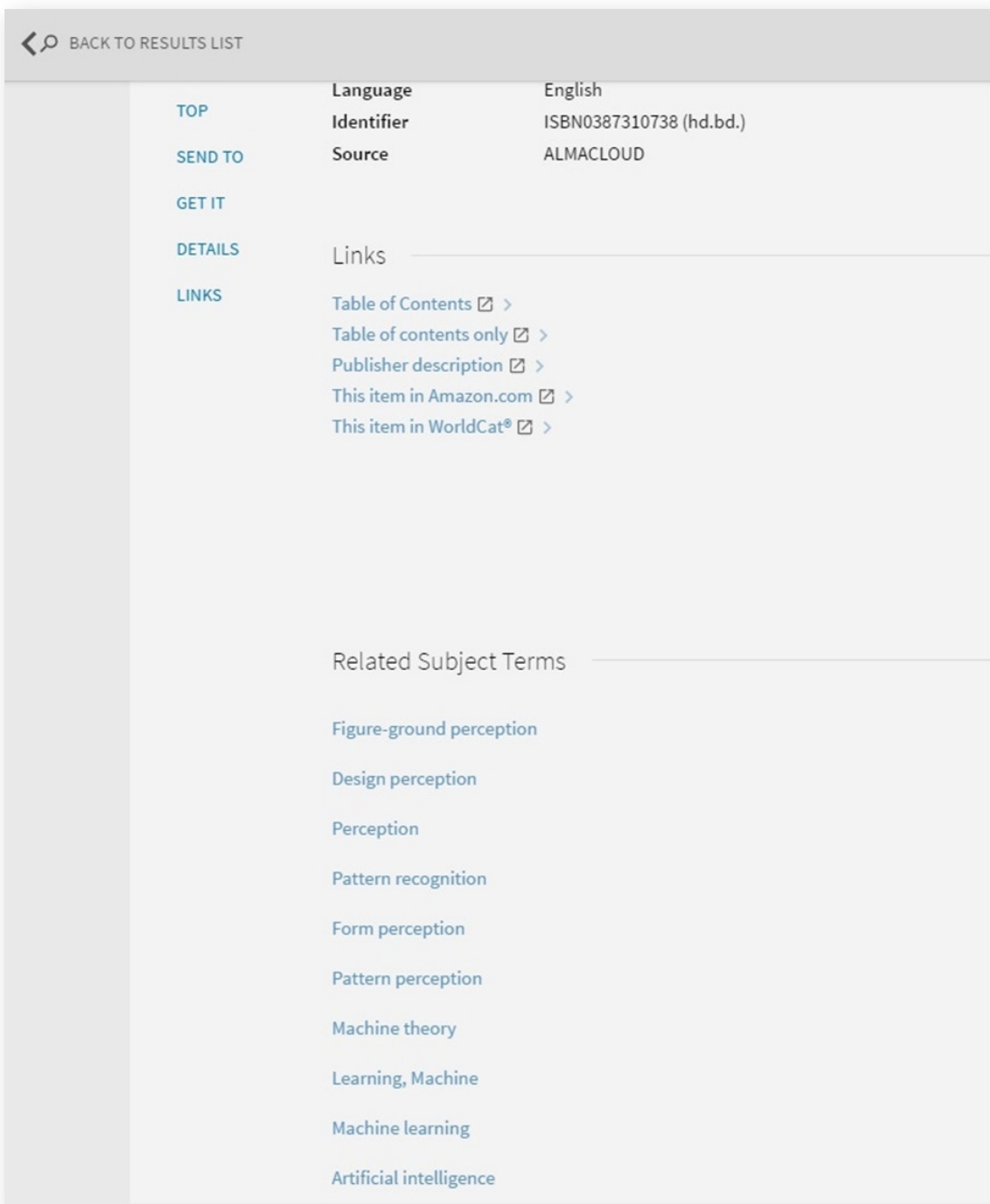
Figure 8: Ask a Question widget, Leeward Community College Library

Enriching record metadata through Linked Open Data

Developed by: Primo developers

Goal: Facilitate the addition of information to Primo via the Linked Data widget

Code on GitHub: <https://github.com/noamamit92/primo-explore-linked-data-demo>



The screenshot shows a Primo record page with a left sidebar and a main content area. The sidebar contains navigation links: TOP, SEND TO, GET IT, DETAILS, and LINKS. The main content area displays metadata for a record with the following details:

Language	English
Identifier	ISBN0387310738 (hd.bd.)
Source	ALMACLOUD

Below the metadata, there is a section titled "Links" with the following items:

- Table of Contents [☑ >](#)
- Table of contents only [☑ >](#)
- Publisher description [☑ >](#)
- This item in Amazon.com [☑ >](#)
- This item in WorldCat® [☑ >](#)

Further down, there is a section titled "Related Subject Terms" with the following terms:

- Figure-ground perception
- Design perception
- Perception
- Pattern recognition
- Form perception
- Pattern perception
- Machine theory
- Learning, Machine
- Machine learning
- Artificial intelligence

Figure 9: Adding related subject terms through Linked Open Data

Boston University customizations

Developed by: Boston University

Goal: Share Boston University's customizations for the new Primo UI

Code on GitHub: <https://github.com/bulib/primo-explore-bu>

[See live example here](#)

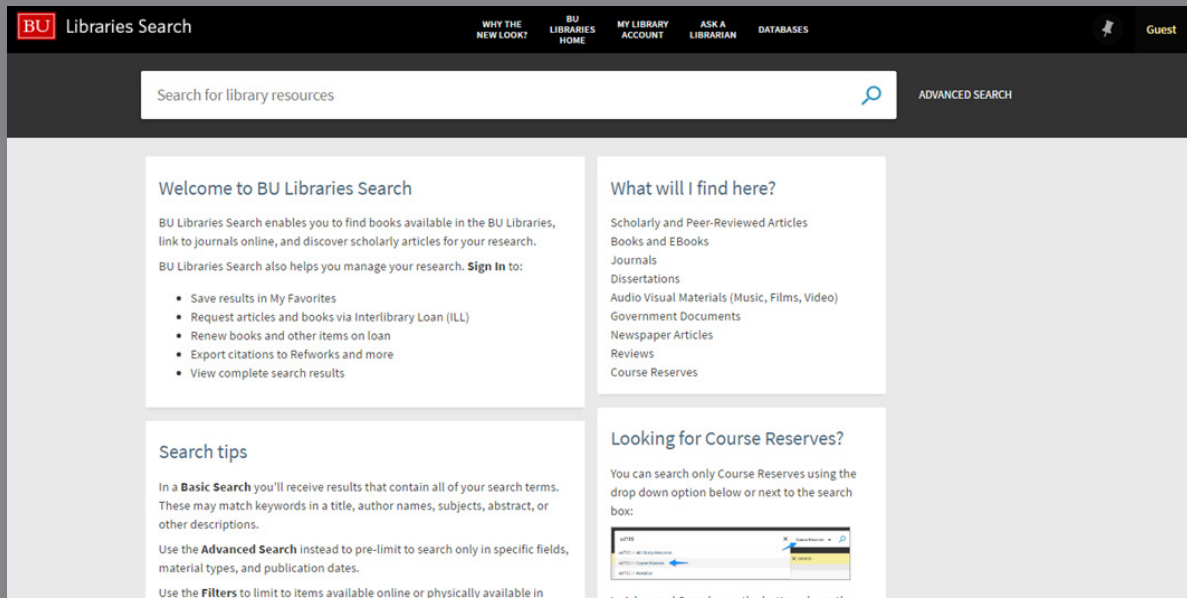


Figure 10: Boston University customizations

Simple Domain Object Model for the new Primo UI

Developed by: KU Leuven

Goal: Simplify access to client-side elements

Code on GitHub: <https://github.com/mehmetc/primo-explore-dom>

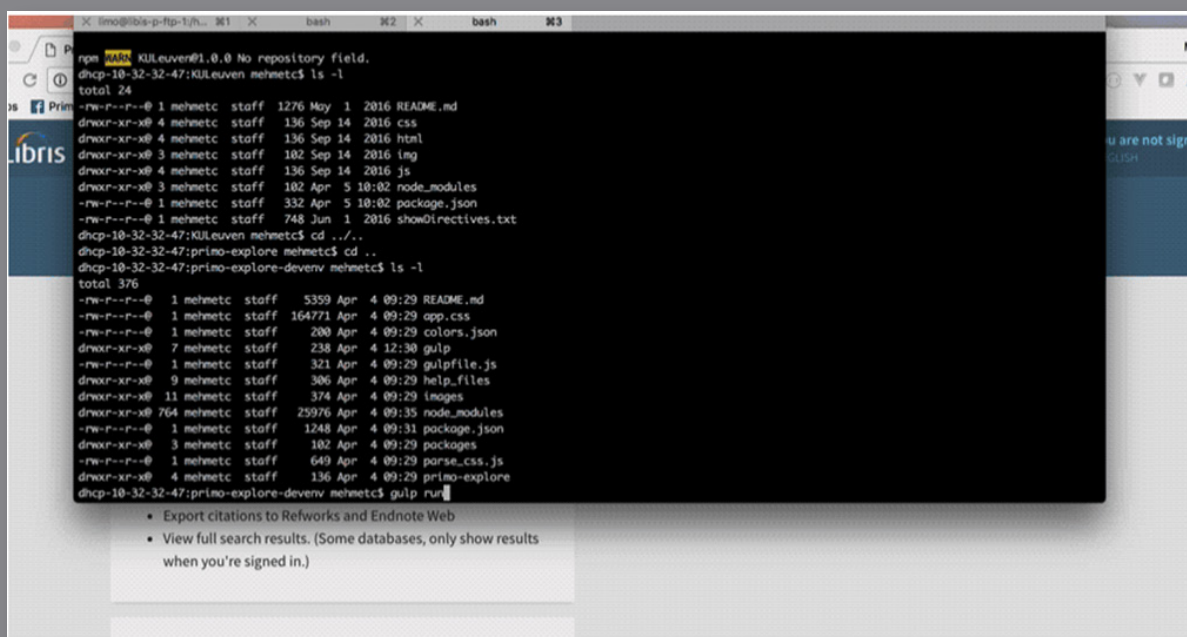


Figure 11: Simple Domain Object Model for the new Primo UI

Conclusion

The Primo Open Discovery Framework takes library collaboration to the next level, as it presents a new model of vendor-community cooperation. As always, libraries can implement the Primo out-of-the-box version, a feature-rich discovery solution, to provide their users with advanced services and a superior user experience. But now they can also choose to extend Primo through in-house development and by leveraging developments of the Primo community.

This approach allows library developers with Angular and CSS knowledge to extend the new Primo UI capabilities, develop additional functionalities, adapt the UI design, and connect Primo with external services. Such customizations and extensions can be shared with the Primo community, so other Primo users can enhance their own systems with no extra effort.

This smart collaboration mechanism allows for fast product innovation and cost-effective development efforts, as well as contribution to, and influence over, the product roadmap.

As more and more Primo customers adopt the new Primo UI, and take part in developing new enhancements to it, we are bound to see an accelerated flow of innovation made available to the entire Primo community.

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