

Be realistic, demand the impossible: Comparison of 4 discovery tools using real data at the EPFL Library

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1. Introduction

Resource discovery tools are becoming more and more usual in academic libraries (1). This evolution reflects the mutation of libraries themselves. In particular, libraries are progressively less concerned with the accumulation of documents but more focused on providing access to the information that students and researchers need, regardless of the origin and document format. The EPFL Library is no exception, and its current venerable OPAC (*Online Public Access Catalog*) is no longer adapted to this task. Hence, at the end of 2010, taking advantage of the availability of attractive new discovery tools on the market, we started looking for a successor.

Choosing the best tool depends greatly on the local context. In this report, we tried to expose the strengths and weaknesses of the current offering in discovery tools, and what they would mean for our own library. Obviously, it would be risky to generalize our findings. This document is not meant as a definitive judgment on the merits of each tool *per se*, but as an effort to share our findings with other librarians and provide constructive feedback to the software vendors. Furthermore, we need to emphasize that the market is evolving constantly. Thus our report must be seen as a snapshot, that should be re-assessed for future evaluations.

Clearly the OPAC service is critically important for the library and its users. It determines how effectively a patron will search through the existing resources: an attractive interface, an efficient search capability and simple work-flows are crucial in this perspective. Intended as the virtual gateway into the library, the OPAC eventually affects the usage of its resources, which is the ultimate measurement of their usefulness. Thus our first goal was to find a replacement solution that would enable patrons to explore all of our information resources through a modern, user-friendly interface and subsequently obtain as many relevant documents as possible. This new tool should enable a user to quickly identify, locate and access the relevant documents, either print or digital, through a seamlessly integrated delivery service.

The OPAC is also a strategic asset in the library's communication with the outside world – whether it's a patron asking for a book at the reference desk, a researcher interested in a new topic or a prospective student considering an academic move while surfing the Internet on her mobile phone, the library's online image is always at stake. Therefore, it needs to be in full control of its OPAC and be able to constantly adapt it to its needs. This is currently not the case at the EPFL library and to gain access to a locally configurable interface was another important goal of this project.

To this intent, a set of basic requirements for a replacement product was defined:

- Simultaneous search through multiple data sources (library catalogues, article databases, etc.): this is arguably the minimum requirement distinguishing discovery services from OPACs.
- Global search index instead of federated searches: the inherent weaknesses of federated search, such as performance limited by the slowest sources, deduplication problems, and so on, are well-known (2) (3).
- Hosted instead of local installation: our human resources for IT are limited (2.5 FTEs), outsourcing the day-to-day system administration tasks enables us to focus our activities on our web site, link resolver, institutional archive, and so on.

But a modern discovery tool should go beyond these requirements, matching both the needs of demanding users and the dreams of librarians. With that in mind, we compiled the list of features our ideal discovery tool would offer (in order of importance):

- 1) First and foremost, it should enable our users to explore the full extent of the library resources, and offer relevant content from outside these resources (*content and relevance*).

- 2) It should offer simple and powerful search capabilities (*search functions*).
- 3) Search results should be displayed in an attractive way and allow the user to interact efficiently with them: direct access to online resources, check-out of print documents, convenient display of possible search refinements, and so on (*results view and manipulation, subsequent results use*).
- 4) End users should have access to a number of customization options (*user account*).
- 5) It should remain simple from a system administration point of view (*administration*).
- 6) Finally, various functionalities specifically tailored to librarians should be available: expert search, easy linking, statistics, and so on (*professional interface*).

Four contestants meeting the basic requirements were available at the start of the project:

- EBSCO Discovery Service (EBSCO)
- Primo Central Total Care (Ex Libris)
- Summon (SerialsSolutions-Proquest)
- Worldcat Local (OCLC)

The requirements for a global search index and a hosted solution led to the exclusion of free software solutions such as Blacklight or VuFind. Indeed, sustainably maintaining them would involve too many of our limited IT resources and the creation of a global index is prohibited by the licensing terms of our electronic products.

To ensure that the chosen product would effectively take full advantage of our existing resources and to make the test as realistic as possible, we requested a full-scale trial of all four above products, including the real-life resources currently available to our patrons. Happily, the product vendors understood our contents and they all agreed on taking part in our test.

As a point of comparison, the four candidates were evaluated against the Swiss meta-catalog *Swissbib*, a state-of-the-art OPAC that is already available to our users. Since *Swissbib* does not include an index of articles, Google Scholar was used in parallel as a comparison.

Local context

EPFL is one of the two Swiss Federal Institutes of Technology, located in the Western, French-speaking Switzerland. Its 8400 students and 4400 collaborators are divided into 5 schools (Architecture, Civil and Environmental Engineering; Computer and Communications Sciences; Basic Sciences; Engineering; Life Sciences) and 2 colleges (Management of Technology; College of Humanities).

The mission of the EPFL Library, with its staff of 33 FTEs, is to provide the EPFL community and the general public with a high-quality access to information in the institution's study and research areas. To achieve this goal, the library offers a mostly open-stack physical collection of 500'000 volumes, as well as online licenses to 14'000 scholarly journals and 40'000 e-books.

The EPFL Library is a member of the NEBIS library network, which joins the collections of 85 libraries throughout Switzerland into one single union catalog of 4.2 million records (4). NEBIS uses a central server running Aleph (Ex Libris) as its integrated library system (ILS). Books, print journals and individually purchased e-books are normally catalogued into NEBIS. Users can search the catalog through an Aleph OPAC designed in the late 1990s. A new OPAC based on Ex Libris's Primo version 2 was launched in 2010 by the NEBIS central office, but it does not meet the basic requirements for the discovery service mentioned above. The ILS and both OPACs are administered at our sister institution in Zurich, ETH Library.

At EPFL, two catalogs have been developed locally to deal with electronic journals and e-book packages. Compared to the NEBIS union catalog, they allow a more flexible management of

licensed titles and easier updates to quickly reflect the evolution of our subscriptions and changes in package contents.

The EPFL library also subscribes to a number of bibliographic and factual databases. These databases, as well as the NEBIS OPAC, are connected to licensed resources through a link resolver hosted at the ETH Library, using Ex Libris's SFX.

The desired outcome of our study was to find a solution to integrate as many of these tools as possible into the new single interface.

Methodology

With the assistance of the solution vendors, we implemented the products under real conditions with as many resources as possible from our catalogs, journal and database licenses, beginning in February 2011.

During the set-up phase, the project workgroup members were asked to define their idea of a perfect product, creating a broad set of (possibly unrealistic) criteria against which the tools should be tested. The resulting wish lists were compiled according to the 6 main groups of features mentioned above, yielding systematic evaluation sheets that are presented in the Appendix section.

After completion of the implementation phase (server setup, loading of the library catalog and online resources), where each product was assigned to one specific collaborator, the workgroup members individually tested all products using the evaluation sheets.

Our original planning called for the parallel testing of all products over a three months period during the 2011 Spring academic semester. To gain input from our core public, various focus groups were expected to participate in the testing process. Undergraduate students would be asked to solve selected problems individually. Graduate students representing various doctoral programs would perform searches relevant to their respective subjects. Librarians outside the workgroup would also perform their own evaluation and provide further technical insight. Finally, a less formal test would be freely offered to all members of our university, as well as other interested parties in Switzerland in a spirit of regional cooperation. The test was meant to be as open as possible.

Unfortunately, it quickly became obvious that all products suffered from a number of critical shortcomings. Despite a close collaboration, vendors were not able to solve the problems in time for the intended testing period. The raised issues were deemed serious enough to force us to cancel the extended testing phase. Consequently, the tests were finally conducted only by librarians from within our institution, over a shorter period and on incomplete sets of data.

At the end of the testing phase, the vendors were given the salient points of the evaluation of their product. They were then able to respond to our comments and cleared away any unjustified criticism caused by misunderstandings on our side. A close collaboration with the Swissbib team also enabled us to gain more insight in our comparison results.

In the present document, we report the main findings of our evaluations after taking the vendors' responses into account, with an emphasis on the content and relevance issues. For each product, we present the features that proved to be decisive, whether positively or negatively. The final outcome of our evaluations considers all tested features as presented in the Appendix section, weighted according to the order of importance presented above.

Technical aspects are discussed when deemed relevant to other institutions attempting the implementation of one of the considered products.

2. EBSCO Discovery Service

Released at the beginning of 2010, EBSCO Discovery Service (EDS) harvests metadata from both internal (library) and external sources (e.g. databases available on the *EBSCOhost* platform) to build a pre-indexed set of metadata that can be searched efficiently (5).

Library data (bibliographic records and local holding information) from the full NEBIS catalog were delivered to EBSCO in MARC XML format. Electronic resources were declared in a Microsoft Excel spreadsheet containing the names, providers and access URLs of all licensed packages at EPFL, together with an export of our SFX knowledge base. The resulting EDS installation was then tested between July 18 and September 20, 2011.

Figure 1: Results of a search on EDS (item and library information are highlighted in red).

Content and relevance

Its central bibliographic index is one of the strong selling arguments of EDS, built on the well-established data available on the *EBSCOhost* platform. Our test queries quickly confirmed it, at least as far as journal articles are concerned. For most queries, a large number of relevant hits was returned, with sources distributed among several of our subscriptions. Unfortunately, the situation with e-books was less satisfactory. For example, the e-book packages *ProQuest Safari Tech Books* and *CRCnetBASE* were not included in the index. As these two packages account for almost half of our e-books, it was a significant problem for us.

The content gaps in the EDS index are partly addressed by an optional federated search functionality. However, the practicality of this option failed to convince us, as it requires users to explicitly select which extra resources are to be searched. This obviously implies that they have

to know which specific resources could be relevant for them. The added value of a discovery service should be to free users from having to make this kind of choices. Furthermore and as pointed out in the Introduction, federated search considerably slow down the searching process.

The screenshot displays the EPFL Library search results page. At the top, the navigation bar includes 'New Search', 'EPFL Library', and a menu with 'Sign In', 'Folder', 'Preferences', 'Language', 'Ask-A-Librarian', and 'Help | Exit'. The 'Folder' menu item is circled in red. Below the navigation bar, the search bar shows 'carey organic chemistry' with a 'Search' button. The results page shows three items, each with an 'Add to folder' link circled in red. The first item is an eBook titled 'Organic chemistry' by Francis A. Carey, with a call number 'GS 20831' and availability 'ZB (Zürich) Freihand 02 - frei zugänglich, 2.UG'. The second item is a book titled 'Organic chemistry' by New York McGraw-Hill, with a call number 'T 35036' and availability 'A 28/140 days: ETH-BIB (Zürich) Magazin'. The third item is a book titled 'Organic chemistry' by Francis A. Carey, with a call number '1229 S. III.' and availability 'Multiple Locations'. The right sidebar contains an 'Integrated Search' section with various collection checkboxes.

Figure 2: "Add to folder" command in EDS and the folder access link.

Strengths

Availability information

Finding a book on shelf is of course an important part of the discovery process for printed documents. EDS was able to take advantage of the MARC XML data exported from our catalog to display accurate availability details, such as the return date for checked-out items, next to the call number (see Figure 1). This important feature makes the use of print collections more efficient as it saves users the frustration of walking to a empty shelf. Nevertheless, the way in which the availability information is displayed in EDS could be improved for visibility.

Advanced search

Although studies have shown that only a minority of users take advantage of advanced search functionalities (6), the situation might be different with discovery tools such as EDS, where a larger bibliographic universe is made visible. In any case, we as librarians were happy to note the availability of a rich set of Boolean operators and field codes, allowing the elaboration of precise queries.

Weaknesses

Faceted navigation

Faceted navigation, made popular by various well-known online applications such as amazon.com, is generally available in modern library discovery tools as well, and EDS is no exception. However, this functionality is unusually implemented in EDS as a cumbersome two-step process: first the desired facets have to be selected, then confirmed with a second click. After our tests, EBSCO announced a forthcoming update that will remove the confirmation step.

We noted another weakness of EDS's faceted navigation, although perhaps less serious. Like many other information retrieval systems, EDS automatically saves a history of the queries entered during a work session. These queries can then be recalled and modified by the user, typically to change one or more keywords. Unfortunately, EDS apparently only remembers text queries and not the selected facets. This means that in order to perform a modified search using the same facets, a user would have to remember all of them and apply them manually all over again.

Natural language searching

EDS offers an interesting natural language searching functionality called *SmartText* that is available as an option to the user. Unfortunately, we found it to be poorly documented. The EDS online help on this topic is closer to a sales pitch than any usable information as to why one document would be rated higher than another. A better explanation is available on the EBSCO support web site (7), but it also lacks many details that would be useful to librarians for teaching and promotion purposes. For example, the support web site states that '*SmartText Search takes the chunk of text entered into the search box and first runs it through a sophisticated summarizer, pulling out all the main words/phrases in the chunk of text*'. This might satisfy a casual user but it is unfortunately inadequate for information professionals.

Results manipulation

After a search, users can save interesting or relevant results into a personal folder. From this folder, they can then send the references by e-mail, store them into a bibliography management tool, save them to a file, etc. EDS makes saving references into the user's folder a mandatory step in this workflow, which at first appears unduly complicated. However, after further examination this did not turn out to be a problem. Indeed, a single click is enough to save a result into a folder, which makes it simple to prepare a list of references (possibly scattered over several pages of results) for future processing. No further confirmation or specific command is required, so fewer clicks are actually necessary to put new items into the folder than in other systems that treat saving/exporting/e-mailing as an action performed over a selection of search results. Nevertheless, accessing a different part of the interface (the personal folder) can still be seen as a complication in comparison with other tools (see Figure 2 for the positions of the "Add to folder" command and personal folder on the interface). Deciding which workflow works best for each user will largely be a matter of opinion, based on personal habits and tastes.

Mobile interface

Although we appreciated the availability of a version of EDS dedicated to mobile devices, we found it not convenient to use. For example, simultaneous searching of the library catalog (NEBIS in our case) and the EDS index was not available in the mobile version during our test. According to EBSCO, this feature will become available in the near future.

Circulation

Ideally, the desired discovery interface should offer circulation functionalities to the user, such as placing a hold request for a book currently on loan, or requesting an inter-library loan for a document that is not available locally. In our test, EDS did not provide these options and instead required users to fall back to the old OPAC using hard to find hyperlinks. This tedious procedure might discourage some users and thus decrease collection usage instead of promoting it.

Administrative issues

We also encountered some problems on the administrative side. The initial upload of the NEBIS bibliographic records was a failure, which uncovered some apparently serious bugs in the EDS software. The EBSCO team treated this problem with the necessary care and professionalism, eventually solving it for good. Regardless of the positive outcome, such a significant problem (which blocked any progress for 3 months) raises some concerns about the maturity of this product.

There is no way to automate the update of electronic resources records from our SFX knowledge base to EDS. Instead, the data needs to be exported from SFX and manually imported into the EDS administration interface. Not only is this process rather tedious, but we doubt whether it could cope with e-journals with multiple ISSNs or e-books with multiple ISBNs.

Test summary for EBSCO Discovery Service (EDS)

For each of the six main feature groups defined in the Introduction, the following table summarizes the main outcomes of our test. Details about each feature group can be found in the Appendix.

Feature	Comment
1) Content and relevance	Extensive content for articles, less so for e-books.
2) Search functions	Advanced search capabilities could be better documented.
3) Results view and manipulation and subsequent result use	Uncomfortable faceted navigation. Unusual personal folder workflow.
4) User account	Missing circulation functionality.
5) Administration	Problematic upload of the catalog data. Troublesome electronic collection management.
6) Professional interface	Permanent links to the individual records.

3. Primo Central Total Care

In 2009, the Ex Libris group introduced Primo Central as part of their global library solution, Primo (8). It provides a central index of scholarly articles and e-books that can be combined with library catalog data to build an integrated discovery tool, with Primo as a user interface.

Since the NEBIS libraries use Ex Libris products for their integrated library system (Aleph) and link resolver (SFX), Primo Central was of course a strong contender. Indeed, our sister library at the ETH Zurich has chosen Primo as the basis for its own discovery system, the *Wissensportal* or Knowledge Portal (9). We tested Primo Central Total Care (PTC) version 3.0.3, which is a hosted version of Primo Central.

The NEBIS library data was exposed to PTC through the Deep Search protocol, with Zurich's Primo instance as a server (10). Through this protocol, PTC is able to search for records directly in the Primo database, without any need for a massive data transfer and storage. To achieve this result, Primo administrators in Zurich allowed Ex Libris Primo Central servers to

access their system through a specific URL. Electronic holdings were based on an export from EPFL's SFX knowledge base, prepared in February 2011.

The PTC tests took place between June 6 and September 20, 2011.

Content and relevance

Content gaps, as well as their importance for our institution, were difficult to assess, especially considering that the electronic holding file that was used during the test was several months out of date. Based on e-mails from the Ex Libris staff at the end of May, we had assumed that our SFX instance would be harvested automatically during or shortly before the tests, but it turned out not to be the case. Only the initial export performed on February 15 was used to set up our PTC instance and no provision was made for updates.

In any case, at least one significant package was identified as missing in the Primo Central index, namely the Royal Society of Chemistry e-book collection. Ex Libris subsequently informed us that a recent agreement with this publisher would make its collection available in Primo Central in the near future. Incidentally, we were disappointed at first by the lack of information regarding newly available (or updated) resources in the Primo Central index, as the only way to learn about them was to visit the Resource Collections Activation interface on a regular basis. Ex Libris has informed us that paying customers do indeed receive regular updates, whereas test customers do not.

Primo advertizes relevance ranking as one of its core functionalities. We were therefore extremely disappointed by the ranking of results in our test queries. For example, the first hits returned by a search for a specific EPFL researcher who authored numerous articles and books (available both in print and digital format) were articles by other authors but citing one of his publications. This is of course not acceptable. As it turns out, the Deep Search protocol imposes the ranking rules set up by the original Primo server (in our case, the one in Zurich) to search results in PTC, which means that the exact ranking method was neither known nor tunable for us.

To overcome this, the Ex Libris staff suggested two possible solutions. First, we could set up a local data silo, where we could set the ranking rules ourselves, and then have PTC harvest this silo. However, this option would remove one of PTC's main advantages over the competition, namely the extremely easy integration of our library catalog. A second option would be to ask ETH Zurich to change its ranking parameters to better fit our needs. Unfortunately, as it would affect all NEBIS network members, such an adaptation would be very difficult to justify and to insert into the development schedule of the network.

Last but not least, the Ex Libris staff have informed us that the documentation regarding Primo's relevance ranking is only provided to Primo Local or Primo Direct customers, but not to PTC customers, because the latter do not configure the software themselves. We feel that this decision is a mistake, since providing more documentation would definitely improve the communication between customers and the technical staff. Furthermore, as with the EDS *SmartText* technology discussed above, librarians need to know the inner workings of the tools they offer to their patrons.

Strengths

Library-specific faceted search

Filtering book results according to the library that holds them is an important feature in our environment. Circulation between NEBIS member libraries is very efficient, so the union catalog can be seen as one single library. However, patrons with a time constraint prefer documents that they can use right away, i.e. books currently on shelf in their local library building. Thanks to the compatibility between PTC and the NEBIS data, it was easy for Ex Libris to add a facet that restricts search results to documents owned by the local library.

Administrative issues

Throughout the project, we enjoyed very good communication with the Ex Libris technical staff, and would like to take this opportunity to thank them for their time and support. From a technical point of view, the almost transparent connection between PTC on one side and the library catalog (via Primo) and the SFX link resolver on the other side is obviously an attractive proposition when minimizing the local administration work is important. There is no need to set up any intermediate data silo, or organize the transfer of vast amounts of data.

Although we have not been able to take advantage of this during the short testing period, it should be noted that the large installed base of Ex Libris solutions (including but not limited to Primo) can be a significant advantage. The extensive customer community allows for fruitful exchange of information, for example through the EL Commons wiki (11).

Weaknesses

Content labeling

A few labels were poorly chosen, which could confuse the users. For example, the main search could be performed over 3 different subsets: “NEBIS” (i.e. our original library catalog), “Primo Central” (Ex Libris’s central index) and “Primo Central + NEBIS”. While we expect that our patrons have become familiar with the NEBIS name, “Primo Central” will have no meaning for them. We assume that this name can be changed, but the Ex Libris staff has not formally confirmed this.

Document-type filtering

In a combined search performed simultaneously over books, chapters, articles, and so on, filtering according to the document type is an important option. PTC does indeed provide such an option with specific facets. However, they did not work as expected during our tests. For example the “book” format facet did not act on books coming from the NEBIS catalog but only on records from the Primo Central index. This was probably a configuration problem that could have been solved with the help of Ex Libris technicians. Nevertheless, it indicates that one cannot assume that combining any existing catalog with a central index will be a straightforward task – even when the catalog is based on software sold by the same vendor as the index.

Duplicates handling

When displaying results coming from different sources, proper handling of duplicate documents is of course a concern. In our tests, PTC did not de-duplicate the results in any clear way, making them more difficult to interpret (especially considering the inadequate relevance ranking discussed above). We were informed that properly harvesting the SFX knowledge base should ensure that Primo Central results are de-duplicated. Although we do not see how the origin of the electronic holding data should play a role in this process, we agree that automatic harvesting should be set up in all cases. The Ex Libris staff also advertizes the grouping of records from the library catalog and the Primo Central index as possible in Primo 3.1 (released on June 21, 2011) (12).

Multilingual metadata

Switzerland is a multilingual country, and the NEBIS network reflects this fact. A search interface that is capable of handling multiple languages is therefore essential for us. While PTC provides a satisfactory support for non-English languages, it does not match the sophistication of the old NEBIS OPAC. Subject terms, as well as author information (occupation, nationality, sometimes canonic name) are trilingual in the NEBIS system (German, French, English). The

displayed text depends of the selected interface language (see Figures 3 and 4). By default, PTC does not support this functionality.



Title	Calcul différentiel et intégral : fonctions réelles d'une ou de plusieurs variables réelles / Jacques Douchet, Bruno Zwahlen
Imprint	Lausanne : Presses Polytechniques et Universitaires Romandes, 2006
Descr.	414 p. : ill.
Series	(Enseignement des mathématiques)
Note	Ouvrage précédemment paru en deux volumes. Vol. 1 Fonctions réelles d'une variable réelle ; Vol. 2 Fonctions réelles de plusieurs variables réelles
ISBN	2-88074-728-7 978-2-88074-728-2
All Holdings	All items
Library	EPF-BIB (Lausanne) (07) 517 DOU5 Enseignement 
Library	SUPSI (Manno) 515.33 DOUC 45654 Galleria 2 
Subjects	DIFFERENTIAL AND INTEGRAL CALCULUS (MATHEMATICAL ANALYSIS) : 517.1/.3 TEXTBOOKS (DOCUMENT TYPE) : (075)
Author/-ess	Zwahlen, Bruno, Mathematician, Switzerland, 1934 -. eng
Author/-ess	Douchet, Jacques
Sys. no	005269166

Figure 3: Detailed record in the NEBIS OPAC using the English-language interface.

Titre	Calcul différentiel et intégral : fonctions réelles d'une ou de plusieurs variables réelles / Jacques Douchet, Bruno Zwahlen
Adresse bibliogr.	Lausanne : Presses Polytechniques et Universitaires Romandes, 2006
Collation	414 p. : ill.
Collection	(Enseignement des mathématiques)
Note	Ouvrage précédemment paru en deux volumes. Vol. 1 Fonctions réelles d'une variable réelle ; Vol. 2 Fonctions réelles de plusieurs variables réelles
ISBN	2-88074-728-7 978-2-88074-728-2
Tous les exempl.	Tous les exemplaires
Bibliothèque	EPF-BIB (Lausanne) (07) 517 DOU5 Enseignement 
Bibliothèque	SUPSI (Manno) 515.33 DOUC 45654 Galleria 2 
Matières	CALCUL DIFFÉRENTIEL ET INTÉGRAL (ANALYSE MATHÉMATIQUE) : 517.1/.3 MANUELS POUR L'ENSEIGNEMENT (TYPE DE DOCUMENT) : (075)
Auteur/-trice	Zwahlen, Bruno, Mathématicien, Suisse, 1934 -. fre
Auteur/-trice	Douchet, Jacques
No. de système	005269166

Figure 4: Same record in the NEBIS OPAC as in Figure 3 using the French-language interface, demonstrating the translation of the Subjects and Author/-ess fields.

Export options

PTC users can export relevant records to a bibliography management tool, as long as this tool supports the RIS format used by Endnote, Zotero and others. Unfortunately, it doesn't offer an export to the BibTeX format commonly used by the LaTeX document preparation system. Since LaTeX remains the *de facto* standard for mathematics, and quite popular in physics and engineering, this would make PTC uncomfortable for a significant part of our audience. Of

course, conversion tools exist that could translate the RIS records to BibTeX, but offering a native export would clearly make the discovery tool more attractive to our patrons.

Circulation

Despite the strong compatibility of PTC with the existing Aleph ILS, its interface did not provide any access to the NEBIS library user accounts. For active circulation functionalities (hold requests, inter-library loan and so on) the user had to fall back to the old Aleph OPAC through hyperlinks. Although this came as a disappointment, we were not entirely surprised. Indeed, the Primo instance hosted at ETH Zurich and proposed to the NEBIS libraries as a replacement for the Aleph OPAC does not offer this functionality either. However, according to Ex Libris staff, harvesting the ILS data including circulation information is a standard option with Primo version 3. As we were not made aware of that during the set up phase, we unfortunately could not take advantage of it. We look forward to future developments within the NEBIS network in this respect.

Test installation URL

We could not help but notice that the entry page URL for our test installation was absolutely dreadful, looking much more like an undocumented prototype running on a development machine than a professional commercial solution (13). Since the end of the tests, we have been informed that Primo version 3.1.0 solves this problem, so that the URL would now be limited to the “http://<server-name>:1701/” part. We welcome this improvement, although we wonder how an official product might contain such obvious unpleasantness.

Customization options

PTC doesn't allow customers to easily adapt the interface to their needs, be it for aesthetic (to comply with corporate web design guidelines for example) or functional purposes such as the addition of links to custom services: inter-library loan requests, geo-localization, or whatever new functionality the customer might see fit to implement. Ex Libris staff will handle requests for such customizations and implement them if possible, but this solution is of course less flexible than doing it on one's own. We were informed that if we wished to have such flexibility, we should choose Primo Direct instead of PTC. In that model, we would be given full administration rights over a system hosted by Ex Libris, which means a complete control over the interface.

Permanent URLs

Finally, as a standard feature, PTC does not offer permanent links to individual records. Such links are however very useful for user support, especially to direct users to a specific record in response to e-mail enquiries. We were informed that permanent links can be set up by customers using the documentation available on the EL Commons wiki. Although we appreciate the usefulness of an active user community, we were surprised that such a basic feature would require a specific set-up.

Test summary for Primo Central Total Care (PTC)

Feature	Comment
1) Content and relevance	Improvements in e-book contents are still expected.
2) Search functions	Essentially OK but relevance ranking was unsatisfactory.
3) Results view and manipulation and subsequent result use	Various issues that could possibly be solved locally.
4) User account	No circulation functionality, no communication with Aleph user accounts (in the tested version).
5) Administration	Poor customizability.
6) Professional interface	No feature requested in this section is available out of the box.

4. Summon

The integrated discovery solution *Summon* was introduced by SerialsSolutions at the beginning of 2009. (14). Besides a central index for article-level records and a search interface, it offers an Application Programming Interface (API) that customers can use to build new tools.

As with EDS, library data from the full NEBIS catalog were delivered in MARC XML format. Holding information about online resources were submitted to Summon as an SFX export, and was entered into its knowledge base by SerialsSolutions staff.

We tested Summon between April 11 and September 20, 2011.

Content and relevance

We found various gaps in the central index. Some were scattered throughout an otherwise well-covered publisher collection, while more serious ones involved large collections that were altogether missing, such as the Royal Society of Chemistry e-books. The CRCnetBASE collections were out of date in Summon's index, with no title published after 2009 surfacing during our tests.

Some records with metadata quality problems were further identified in the Summon index: missing authors or subtitles, inaccurate titles, etc. We concede that data errors are hard to avoid completely, and the overall quality of the index is probably acceptable. However, these problems were especially disturbing for us when they affected e-books written by EPFL authors and present in our Course Reserve collection – probably the resources with the highest possible visibility in our institution.

In general, the relevance ranking of results was good. As far as our test queries could show, the indexed content is quite current, perhaps even more so than Google Scholar.

Strengths

Administrative issues

We were very pleased with the quality of support provided by the Summon staff. Good communication and technical know-how allowed a relatively short setup time, after which a responsive team helped us solve a number of problems during the tests. The open API offers interesting opportunities for the development of custom applications.

Weaknesses

Search functions

Search capabilities were generally good, but we nonetheless noticed a few bugs, such as the inability to search for ISBNs containing dashes. We trust that this small issue will be addressed very soon.

Multilingual issues

Summon's user interface is multilingual. However, we observed that Summon did not always handle foreign language searches properly. For example it did not understand the short French definite article as written before a vowel (i.e. "eau" = "water", "l'eau" = "the water"), so that records containing a query term beginning with a vowel were not retrieved if the the name was used with the definite article in the record. Instead Summon considered the whole word group (i.e. "l'eau") as one single word (see Figure 5 for an example). SerialsSolutions has informed us that they were currently working on a better support of non-English languages in search queries.

Furthermore, Summon could not support our multilingual subject headings and authority records. During our test, SerialsSolutions showed a clear interest in studying this problem, but since they will probably try to address it on a global scale rather than deal with just the three languages used by NEBIS, the likelihood of an efficient use of our subject headings in a foreseeable future looks rather low. Of course, one might question the usefulness of NEBIS-specific subjects at a time where the exchange of data makes standardization more and more desirable: perhaps our user needs would be served just as well by vendor-supplied subject headings, even if this vocabulary is less developed than the NEBIS thesaurus. This vast question should be kept in mind, even if it is out of the scope of this report.

Duplicates and alternative editions

During our tests, Summon was not able to properly combine matching catalog items and electronic resources (typically printed books and e-books), or different editions of the same work. Since then, we have been informed that print-electronic matching would be made available shortly thanks to the acquisition of ebrary and its large catalog by SerialsSolutions' parent company Proquest (15). Since not all libraries will want to use this automatic combination, it will not be a standard default. However, simply having it available as a configuration option would be a large improvement as far as we are concerned. SerialsSolutions also informed us that FRBR-like grouping of different editions (for example translations) of the same work was also on their roadmap but they did not give a specific schedule for this project.

Circulation

Once again, we found that we could not communicate with the ILS for circulation purposes (hold requests and such). According to SerialsSolutions staff, there are ongoing projects to add this type of functionality. However, since Summon is seen as competition by ILS vendors (such as Ex Libris with Primo and Aleph), collaboration to develop standard interfaces through which Summon and the ILS could communicate is apparently difficult.

The screenshot shows the EPFL library search interface. The search bar contains the text "tribocorrosion l'eau". The search results section displays two results for the query "tribocorrosion l'eau". Both results are for a dissertation by Julien Perret from 2010, titled "Modélisation de la tribocorrosion d'aciers inoxydables dans l'eau à haute pression et haute température". The first result is a full-text online document, while the second is a dissertation available in full text online. The interface includes a search bar, a search button, and a list of filters for refining the search.

The screenshot shows the EPFL library search interface. The search bar contains the text "tribocorrosion eau". The search results section displays one result for the query "tribocorrosion eau". The result is a dissertation by Julien Perret from 2010, titled "Modélisation de la tribocorrosion d'aciers inoxydables dans l'eau à haute pression et haute température". The interface includes a search bar, a search button, and a list of filters for refining the search.

Figure 5: Searching for “tribocorrosion eau” (tribocorrosion water; lower part) does not find the documents returned by “tribocorrosion l'eau” (tribocorrosion the water; upper part) in Summon.

Administrative issues

As far as electronic resource administration is concerned, maintaining Summon would mean extra work for our institution as one cannot directly use the SFX knowledge base to declare

resources. Instead, electronic resources need to be managed in Summon Knowledge Base and cannot be imported from SFX.

A way to solve this would be to use SerialsSolutions' own link resolver, *360 Core*, which could then replace SFX altogether. According to SerialsSolutions, this adds the benefit of a better de-duplicated and normalized knowledge base. However, such a solution would mean migrating a critical library service to a new tool, which is not a straightforward operation.

Permanent URLs

Summon doesn't offer permanent links to individual records. The rationale behind this choice being that a direct link to the resource itself should be preferred to its record on Summon. This makes sense for online articles, although it can still be useful to point out a specific record during a discussion with a patron. However, when it comes to books from our catalog, it misses the important point that we are looking for a complete replacement for said catalog. We want all usual user actions to be available through a modern interface, so directing patrons to the old OPAC is not coherent with our vision.

Journal title records

The direct integration of our A-Z list was not possible in Summon. Users frequently search for an electronic journal by its name rather than directly for its articles. A search for a journal name should therefore return a link to the journal homepage as a first hit, typically using the link resolver with the ISSN only. In Summon, such a search will only return articles published in this journal and not the journal itself. SerialsSolutions hinted that this problem could be solved by purchasing their *360 Marc Updates* service but did not provide any further details on this solution.

Test summary for Summon

Feature	Comment
1) Content and relevance	Significant content gaps for e-books. Rich, up-to-date content for articles.
2) Search functions	Relevance ranking satisfactory. Few bugs with searching, especially for non-English records.
3) Results view and manipulation and subsequent result use	No matching of print and e-book editions.
4) User account	No circulation functionality.
5) Administration	Not directly compatible with the existing SFX link resolver.
6) Professional interface	Usage statistics available.

5. WorldCat Local Quickstart

WorldCat Local is the discovery solution from OCLC, based on the unequalled WorldCat data set. For the purpose of our tests, OCLC agreed to set up an instance of the WorldCat Local Quickstart (WLQ) system, a light-weight version with reduced installation costs. Since we were in effect asking them to set up a test system at their expense, this decision is understandable. Nevertheless, it prevented us from evaluating functionalities only available in the full WorldCat Local product.

Since April 2009, the NEBIS catalog is present in WorldCat through the Swissbib project. Furthermore, EPFL's institutional archive *Infoscience* is harvested by OCLC's *OAIster* service. As a result, these records were readily available through the WLQ interface without any data transfer. Our electronic holdings were declared to OCLC through the *eSerials Holding* service, as an export of our SFX knowledge base in the Google Scholar XML format.

WLQ testing took place between July 11 and September 20, 2011.

Content and relevance

The immediate availability of our print collections and institutional repository in WLQ was clearly a great advantage. Since the update mechanism had been set up within the general agreement between the Swiss IDS consortium (of which NEBIS is a member) and OCLC, this part of the configuration essentially came for free.

The WorldCat database is one of WLQ's main strengths. The comprehensiveness of its book catalog was matched in our tests by an apparently excellent article coverage. Furthermore, we found the records to be frequently enriched with useful metadata (publication timeline, audience level...) absent from our current OPAC.

As a result, no serious content gaps were uncovered, but we found the holding information to be inaccurate. Although the general coverage of WLQ was very good, we found that most e-book packages currently licensed by EPFL were ignored. Individual titles were indeed returned in a general search, but were not reported as available for our institution. The reason for this was that our SFX exports were used to determine only journal holdings and not e-books. According to OCLC, the full version of WorldCat Local offers an administrative interface to a knowledge base where such collections can be declared. Since it was not available in WLQ, we could unfortunately not test it.

OCLC suggested that systematically cataloging e-books in the NEBIS catalog would also solve this problem. In our opinion, however, the manual input of large e-book packages is hardly a reasonable option, especially for collections with changing content. Automatic insertion of records into the NEBIS catalog is not practical either, as vendor-provided metadata do not always meet the quality standards required by the network.

Strengths

Document-type filtering

Document-type facets were found to be reliable, and we particularly appreciated that e-books were defined as a sub-category of books (see Figure 6). This layout is quite useful in the context of a hybrid library such as ours, where a book could be available both in print and digital formats. Certain patrons are first interested in the availability of a given title, regardless of its format, whereas others might be looking for a specific format. In WLQ, both approaches are easily possible.

Permanent URLs

As said before, simple permanent URLs pointing to individual records are sometimes useful for user support. Such links are readily available in WLQ thanks to the unique WorldCat identifier attached to each record.

Weaknesses

Interface issues

The user interface was generally pleasant, but there were a few things that could be improved in our opinion (see Figure 7). First of all, too many clicks are required to reach localization information for a print document (call number, etc.). The situation is similar for e-books, where the detailed information page contains many links that could be confusing for the user (see Figure 8). This is especially frustrating since a discovery tool should improve usability of our resources instead of hiding them.

The screenshot displays the WorldCat Local Quickstart interface. At the top, there is a navigation bar with 'Bibliothèque de l'EPFL', 'Search', and 'WorldCat' menus. A search bar contains the text 'quarteroni' and a 'Search' button. Below the search bar, there are options for 'Libraries to search' (set to 'Libraries Worldwide') and an 'Advanced Search' link. On the left side, a 'Format' facet is expanded, showing a list of format types: 'All Formats (849)', 'Article (431)', 'Downloadable article (3)', 'Chapter (4)', 'Book (211)', 'eBook (63)', 'Microform (5)', 'Thesis/dissertation (4)', 'Downloadable archival material (142)', 'Computer file (88)', and 'Journal, magazine (1)'. The 'Book (211)' option is highlighted with a red circle. Below the format facet is a 'Refine Your Search' section with 'Author' and 'Year' filters. The main results area shows 'Results 1-10 of about 849 (.19 seconds)'. The first three results are: 1. 'Numerical mathematics' by Alfio Quarteroni, Riccardo Sacco, Fausto Saleri; 2. 'Scientific computing with MATLAB' by Alfio Quarteroni, Fausto Saleri; 3. 'Numerical approximation of partial differential equations' by Alfio Quarteroni, Alberto Valli.

Figure 6: Sample search results on the Worldcat Local Quickstart interface. The facets for various subtypes of the “Book” format are highlighted in red.

We also observed that less cover pictures were displayed for French books than for the English ones. This is probably a question of securing agreements with the relevant providers, but we think it would make WLQ more attractive for libraries with a consequent collection of non-English books.

Navigation-wise, we would suggest not hiding the link to return to the WLQ home page under a menu. And finally, we found that user customization of the interface was poor, with no visible way to change the number of results per page, for example.

Availability information and circulation

In the NEBIS network, it is useful to distinguish local books (available immediately unless they are on loan) and books from other NEBIS libraries (generally available within a couple of days). Unfortunately, WLQ only made a distinction between books from EPFL and the rest of the world, including the NEBIS libraries. According to OCLC, the missing intermediate levels should be available in the full WorldCat Local version.

As with the other tested tools, no active circulation functionalities such as hold requests or inter-library loan were available.

Administrative issues

The lack of customization options in the end-user interface was mirrored in back-office administration, with no visible ways to adapt any part of the interface to local needs. According to OCLC, only the full WorldCat Local version allows such modifications.

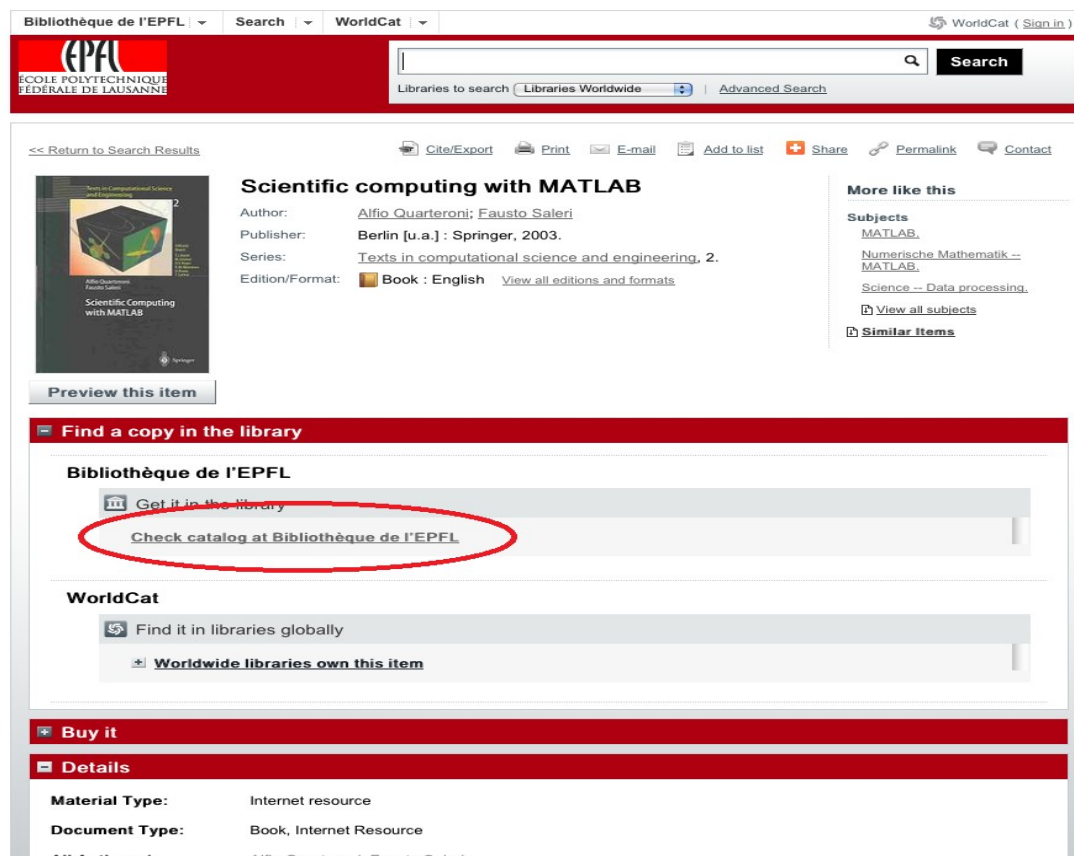


Figure 7: The WLQ interface after clicking on a locally available item of interest in the result list (#2 in Figure 6). Instead of displaying item information, the interface offers a link to the old OPAC (highlighted in red). The command to return to the main page is located under the “WorldCat” menu header at the top of the page.

In comparison with the other competitors, we felt a certain lack of commitment in this project coming from OCLC. As noted above, only the limited WLQ was offered for our tests instead of the complete WorldCat Local solution. Furthermore, technical support was slow to respond. Specifically, obtaining accurate answers to make sure that our online resources were properly declared through the *eSerials Holding* service took about three months even though it would have required little more than uploading two files and receiving a receipt confirmation. That a test customer would receive a lower priority than a paying one is understandable, but failing to answer such a simple question within a reasonable time did not project a good image of OCLC services.

Test summary for WorldCat Local Quickstart (WLQ)

Feature	Comment
1) Content and relevance	Excellent database for books. Poor management of electronic holding information.
2) Search functions	No comment.
3) Results view and manipulation and subsequent result use	Well-designed facets, pleasant display of results. Access to the electronic documents or local availability information for print documents too complicated. No BibTeX export.
4) User account	No circulation functionality.
5) Administration	No administration interface. Technical support was lacking during this test.
6) Professional interface	Convenient permanent links to records.

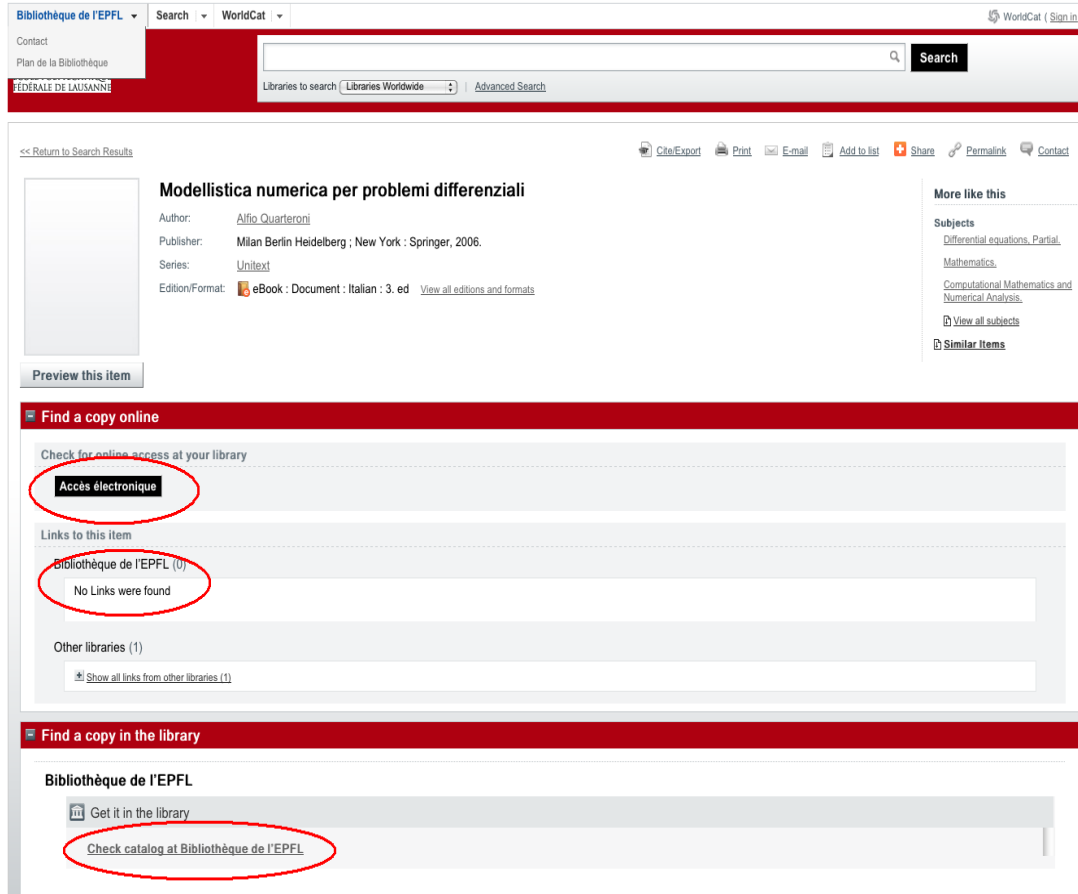


Figure 8: The WLQ interface after clicking on a locally available e-book. Links that a user might reasonably select to access the full-text are highlighted in red.

6. Swissbib

Swissbib is an aggregation of all academic library catalogs in Switzerland, developed at the University of Basel as part of the *e-lib.ch* project (16). Based on OCLC technology, it offers a modern, multilingual search interface based on web 2.0 technologies, and supports various machine-communication protocols (SRU, OAI-PMH,...) (17).

Since Swissbib is essentially a library catalog, it cannot be directly compared with the four discovery tools presented in this report. However, the combination of Swissbib with Google Scholar was chosen in our test as the standard against which the other products should compete. In that aspect, its functionalities were thoroughly tested during the comparison and are included in our conclusions.

Content and relevance

Due to the nature of Swissbib, its content is limited to documents available in the catalogs of Swiss academic libraries. Articles and e-books can only be found if they have been cataloged beforehand. Functionalities such as simultaneous searching through other available resources and full-text search are unavailable.

Swissbib supports relevance ranking of search results, but the resulting sort order is not always relevant, as shown on Figure 9, and leaves room for improvement.

The screenshot shows the Swissbib search interface. At the top, there is a green header with the 'swissbib' logo. Below it is a navigation bar with links for Home, My swissbib, About swissbib, Feedback, and Help. A search bar contains the text 'linear algebra' and a 'Search' button. To the right of the search bar is an 'Advanced search' button. Below the search bar, there is a 'Save in:' dropdown menu set to 'Temporary list' and a 'Show lists' button. The main content area displays '4457 hits for «all fields = linear algebra»'. Below this, there are sorting options: 'by relevancy', 'max. number of results' (set to 10), and 'list' (set to long). There are also pagination controls showing '1 2 3 4 5'. The search results are listed in a table with four entries:

1.	<p>Proceedings of the Fifth Conference of the International Linear Algebra Society Atlanta, Georgia, 1995 Author / Contributing: special issue eds.: Frank Hall ... [et al.] Host document: Linear algebra and its applications. vol. 254 = 1997 / MONAT mar 15 Year: 1997 Book</p>	More information on local level
2.	<p>Sixth special issue on linear algebra and statistics Author / Contributing: special issue eds.: R. William Farebrother ... [et al.] Host document: Linear algebra and its applications. vol. 264 = 1997 / oct Year: 1997 Book</p>	More information on local level
3.	<p>Proceedings of the Fourth Conference of the International Linear Algebra Society (Rotterdam, 1994) Author / Contributing: special issue eds.: Harm Bart, Ludwig F. Elsner, and André C. M. Ran Host document: Linear algebra and its applications. vol. 241-243 = 1996 / jul-aug Year: 1996 Book</p>	More information on local level
4.	<p>Proceedings of the International Linear Algebra Society (ILAS) Symposium on Fast Algorithms for Control, Signals and Image Processing (6-8 June 1997, Winnipeg, Canada) Author / Contributing: eds.: Dianne O'Leary ... [et al.] Host document: Linear algebra and its applications. vol. 284 = 1998 / MONAT nov 15</p>	More information on local level

On the left side of the interface, there is a 'Narrow results' sidebar with various filters: Network, author, Format, Language, and Year. Each filter has a list of options and a 'Display more ...' link. At the bottom of the sidebar, there are buttons for 'Show less filters', 'Subject: Topic', and 'Subject: Person'.

Figure 9: Sample search results in Swissbib. The first hits are conference proceedings from the 1990s, which few users would probably find relevant.

Strengths

User interface

The modern and well-designed interface was found to be adequate, although call numbers and other local information could have been more prominently displayed. Trilingual authority information and subject terms are properly shown according to the user's language choice, although these multilingual subject terms can unfortunately not be used as facets.

Administrative aspects

The main advantage of Swissbib that no other contestant could beat was its effective cost. As a project funded by the library consortia, access to the main version is free and open to all. Localized views specific to a library or group of libraries can easily be deployed and customized at no cost, in return for some shared developments.

Weaknesses

Circulation

For Swiss academic users, Swissbib supports logging into a personal account with their usual credentials (through the Shibboleth authentication protocol), but the Swissbib account is not linked with the library user accounts of the various participating ILS such as NEBIS/Aleph. Thus, local or inter-library loans cannot be requested directly from within the Swissbib interface and have to be done by falling back to the old OPAC.

Test summary for Swissbib

Feature	Comment
1) Content and relevance	Content quality equivalent to the current OPAC. No articles.
2) Search functions	Reasonable search functionality.
3) Results view and manipulation and subsequent result use	Relevance ranking could be improved. No BibTex export.
4) User account	Not connected with the ILS account, no active circulation.
5) Administration	Not tested.
6) Professional interface	Permanent links to the individual records.

7. Discussion

Setting up the trial servers took much longer than expected, due to various technical issues and the specific situation of the EPFL Library as a member with limited administrative rights in the NEBIS network. Due to the delays, most tests could only take place during the Summer academic break (June to September 2011). It was thus no longer possible to assemble the planned focus groups, which explains the limitation to workgroup members only. Moreover, the observed content problems convinced us that the products were not satisfactory in their current state, and could not replace the already available tools (OPAC, local catalogs and so on). Consequently, the workgroup voted against an extension of the tests to the library staff and general audience.

Setup problems, interface weaknesses and the unavailability of important e-book collections lead us to dismiss EBSCO Discovery Service as a candidate to replace our OPAC, regardless of the other interesting aspects of the product.

Primo Central Total Care could have been the product of choice based on our existing software environment, which includes several Ex Libris products: Aleph and SFX for EPFL, as well as other Primo solutions at ETH Zurich. In particular, the Deep Search protocol promised to be an attractive solution to the problem of data synchronization between library catalog and discovery tool. Unfortunately, as we found out, using this protocol meant that we would have no control over the relevance ranking. The very poor ranking performance that we observed is a direct consequence of this problem. The lack of direct control over the web interface itself is also a weakness, but it might conceivably be addressed by recognizing that PTC is probably not the version of Primo best suited to our needs. Primo Central Direct, which should be essentially the same as PTC except for the direct administration part, might look more suitable from this point of view.

Even though Summon was one of the solutions requiring more work in terms of data transfer and processing, it was surprisingly the only commercial solution to be ready and running in agreement with our original schedule. The consequently longer trial period allowed us to make good use of SerialsSolutions' very good technical support and solve many small issues. PTC came online a distant second, but there was still enough time to take advantage of Ex Libris's staff and achieve some improvement.

Even without the numerous fixes introduced by the SerialsSolutions staff, Summon came out of the test as the best commercial solution. Even then, it still suffers from annoying weaknesses, both in content and in functionality. Several forthcoming improvements are advertised, but we do not have a precise schedule for these.

WorldCat Local Quickstart was not a strong contestant in the competition. Its main interest lay in the theoretically light workload involved in the declaration of our resources, the NEBIS catalog being already included in WorldCat. However, from a functional point of view the only real improvement over the readily available combination of WorldCat and Google Scholar seems to be the simultaneous search between print and electronic resources. OCLC directed

us to the full WorldCat Local solution for many features in our wishlist, but since we were not able to test it, we cannot judge whether it would be an attractive alternative. Furthermore, considering our experience during the tests, we are concerned about the level of support we could receive from OCLC, even as a paying customer.

Overall, none of the tested products met our expectations. Admittedly, our full list of criteria was a hard one to fulfill, but the important shortcomings identified during our tests and shared by all contestants all concerned essential features. Some of them were severe, like missing or inaccurate content, absence of circulation functionalities, no integration of our journal A-Z list. Others were less critical but still troublesome, such as the absence of support for our multilingual indexing. Finally, some were missing nice-to-have features such as a facet to filter out books currently on loan.

As a result, there was no winner in our competition. For article searches, all contestants were generally good (except for some relevance ranking problems, such as with PTC) but presented no significant improvement over existing bibliography databases such as ISI or Google Scholar. However, for book searches in the library catalog, we uncovered many problems that prevented them from being a suitable replacement for our OPAC. In particular, the lack of native circulation support was decisive. Last but not least, the significant content gaps for e-books was a serious issue considering the ongoing development of e-book collections at EPFL.

Of course, besides the strengths and weaknesses, pricing had also to be considered. All four commercial vendors were kind enough to prepare attractive offers for us, but the yearly license prices (on the same order of magnitude as typical online databases) remained too costly for products suffering from the significant shortcomings presented above, especially considering the amount of development time we would have to invest to overcome some problems.

Single search box, separate result lists

An unexpected outcome of our test was the realization that a discovery tool combining book and article search into one single step was maybe not such a desired feature after all. Since the merged results list can sometimes be rather confusing, the very first search refinement a user might want to perform over the results might actually be to select just one document type. So perhaps combining search results from the library catalog and from the central index is not the ideal solution in general, but only for some specific source combinations, such as books and e-books, articles and book chapters, or other “compatible” document types. Offering simultaneous but distinct hit lists for the various sets, as done for example at the Villanova University (18), might be better understood by the users.

8. Conclusion

The severe shortcomings found in all tested products forced us to abandon all of them as suitable candidates to replace our OPAC. Instead, the most attractive available option at the end of our test was identified as a gradual switch to Swissbib as our standard catalog, with a localized view limited to NEBIS documents by default. This will be in effect a first step towards a modern OPAC with web 2.0 functionalities, at no direct cost for our institution.

In a second step, our e-books and journal catalogs could be progressively integrated into this new OPAC via a local installation of the search portal. Finally, licensing a centralized index might be an option to add the possibility to search through article-level documents, even though we might prefer to present such results in parallel to the book-level results rather than merge them all. This option would clearly be more labor-intensive than a ready-made hosted solution but currently appears to be the only one able to deal with our specific situation.

As a closing statement, we will remember that the competition between solution developers motivates a rapid evolution of the product ecosystem. Our study is only a snapshot at a point in time, and we look forward to future developments on these tools. Notably, the forthcoming Primo 3 OPAC that the ETH Zurich library is currently setting up for all NEBIS member libraries

will be an interesting development towards finally offering our patrons a discovery tool that is living with its time.

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10. Appendix

The criteria against which the Discovery tools have been tested are listed here. The Evaluation and Product ID Card are purely descriptive, while other sections are presented in order of decreasing priority. We did not assign any specific weight to the individual features but rather used the relative priority ranking to determine the end rating.

Answer types

<i>info</i>	factual information
<i>012</i>	0 stands for a missing feature 1 stands for an incompletely implemented feature 2 stands for a correctly implemented feature
<i>txt</i>	text
<i>rating</i>	0 to 6 rating, with 0 as worst evaluation and 6 as best evaluation (average : 4)

	<i>feature</i>	<i>field</i>	<i>type</i>
EVALUATION	Tester role	Member of the project team, librarian, student, public	info
	Date	Evaluation date	info
	Language	Interface language used during the test	info

PRODUCT ID CARD	Product	Name of the product or service	info	
	Company	Name, Headquarters	info	
	Software	Name, open source/proprietary	info	
	Technology	Robust, well-known, widely used technologies, if any.	info	
	Pricing	Installation cost		info
		Annual cost		info
		Cost model (FTE, source number, ...)		info
	License agreement	Duration (minimum, maximum)		info
		Price evolution between year N and N+1		info
		License agreement provided		012
License agreement explains library's data use after license termination			012	
	Library catalog data available for sale by Company.		012	

1. CONTENT AND RELEVANCE	Tests queries	<i>[Various test queries]</i>	rating
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	<i>feature</i>	<i>field</i>	<i>type</i>
2. SEARCH FUNCTIONS	Simple Search	One search box for all resources	012
		Autocomplete	012
		Fulltext search for online resources	012
	Advanced search	Choose a field	012
		Boolean operators	012
		Truncation	012
		Position in word (beginning, middle, end)	012
		Sentence search	012
	Browse through search	1-click search reset	012
		1-click back to previous step	012
		Browsable and customizable search history	012
	Search not limited to our resources	1-click choice for external resources (or back to EPFL resources only)	012
		EPFL / NEBIS / Switzerland / World filter	012

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<i>feature</i>	<i>field</i>	<i>type</i>		
3.1. RESULTS VIEW AND MANIPULATION	Results display	“Did you mean” function	012	
		Clear ranking (sorted by relevance, date, author, title, by increasing or decreasing order)	012	
		Ranking easy to modify (sorted by relevance, date, author, title, by increasing or decreasing order)	012	
		Book cover display	012	
		Print or online indicator	012	
		Availability indicator (book on the shelves or not, access to an online resource at EPFL)	012	
		No lost, missing or eliminated document displayed (except for librarians)	012	
		Hide documents not available (borrowed books, online resources from another institution)	012	
		Tags and comments display	012	
		View all editions (FRBR)	012	
		Custom number of results per page (e.g. 20, 50 ,100)	012	
		Browse through results (from a notice to another)	012	
		Library facet (e.g. Bibliothèque de l'EPFL)	012	
		Specific location facet (teaching collection, architecture collection, ...)	012	
		Availability facet (on the shelves or borrowed)	012	
		Delete one facet at anytime	012	
		Delete all facets in one click	012	
		Location (library, callnumber, ...)	012	
		Suggest a purchase in one click (fields automatically filled up)	012	
		Custom suggestions	People who borrowed this book also borrowed... suggestion	012
			Order suggestion	012
			Databases or online resources suggestion	012
		Order	Order a document directly from the results list	012

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<i>feature</i>	<i>field</i>	<i>type</i>	
3.2. SUBSEQUENT RESULTS USE	Alert on customized query	Email	012
		SMS	012
		User account	012
		RSS feed	012
	Alert on availability of a document (customized by user)	Email	012
		SMS	012
		User account	012
		RSS feed	012
	Results export	Text file	012
		Email	012
		CSV ou Spreadsheet file	012
		Zotero	012
		Endnote, Refworks, RIS, BibteX	012
		MODS	012
		Dublin Core	012
		MARC XML	012
		PDF	012
		Printer	012
		Inter-library loan request	012
		Purchase suggestion	012
		Save in a temporary basket	012
		Save in a basket in user account	012
		Share on social networks	012
	Permalink	Short link	012
		Ease to build link	012
		Link linked to a QR code (to access a simple and easy-to-read notice on a smartphone)	012

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	<i>feature</i>	<i>field</i>	<i>type</i>	
4. USER ACCOUNT	Authentication	Forgot your login/password function with automatic email sending	012	
		Easy authentication opened to all of our users	012	
	Loans	Documents on loan	012	
		Past loans	012	
		Documents ordered	012	
	Taxes	Taxes, reminders	012	
		Articles copy	012	
		Other (interlibrary loans, ...)	012	
	Custom suggestions	Automatic loan suggestion (based on user profil)	012	
		Automatic report when a new resource is available (based on user interests and profil)	012	
	Preferences	Interface language	012	
		Display format (short, long)	012	
		Interface colors	012	
		Default export parameters	012	
		Results default ranking	012	
		Default number of ranking	012	
		Preferred location	012	
		Customization of simple search (with custom selection of fields)	012	
	Add content to notice	Check and update saved preferences	012	
		Add tags	012	
		Add comments	012	
	References basket	Add rating	012	
		Several baskets (lists of references)	012	
		Share basket by email	012	
		Share basket on social networks	012	
		Share basket with anyone on Discovery tool	012	
			Share basket with another user	012

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	<i>feature</i>	<i>field</i>	<i>type</i>
5. ADMINISTRATION	Knowledge base	Realistic package descriptions in the knowledge base (no activation title by title)	012
		SFX knowledge base can be imported	012
		Knowledge base complete and up-to-date	012
		Ability to use our SFX link resolver	012
		Complete and correct import of the NEBIS catalog	012
	Management	Ease to update local resources	012
		SRU search for external resources	012
		Lists for backoffice work	012
		Data export and import, particularly for batch setup	012
		Complete documentation	012
		Adaptability to our needs	012
		Problems occurred during the tests	txt
		Simple search among chosen search fields (all the fields if necessary)	012
		Recommandation customization for every query (databases, ...)	012
		API available to query the Discovery tool and get the results	012
		API to integrate the Discovery tool in our webpages (searchbar, results lists, ...)	012
		Ease to customize interface in French (and English)	012
		Support / customer service	FAQ
	Email		012
	Support center (hotline, ...)		012
	Answer quality / support competence		rating
	A given account manager whose name is known (no anonymous support)		012
	Problem solved by		txt

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	<i>feature</i>	<i>field</i>	<i>type</i>
6. PROFESSIONAL INTERFACE	Backoffice management	Statistics on user queries and platforms to which users are sent	012
		Lists for backoffice work	012
	Search	Show documents not available (borrowed book, online resources from another institution)	012
	Records identification	View and use through record number	012

USER EXPERIENCE / PERSONAL COMMENTS	Tester opinion	Ease of use	rating
		Preference setup	rating
		Global opinion	rating
		Strengths	txt
		Weaknesses	txt
		Comments	txt
	Mobile web (smartphone and tablet)	Mobile App or mobile website	info
		Mobile search interface	012
		Mobile-suitable results display	012
		Mobile-suitable notice display	012
	Interface quality in French	Mobile-suitable user account display	012
		Complete (or partial) translation of the interface	rating