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Open source solutions for libraries: ABCD vs Koha

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Abstract

Purpose – The purpose of this study is to present an overview of the two open source (OS) integrated library systems (ILS) – Koha and ABCD (ISIS family), to compare their "next-generation library catalog" functionalities, and to give comparison of other important features available through ILS modules.

Design/methodology/approach – Two open source ILSs, Koha and ABCD, were compared in-depth according to their functionalities and characteristics. A checklist was created for each module: acquisition, cataloging, serials, patron management and circulation, reports and statistics, and administration. For an online catalog module, a separate checklist with "new generation catalog" characteristics was created. The authors also defined an additional set of criteria which could influence the decision process and selection of appropriate ILS like funding, metadata schema, preferred ILS functionalities, provided support, and the role of the IT department, and computer and network infrastructure in the library.

Findings – Evaluation of ILSs reveals that Koha has more functionalities than ABCD, especially those connected with the "next generation library catalog". If a library is using UNIMARC or MARC21 format for bibliographic description and has a good IT support, Koha is an open source ILS with a wide community which has to be considered for implementation. ABCD has great metasearch possibilities and is worth considering by libraries using other or no metadata schemas or without IT support.

Research limitations/implications – The research was limited to two research libraries and their praxis and experiences. Further analysis can include other open source ILSs.

Practical implications – This study can help libraries preparing to migrate to open source ILS to choose an appropriate one.

Originality/value – This is the first comprehensive study conducted on Koha and ABCD comparing all modules in detail.

Keywords Integrated library system, Open source software, Koha, Libraries, Library systems

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1. Introduction

With the development of information and communication technologies, the structure of the academic and research library collection has fundamentally changed, and the digital resources now account for the majority of library budget and usage. The

software used to manage today's library collections has evolved to reflect changes in the technology, information access and staff needs. Many integrated library systems (ILS) are not effectively "integrated" since their back end, including acquisition, cataloguing, circulation and other technical and administrative activities, still engages great efforts from librarians. Managing collections by different carriers, and in variety of formats, media and types, is a demanding and time consuming task with uncertain benefits for end users. On the other side, ILS front end interfaces are competing with big players like Google, Amazon, Facebook, and others, when it comes to features like speed, design, relevance, or usability. A new generation of library users with new information seeking patterns requires a new approach and a user-centric virtual environment to encourage the exploration of library-materials. New trends in the libraries brought the concept of "next generation catalog" decoupled from, but still interoperating with, current ILS (Sadeh, 2008). For the integration of different types, media, carriers, and formats some libraries use an overlay system or discovery tool. However, in many libraries ILS online catalog, preferably with "next generation catalog" characteristics, is still the main access point to library collections. Interactive functionalities like suggestion or request for a new item, self-checking, renewal and hold and recall, subject classification through tagging, as well as reviewing and annotating a resource, provide active user participation in other ILS modules. Functionalities of ILS still strongly influence the quality of the library information services and user satisfaction. Organization and architecture of databases, search and browse capabilities, search results management and the level of interactivity with end users depend on ILS used by the library.

There is a number of both proprietary and open source ILS available nowadays, and it is not an easy task to compare them. All ILS share a lot of common functionalities and they differentiate in their levels of maturity and finalization (Müller, 2011). There are also new features reflecting recent technological trends and changes in the users' behavior and expectations. Flexibility of the ILS software and the speed at which changes are adopted become the important factors in ILS development. Proprietary ILS are usually costly, protected by copyright and have restrictions and limitations on usage and distribution. in situations when libraries of all types and sizes are affected by serious financial restrictions (Hamby *et al.*, 2011), open source solutions are becoming a more viable alternative than they were in the past (Wrosch, 2007). "Open" or "free" means that library does not have to pay the license fees and upgrades, but some expenses such as the staff time, training, infrastructure, software support, etc. are similar to the proprietary ILS (Breeding, 2008).

Open source software (OSS) is not only about a software itself, it is more about democratization, collaborative networking and personalization of software, and a perception of the software as a service (O'Reilly, 1999). For libraries a shift towards OSS is in harmony with library core responsibilities, as are free access to library resources and promotion of intellectual freedom. Among a variety of additional reasons for migration to OSS, one should mention:

- Dissatisfaction with the previous system – based on old concepts, obsolete software, outdated hardware, no upgrades, lack of flexibility, lack of support, high maintenance fee, poor functionalities, time consuming administration.

- Budgetary restrictions – importance of having a system with all needed functionalities at lower and affordable cost, especially for smaller libraries and libraries from developing countries.
- Openness to customization and to contributions from user community (Chang *et al.*, 2010).
- More support options than those using proprietary software (Breeding, 2007).

OSS licenses give users the freedom to run a program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program, without having to pay royalties to previous developers (Wheeler, 2007). When developing open source ILS, a group of people or institutions contribute their time, money and skills to its development and then offer their results to the community free of charge. There are possible disadvantages of OSS in comparison with commercial systems, like a need for a certain level of in-house expertise, a lack of quality assurance, a lack of direction caused by the involvement of many developers. Additionally, the regular updates are not guaranteed and the source code may be compromised (Jeffery J. in Keast, 2011). However, wide community which develops and supports the software offers more flexibility and evolution toward the new generation of technologies, better interoperability with other systems, a wider choice for selecting a support service company, and other advantages. Support is a critical issue in the OSS implementation and maintenance, and could be provided by professional support companies (Dimant, 2010) or by local IT staff. The services involved in the OSS support might include conversion services, installation, configuration, training, ongoing support, hosting and custom development (Breeding, 2008). Although dedicated IT staff is not present in many libraries around the world, increased functionalities and better manuals could encourage even those libraries for the OSS implementation.

2. Literature review

The increasing amount of the digital content in libraries brings about several new issues to ILS, particularly in terms of handling different materials, licensing issues, preservation of digital content and access. Even the term "catalog" fails to completely capture the current vision of the tool for finding library materials, and it does not fit to the new, expanded vision of the library search environment (Breeding, 2007). Catalogs are still used in libraries referring to library collections in their broader terms.

In the beginning of the millennium, the library web catalogs started to transform into "next-generation catalogs" offering improved functionalities and intuitive interfaces more in line with popular websites like Amazon and Google. These "next-generation catalogs" also provided the capacity to harvest records from various locally hosted silos of information, through search, retrieval, and presentation of the results from within the single interface (Vaughan, 2011). Very recently, the library catalogs have been faced with another trend that has influenced users' behavior. With the Web 2.0 tools the web has become a place for easy collaboration and active participation, where users started to give feedback, create additional, and share existing content. Governed by the new generation of library users libraries are forced to reconsider their services and their role in the information environment (Mercun and Žumer, 2008).

The emergence of OSS has changed the philosophy and practice in software development, implementation and ownership; a phenomenon which has also influenced

interpretations, actions and behaviors of organizational members (Mengesha, 2010). Preparing for the migration, libraries usually conduct a thorough investigation of functionalities and flexibility of ILS available in the market. Library system personnel and administrators take the selection process seriously, spending even up to two years for the detailed examination of the available ILS solutions (Wang, 2009). Published research about available open source ILS, according to specific functionalities, is therefore very useful to libraries. As reported by published studies, Koha is at the moment among most popular ILS on the market (Breeding, 2008; Müller, 2011; Riewe, 2008; Yang and Hofmann, 2010). None of these studies took under consideration ABCD, relatively new and unknown software coming from ISIS family, widely used in Latin America (De Smet, 2010a). The history of the ISIS software started in 1970s with Central Documentation System/Integrated Set of Information Services (CDS/ISIS) which was a free software from the very beginning. Even only the executable files were made available, together with the CDS/ISIS Windows version and all "ISIS clones", it could be considered as the predecessor of the "open source" library software (De Smet, 2008). The release of ABCD represents a major step forward for the ISIS community, both in creating its first true ILS and in shifting to an open source development model (Breeding, 2010). ISIS family of software packages are still popular in small institutions with little funding, and parenting institutions like UNESCO and BIREME, influenced their extensive implementation in the development community (Hopkinson, 2009).

3. Methodology

In this paper, two open source ILS installed on authors institutional servers were tested and compared in-depth according to their functionalities and characteristics: ABCD v.1.1 beta 1[1] and Koha v. 3.4.4[2] These two open source ILS were selected because, according to authors' knowledge, there are no comparative studies of ABCD and Koha published yet, except the study of Koha and CDS/ISIS (Müller and Caissy, 2007) and authors' presentation of comparison of ABCD and Koha at 36th IAMSLIC Annual Conference in 2010 (Macan and Fernandez, 2010). Authors have rich experience in implementing ABCD in their libraries – ABCD at the National Institute for Fisheries Research (INIDEP), Mar del Plata, Argentina and Koha at the Ruder Bošković Institute, Zagreb, Croatia. A list of preferred ILS functionalities was created according to published literature (Müller, 2011; Balnaves, 2008; Bissels, 2008; Mercun and Žumer, 2008), as well as authors praxis with these and some other ILS's. The evaluated functionalities of ILS's were grouped into: "next-generation catalog" features, general characteristics, online catalog, acquisition, cataloging, serials, patron management and circulation, reports and statistics, and administration section. The presence or absence of each functionality was tested and recorded by authors. Furthermore, a set of additional criteria was defined, which could influence the decision process and selection of ILS like funding, metadata schema, preferred ILS functionalities, provided support for ILS and the necessity of IT staff and computer and network infrastructure in the library.

4. ABCD and Koha – general overview

Since Koha was developed eight years before ABCD and it has become one of the most popular open source ILS in the market, its community has grown and is much bigger than ABCD's. Until today, Koha has a stabile 3.8.2 version, while ABCD is in v. 1.1 beta 1. At the time of the study, Koha had 1169 implementations worldwide and ABCD had

16, according to the Library Technology Guide (www.librarytechnology.org). However, these numbers are not quite comprehensive and Koha developers estimate the number of Koha implementations somewhere around 4.000.

The size of community and its activity is very important when choosing which ILS to implement. The community guarantees continuous software development and implementations of new features. Koha releases new features every 6 months and new bug fixes every month. The rules according to which a new code can be approved for the next release are available on Koha Community website (Koha Library Software Community, n.d. b). An official Development Team is elected to manage its new releases and the list of core teams for each version can be found at Koha Community website. More than 150 individual developers as well as 16 contributing companies and institutions participated in development of Koha v. 3.4.4, and this community is constantly growing with every release. ABCD is being created and developed by BIREME (WHO, Brazil) in collaboration with the Flemish Interuniversity Council (VLIR, Belgium) and the team consists of about 20 developers. Release of the ABCD v. 1.2 is expected in August 2012, while the v. 2.0 should be released in December 2012.

Most OSS exist under a standard license agreement that defines the terms of use. ABCD is developing under GNU Lesser Public License (LGPL) which intends to ensure that the software is free for all users (Free Software Foundation, 2007a). Koha is developing under common GNU Public License (GPL) version 2 which means that everyone is allowed to use, redistribute and change the software, but new versions must be released under the same terms (Free Software Foundation, 2007b).

ABCD and Koha are programmed in different programming languages – while ABCD is mostly written in PHP (only EmpWeb module was programmed in Java), Koha is using PERL. They also use different types of databases – ABCD is continuing the tradition of the ISIS family and uses a textual database[3] while Koha uses a relational MySQL database. Both ILS support multi-branch, multi-users, remote load and multi-language mode. Both software programs can be installed and used on personal computers without internet connection. Local installation ABCD for Windows OS includes all dependences such as PHP, Apache web server, YAZ, MySQL, and Java. Koha could also be used offline, but the installation process would last longer because there is no integrated install package available, except if installed in virtual machine. While ABCD has installation packages for Linux and Windows OS, Koha runs natively on Linux, FreeBSD, MacOS and other UNIX-like operating systems. As pointed out earlier, there is a possibility to setup and run Koha using preinstalled and preconfigured virtual appliance on Windows (VirtualBox or VMware images), but one should still have expertise in Linux OS and Perl computer language as virtual appliance is based on Linux operating system. Koha has also the possibility of its interface translation into any language via collaborative translation tools which provides the inclusion of the translation in future official releases. At the present Koha is available in Chinese, English, French, German, Greek, Italian, Portugese and Spanish language, and partial translations are available in various other languages[4]. ABCD is available in English, French, Spanish and Portuguese.

4.1 ABCD

As a part of the ISIS software family, ABCD represents the integration of many ISIS tools, e.g. the meta-search capability, the CMS-based library "portal", advanced serials management and finally the advanced circulation module, which allows linking to

non-ISIS user databases and multiple loans policy implementations (De Smet, 2010a). ABCD was developed in 2009 by BIREME (WHO, Brazil) in collaboration with the Flemish Interuniversity Council (VLIR, Belgium), using the UNESCO's ISIS database technology. Instead of using relational databases ABCD uses the ISIS "Formatting Language", which allows library staff to manipulate all data in their databases in a highly granular way to keep full control without extensive programming. ISIS records carry their individual structural description as a "header" within themselves, unlike the relational table-based databases where all records in the same table share the same structure. Therefore, each record can have its own different structure and, as a consequence, ABCD accepts any structure and includes structure-definition tools (Dhamdhere, 2011).

ABCD is called a "suite" of software for the library and documentation centre automation because it consists of some relatively independent modules which can fully co-operate or work independently. In fact, some existing advanced software were adopted and adapted into ABCD. That is why original names such as iAH, SeCS (both developed by BIREME) and EmpWeb (Empréstimos en Web) developed originally by KALIO ltd. from Uruguay, and amply tested in Valparaiso, are used.

4.2 Koha

Koha was the first open source integrated library system (ILS) developed in 1999 by Chris Cormack, employed at the computer consulting company Katipo Communications, for Horowhenua Library Trust (HLT) from New Zealand. It was developed in response to the need of a library management system that could run at branch libraries connected to the central libraries by ordinary phone lines. The name Koha comes from the Maori word for a gift or donation, which is very convenient, considering Koha's availability for a distribution under the open source General Public License (GPL) version 2 or later. Later on, Koha was developed and significantly improved by a great number of individual programmers and institutions. Its releases from 3.x.x can be considered as a new product.

As Koha became more popular among libraries of all types and sizes, a number of support companies appeared all around the world, like LibLime, ByWater Solutions, and others. With time, LibLime, one of the biggest Koha support companies, had forked the software and this version of Koha is now developing in a different direction and it is called LibLime Koha (Wikipedia, 2012). Therefore, it is important to differentiate this fork version of Koha from the official Koha Community's version. Fork versions of Koha could also have different functionalities, so it is important to note that this comparison deals with community's version of Koha (v. 3.4.4).

Koha is completely web-based (both online catalog and staff interface) and supports simultaneous work of more librarians. It is a full-featured ILS which includes modules for circulation, cataloging, acquisitions, serials, reserves, patron management, branch relationships and more. Koha is aimed for libraries of all sizes and types and supports a setup for multiple libraries or branches using a single system.

5. ABCD and Koha – comparison of functionalities

5.1 Online catalog with the next-generation catalog characteristics

Online library catalogs play an essential role in helping users locate library resources effectively, but it is clear that nowadays online library catalogs are no longer adequate to meet the challenges in a highly networked and integrated environment (Padmavathi and

Seetharam, 2011). The development of new technologies enabled significant improvements of library catalogs and its functionalities. The revitalized "next-generation online catalog" aims to deliver to the library patrons an experience of the library collections and services more in tune with the expectations set by the mainstream web services and competitors like Google and Amazon (Breeding, 2011). The concept "next-generation library catalogs" refers to the new client-oriented and user-centric catalog, providing better functionality in terms of library collections and services, and better search experience to users (Breeding, 2007). According Breeding the next-generation library catalog should have a state-of-the-art web interface, enriched content, faceted navigation, keyword searching, relevancy, "did you mean [. . .]?" feature, recommendations, user participation by the Web 2.0 tools etc. In the study of six new-generation library catalogs, their features were grouped in several categories as search and presentation of results, content, users' participation, personalization etc. (Mercun and Žumer, 2008). According the study of student preferences, the most preferred functionalities in the "next-generation catalog" are a faceted browser, tag cloud, relevance ranking, and borrowing suggestions (Tam *et al.*, 2009).

ABCD and Koha have the online catalog integrated into the library management system. When talking about basic online catalog functionalities, both online catalogs offer excellent search, allowing the use of Boolean operators as well as stemming and truncation of search terms. Catalogs have simple Google-like search, as well as advanced search with search limitations options, ranking by relevance and faceted navigation. ILS administrators have possibility to customize online catalog interfaces according library preferences. Both software programs also have the possibility to print or export the search results in different formats, narrow search results, save search histories, and display information about availability of items on online catalog (checked out, available, available only for work in the library reading room, lost, etc.) and location in the library. In addition to these functionalities, Koha also allows users to save search results and browse subject authorities, and librarians to post news and messages to patrons and library staff (Appendix).

To give an answer on how ABCD and Koha online catalogs are performing in terms of the "next-generation catalog" characteristics (Next Generation Catalog Requirements[5], an analysis has been made according to their preferred functionalities (Table I).

Table I shows that both analyzed versions of software lack some of the very useful "next-generation catalog" functionalities, such as "did you mean [. . .]" feature, reading/borrowing suggestions, recommendations, spell-checking, full-text upload, searching inside available full-texts or mobile versions of online catalog (e.g. applications). ABCDs online catalog (Figure 1) is an adapted version of BIREME's general "advanced interface for Health information" (iAH). The iAH interface developed by BIREME is currently being upgraded to iAHx, aligning it perfectly with modern IR concepts and techniques like clustering and relevance ranking based on Lucene indexing. ABCDs online catalog allows meta-searches using full-fledged CMS to create meta-search interface, connecting online catalog, institutional repository, digital archives, and other internal and external databases consistent with ISIS format. For this purpose a simple Google-like search box is provided for users and a queries are sent out to interrogate all defined databases (Dhamdhere, 2011). Consecutive searches are performed and search results are

Feature	Description	ABCD	Koha
Data and database			
Metasearch	Including all resources available to the user	Yes	No
Enriched content	Reviews, tables of contents, summaries etc.	No	Yes
Full-text	Uploading of full text to the catalog	No	No
Search/retrieval/display			
Ranking by relevance	Traditional ranking of search results is based on the frequency and positions of terms in bibliographical records during keyword searches	Yes	Yes
Faceted navigation	Discipline; level (basic, academic); audience (student, teacher, researcher, general public . . .); genre; date ranges; topical time frame; full-text options (open or restricted access, on shelf, inter-library loan, purchase), geographic area; personal names; media types; language	Yes	Yes
Spell-checking	Language-dependent and may have to be related to the "language of the catalog"	No	No
Stemming, truncation	Language-dependent and may have to be related to the "language of the catalog"	Yes	Yes
"Did you mean. . .?"	Suggestions for misspelled words	No	No
Unicode support	Full Unicode character sets	No	Yes
Search inside the book	If full-text is available	No	No
Display includes images	For example: display of publication covers	Yes	Yes
Brief display "is work-related"	A merged set of variations on the same work	No	Yes
Reading/borrowing suggestions	What should I read next? What would be a good starter book on this subject?	No	No
Recommendations	"Users that borrow X also borrow Y"	No	No
Virtual shelves	Possibility of browsing items on online catalog in the same order they appear on the shelves	No	Yes
Mobile phone access	Possibility of searching and browsing a catalog using mobile phone devices (via applications, mobile online catalog, etc.)	No	No
Full-text search	Possibility to search through full-texts if they are available	No	No
User functions			
Selective sort capabilities	The ability for users to sort results by a variety of keys	No	Yes
Personal user accounts on online catalog	When logged in to their online catalog account, users have ability to use additional functionalities	No	Yes
Notification Services	Receive online or email or RSS notification of due dates, holds available, new items received (by topic area)	No	Yes
Web 2.0 functions: tagging, rating, commenting, reviewing	Users can assign their own informal terms to items of interest	No	Yes
Making private or public lists	Possibility of making private or publicly available list of titles on online catalog	No	Yes
Reference management software compatibility	Compatibility with different reference management software like Mendeley and Zotero	No	Yes

(*continued*)

Table I.
The next-generation library catalog characteristics of Koha and ABCD

Feature	Description	ABCD	Koha
Staff functions			
Optional layer of abstraction	The cataloger interface should be able to translate the codes used in the catalog record into the plain language of the cataloger	No	Yes
System functions and features			
Service-layer approach	System is not monolithic, but contains parts that are brought together by one or more service layers and user interfaces	Yes	Yes
Exposure of contents via open API's	Catalog interacting with other information systems, allowing them to perform queries (such as Z39.50 or SRU/SRW) and to harvest data for their own uses	No	Yes
Permalinks	Addressable URLs for catalog items that can be added to bibliographies, reading lists, etc.	No	Yes
RSS	Distributing content through RSS (RDF Site Summary), in addition to conventional Web pages: lists of new items in the collection, lists of relevant items in other environments	No	Yes

Table I.



Figure 1.
ABCD online catalog of INIDEP Library

displayed separately, differentiating ABCD meta-search from federated search with aggregated search results or from discovery tools with pre-indexed database.

Koha's online catalog uses Zebra search engine which has an excellent search performance, but it does not support meta-searches in local catalog. Besides this advantage of ABCD over Koha, Koha's online catalog has more additional

"next-generation catalog" features, especially those related with web 2.0 and it supports a full Unicode character set.

In Koha, librarians can enable enhanced content from various online services, such as Amazon.com, Google Books, Syndetics etc. Depending on the service chosen, library can display covers of books, book reviews, a merged set of variations on the same work etc. Online catalog (Figure 2) can be used by registered and unregistered users. Both groups have an ability to search the catalog, browse it by subject, tag cloud or browse virtual shelves, sort and narrow the results by various parameters, add references to their reference management software such as Zotero or Mendeley etc. Registered users can access some additional functionalities, such as the possibility to log into their personal account on the online catalog with current checkouts, fines, reading and search history, suggestions for acquisition, messaging options, personal information etc. Registered users are also able to place a hold on materials via the online catalog, and the possibility of tagging and commenting bibliographic records, making private and public lists of references etc. All of these functionalities can be easily turned on and off using Koha's administration interface.

Koha also has some staff and system functionalities on top of ABCD's, such as optional layer of abstraction of catalogers interface, exposure of contents via open API's, permalinks, and possibility to distribute content through RDF Site Summary (RSS).

5.2 Acquisition

Both ABCD and Koha have acquisition module where libraries can set up their budgets and create their vendors database. For each vendor, the library can make one or more easy-to-track orders using baskets. Both software solutions support suggestions/recommendations for acquisition by library users and "pre-cataloging" function for materials to acquire. In addition to these functionalities, Koha's acquisition module also supports automatic currency conversion (Appendix).



Figure 2.
Koha online catalog of the Ruđer Bošković Institute Library – page with search results

5.3 Cataloging

While Koha supports two broadly used metadata standards – MARC21 and UNIMARC, ABCD is also compatible with MARC21, Dublin Core, METS and other current standards, but its actually independent of formats and libraries can implement any metadata standard or their own metadata schema. Managing different bibliographic structures is a very useful functionality, especially for libraries which do not use any common metadata standard.

The management of various types of material like books, serials, conference materials, thesis, etc., on any analog or digital carrier, including different media (audio, video, multimedia), copy cataloging via z39.50 protocol, authority control, creating a normative list od keywords, recording date and time of the latest transaction, prompt and help messages integrated into administration interface and export/import of bibliographic records are present in both ILS. The systems offer different types of authority control (authors, titles, geographic names, etc.) and Koha has the possibility of automatic creation of the new authority record on the fly if there is no existing authority record during creation of a new bibliographic record. In addition Koha has functionality of duplicates detection when creating a new biblio record, as well as possibility of manual merging of duplicate bibliographic records (Appendix).

5.4 Serials

In ABCD, the Serials Control (SeCs) module provides a tool for managing journals where all kinds of publishing patterns can be managed. In SeCs serials management, a description of the collection is included as well as basic administrative control of suppliers, subscriptions, exchange and management of a cooperative catalog of the serials collections for a group of libraries belonging to the same or different institutions.

Koha has a serials module where library can manage its serials subscriptions. A library can set up new subscriptions of a certain serial from one of the vendors, define frequency and expected arrival dates of new issues, and create routing lists of serials to patrons as well as claims to the vendor. None of the software support binding of serials (Appendix).

Both ABCD and Koha's serials module are primarily focused on managing print serials subscriptions and they are not adjusted for specificities of electronic serials subscriptions.

5.5 Patron management and circulation

ABCD and Koha have numerous functionalities for managing patron database, such as import/export of patron database, setting up patron categories with different permissions, defining circulation rules for different collections/patron categories, and defining fine rules. ABCD and Koha support self-checkout, uploading profile pictures for each patron, and bar codes, but Koha in addition also supports RFID technology (Radio Frequency Identification). They also have a module for inventory control of the catalog. Reservations and holds by administrators/librarians are possible in both systems, but Koha also supports reservations/holds made by users via their personal accounts on the online catalog.

ABCD offers two loan modules. One of them comes pre-configured with the system. The second one is an "Advanced loans" module (EmpWeb) which can cope with multi-branch organizations having different loans policies, etc. In addition to accessing

user-data in the ABCD-user database, "Advanced loans" module can access user-data stored elsewhere, which allows very advanced high-performance usage of the loans module. EmpWeb or ABCD Advanced Loans will also offer a reservation function and a function "MySite" where end-users can check and keep track of availability of loan-objects in their personal account of ABCD-Loans. In Koha it is possible to set up automatic e-mail or SMS overdue notice to the patrons, write messages to their personal accounts, etc.

Tested versions of Koha and ABCD do not support short term loans and interlibrary loans.

5.6 Report and statistics

Various predefined and custom reports are supported by both ILS. In ABCD any kind of custom report can be created selecting predefined, created or customized output format. Different formats can be used to display or export data directly to a text or a spreadsheet processor. Predefined reports are available only if the library is using CEPAL or MARC21 standards. In Koha any kind of report via report wizard or SQL can be created, and a statistic wizards or predefined reports can also be used. Saved reports can be run manually or scheduled to run and automatically sent reports to administrator's e-mail.

5.7 Administration and security

In both ILS, permissions to administrators/librarians can be granted to access/edit only certain functions according their role and responsibilities in the library. Administration permissions in ABCD are divided into permissions related to databases and entry – or exit – formats and permissions related to ABCD functionalities. There are four main user levels: system administrator with "access to all areas"; database administrator, which can change, modify, read and write the given database; database operator, which can read and write the given database; and loans operator, which can read and write only the loans database. ABCD include 53 sub-permissions for all profiles.

ABCD has one group called "adm" which is linked with the system administrator. It is not allowed to edit or delete the profile of this group and at least one user has to be assigned in it. Otherwise, there is a risk of losing access to certain important functions.

In Koha there are 17 main permissions referring to the main Koha functions, such as circulation, cataloging, acquisitions, reports, tools, authorities, serials, system parameters, etc., along with 48 sub-permissions referring to some specific functions. In Koha, the permission level "superlibrarian" can administer all processes in Koha modules as well as set up system parameters via administration interface. "Superlibrarian" can also easily switch on and off all the functionalities in Koha.

5.8 Additional technical criteria

When considering implementation of ABCD or Koha, libraries have to look at the expenses of maintaining servers and/or hosting, and/or expenses of providing IT support if there is no library IT staff. If a library does not have its own server on which to run web-based open source ILS, there is a possibility of hosting ILS on commercial servers. An alternative is the implementation of an offline version of open source ILS, which is also a good solution if the library does not have a stable internet connection.

Existence of IT support in libraries is also a very important segment to think about when implementing an open source ILS. Even if a library has its own servers, but lacks a good IT support which could maintain a server and open source ILS, the library will have to outsource the maintenance of its ILS. Koha is in use all around the world for more than a decade and there is already a number of companies offering support (Koha Library Software Community, n.d. a). Although ABCD is new software, it should be considered through the long history of ISIS software community. Two organizations currently supporting and developing ABCD free of charge are BIREME and VLIR (De Smet, 2010b).

The complete survey of ABCD and Koha with most important functionalities is available in Appendix.

6. Conclusion

When preparing to migrate to a new ILS every library should take into consideration open source ILS. Although it could be considered a traditional integrated library system, Koha has become widely used ILS which is continuously improving its existing functionalities and developing a new ones. It has a larger and very active community, and it also has a wider range of free and paid support than ABCD. It is currently in a stable 3.8.2. version, while ABCD is still in beta version (v. 1.1 beta 1). ABCD is relatively new software and its community has a potential to grow along time. ABCD is more flexible when it comes to metadata standards. It supports all standard and non-standard metadata schemas, while Koha supports only UNIMARC and MARC21. Both systems automate traditional library processes, and their modules can satisfy basic needs of any library type.

According to this study, Koha is a more appropriate solution for libraries using MARC21 or UNIMARC standards. A great advantage of ABCD is independence of metadata standards, as well as integrated meta-search. On the other hand, Koha has more functionalities and some advanced "next-generation catalog" characteristics, including Web 2.0 features, user accounts, customizable interface, etc. Both solutions are web based, but could also be installed and used on personal computers without Internet connection. For that reason ABCD has an easy to install installation pack for Windows OS with included dependences. Koha could also be run on personal computers using preinstalled and preconfigured virtual appliance on Windows.

In a certain extent ABCD and Koha support some type of digital content, but in general they are intended for printed collections. E-books can be managed successfully using Koha, but e-journals management is still unsolved issue in both software programs. Management of digital collections is, hence, not supported well enough and should be considered in future releases.

Although ABCD and Koha are based on more "traditional modules", as well as other available open source and proprietary ILS, not supporting digital content and new workflows in the libraries well enough, both software are strong players in the world integrated library systems. There is still a lot of space for further development of both Koha and ABCD. The community of users and developers, which is getting bigger, can ensure that both ILS will develop new cutting edge functionalities according to library needs and become "fully integrated library systems" in the near future.

Notes

1. http://bvsmodelo.bvsalud.org/php/level.php?lang = en&component = 27&item = 13
2. www.koha-community.org
3. The exception is EmpWeb module which uses MySQL.
4. http://translate.koha-community.org/
5. http://futurelib.pbworks.com/w/page/13686662/Next%20Gen%20Catalog%20Requirements

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Appendix

Feature	ABCD	Koha
General characteristics		
Version evaluated	1.1 beta 1	3.4.4
Date of manufacture	2008	1999
Number of implementations worldwide (according to www.librarytechnology.org)	16	1169
Number of developers	Approximately 20 developers from BIEME and VLIR	More than 150 individual developers; 16 contributing companies and institutions
Community support	Yes	
(project web pages, wiki, trac and mailing list) (community web pages, wiki, blogs, mailing lists etc.)	Yes	
Open source/license	GNU Lesser General Public License (LGPL)	GNU Public license (GPL) v.2
Programming language	PHP (only EmpWeb module is programmed in Java)	PERL
Type of database	Textual (only EmpWeb module in MySQL)	MySQL
Multi-branch mode	Yes	Yes
Multi users and remote load	Yes	Yes
Installation on personal computer	Yes	Yes
Multi language support	Yes	Yes
Online catalog (other than the "next-generation catalog" functionalities)		
Simple and advanced online catalog search	Yes	Yes
Managing record by the end-users (saving, exporting etc.)	Yes	Yes
Search limits	Yes	Yes
Results narrowing	Yes	Yes
Saving search history	Yes	Yes
Saving search results	No	Yes
Browsing subject authorities	No	Yes
Information about availability of items	Yes	Yes
Information about location of items in the library	Yes	Yes
News and private messages to patrons and staff	No	Yes
Possibility of changing online catalog view	Yes	Yes

(*continued*)

Table AI.
Functionalities of ABCD and Koha

Table AI.

Feature	ABCD	Koha
Acquisition		
Budgets	Yes	Yes
Vendor database	Yes	Yes
Baskets of orders	Yes	Yes
Currency conversion	No	Yes
Users suggestions/recommendations for acquisition	Yes	Yes
Cataloging		
Supported metadata standards	Independent of formats	MARC 21 and UNIMARC
Managing of various types of material (books, serials, etc.)	Yes	Yes
Managing analog and digital content	Yes	Yes
Cataloging via Z39.50 (copies)	Yes	Yes
Authority control	Yes	Yes
Creating authority records on the fly	No	Yes
Creating a normative list of keywords	Yes	Yes
Duplicate detection	No	Yes
Merging duplicate bibliographic records	No	Yes
Import / export of data	Yes	Yes
Prompts and help messages integrated in admin interface	Yes	Yes
Date and time of the latest transaction	Yes	Yes
Serials		
Serials frequency planning	No	Yes
Routing lists	No	Yes
Binding	No	No
Patron management and circulation		
Import/export of patron database	Yes	Yes
Setting up different patron categories	Yes	Yes
Defining different circulation rules for different collections/patron categories	Yes	Yes
Defining fines rules	Yes	Yes

(*continued*)

Feature	ABCD	Koha
Bar code support	Yes	Yes
RFID technology	No	Yes
Self-checkout	Yes	Yes
Inventory control	Yes	Yes
E-mail/SMS overdue and other notices	No	Yes
Patrons profile pictures	Yes	Yes
Holds/recall	Yes	Yes
Reservations	Yes	Yes
Short term loans	No	No
Interlibrary loan	No	No
Reports and statistics		
Pre-defined reports	Yes	Yes
Custom reports	Yes	Yes
Administration		
Managing utilities	Yes	Yes
Administration of admin profiles and permission levels	Yes	Yes

Table AI.

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Bojan Macan graduated in Information Sciences and Croatian language and literature and currently he is on PhD study of Information Sciences at the Faculty of Humanities and Social Sciences, University of Zagreb. Since 2005 he has been working at Ruder Bošković Institute Library. So far, he has worked on interlibrary loan, serials acquisition and control, metadata description and conversion, implementation of new technologies in the library (integrated library management system – Koha, institutional repository), development of new library web pages and bibliometric analysis. Since 2009, he has been head of the Ruder Bošković Institute Library. His interests are connected with the implementation of new technologies in libraries, bibliometric analysis, digital libraries, scientific publishing and open access. He is an active member of Croatian Library Association, EURASLIC/IAMSLIC and Croatian Metallurgical Society. Bojan Macan is the corresponding author and can be contacted at: bmacan@irb.hr

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Jadranka Stojanovski graduated in Physics and has a PhD in Information Sciences. From 1997 she was Head of the Ruder Bošković Institute's Library, and from 2009 she has taught at University of Zadar. From the very beginning she was developing new information services for the research and academic community in Croatia, like Scientific Information System embracing 120 special and academic libraries field focusing on ITC implementation in libraries and development of new services for library users, CROSBI – Croatian Scientific Bibliography (http://bib.irb.hr), Centre for Online Databases (http://online-baze.szi.hr), Who's Who in Science in Croatia (http://tkojetko.irb.hr), a pair of compasses – repository of scientific equipment (http://sestar.irb.hr), HRČAK portal for Croatian open access journals (http://hrcak.srce.hr), and others. Besides taking active part in the LIS education at University of Zadar and J.J. Strossmayer University in Osijek where she taught different courses, she is involved in the continuous education of librarians and users, and has taught numerous seminars on online databases retrieval, open access in scholarly publishing, digital libraries etc. She has published more than 50 publications. Her main areas of interest are in the field of scholarly publishing, information retrieval, digital libraries and organization of information.

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