System migration from Horizon to Symphony at King Fahd University of Petroleum and Minerals

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Abstract
Highlights difficulties and problems in library automation systems migration faced by libraries in the Middle East due to the lack of direct support from their ILS’s parent companies. Local vendors lack the required expertise and resources to provide the level of support enjoyed by North American and European user libraries of such systems. In this context, the article presents the experiences of the King Fahd University of Petroleum and Minerals (KFUPM) Library in Dhahran, Saudi Arabia, in system migration from the SirsiDynix integrated library system, Horizon, to the same company’s newer system, Symphony, which readers may find somewhat different from those of western libraries in terms of planning, execution and time span of the project. A brief 30-year history of library automation at KFUPM is also provided.

Keywords
library automation, integrated library systems, systems migration, SirsiDynix, Horizon integrated library system, Symphony integrated library system, data conversion, King Fahd University of Petroleum and Minerals, Saudi Arabia

Introduction
King Fahd University of Petroleum and Minerals (KFUPM) is a renowned institution of higher education in the Middle East and ranked 266th in the Times Higher Education-QS (THE-QS) World University Rankings for 2009 (QS Topuniversities, 2009). This achievement was possible due mainly to the support it received during the formative years from a consortium of several North American universities, including the University of Michigan, the Colorado School of Mines, Caltech and others for overseeing the quality of academic programs, laboratories, the library, and physical facilities during most part of 1970s and 1980s. The consortium team also included two experts from the library field, Richard M. Dougherty of the University of Michigan and Hartley K. Phinney, Jr. of the Colorado School of Mines. They used to visit the library every year to review the achievements as well as the shortcomings. They always impressed upon the library administration the need to follow international library standards and tools, such as the Association of College and Research Libraries (ACRL) standards, the Anglo-American Cataloging Rules (AACR), the MARC format, Library of Congress Subject Headings, Classification, and Authorities and others in both user and technical services. Applying these standards in library operations and services made it possible for the KFUPM Library to stand out as the best library in the region. Today, the university seeks advice from an International Advisory Board (IAB), a very prestigious panel of academic and corporate leaders from such renowned organizations and institutions as British Petroleum, Chevron Corporation, General Electric, Harvard University, Stanford University, University of Chicago, the Smithsonian Institution and others. The Board performs very important advisory functions concerning the University’s internal planning, and its outreach to its peer institutions for new innovations and developments in research.

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and curriculum, academic administration, and providing service to the community. The KFUPM academic programs are accredited annually by ABET, Inc., formerly the Accreditation Board for Engineering and Technology, a non-profit organization that accredits United States postsecondary degree programs in applied science, computing, and engineering.

**Library automation at KFUPM**

Following in the footsteps of western libraries, the KFUPM Library has been focused on automation of its operations since the late 1970s. The library started with remote access to the world’s scientific and technical information through the use of DIALOG and ORBIT search services in 1979. The success of OCLC and the installation of first generation library systems in North American and European libraries prompted the KFUPM library administration to also acquire an integrated library system (ILS). A Task Force on Library Automation (TFLA), comprising members from the library, the Data Processing Center (DPC) (now called Information Technology Center – ITC), was created in 1979 to review several systems, including DOBIS/LIBIS, CLSI, BALLOTS, BATAB, and Hewlett Packard’s 3000 system. Features that KFUPM wanted in a library system included: integration, MARC and AACR2 compatibility, distributed access throughout campus, multiple language capabilities, network capabilities, and IBM compatibility. Of the systems investigated, DOBIS/LIBIS was found to be the most suitable to our requirements. A licensing agreement was signed with IBM in June 1980 and DOBIS/LIBIS version 1, release 1 was installed in March 1981. The Library continued with DOBIS/LIBIS until 2004 and version 3.2 macro level was the last version we used. IBM stopped marketing and technical support of DOBIS/LIBIS in 1992. The Extended Library Access Solutions (ELiAS), a Belgian independent company, took over the rights to market, support, and enhance DOBIS/LIBIS. This was the time when client/server systems became popular. Many libraries started migrating to the new systems. Realizing the new trend in library automation, ELiAS came up with AMICUS, a client/server system developed according to the specifications of the Canadian National Library. The system was designed to become a modern replacement product for their DOBIS system. KFUPM read between the lines that ELiAS would probably abandon DOBIS/LIBIS soon. Other factors also compelled the library administration to plan for migrating to one of the state-of-the-art systems. The university administration created a high-powered Library Automation System Ad-Hoc Committee (LASAC) in March 1996 to survey the existing off-the-shelf software packages in library automation and recommend the one most suitable for the library. The Committee reviewed seven different systems and finally selected the Dynix company’s Horizon in 2003. The system was installed in October 2003 for training and testing. The most difficult part of the Horizon implementation plan was data conversion because of the differences between DMARC (DOBIS MARC) and MARC21 formats. Due to the non-availability of many MARC fields in DMARC, some data was merged with other fields’ data. For example, field 022 was not available in DMARC and we had to place ISSN together with ISBNs in field 020. However, during conversion, many data problems were resolved and many remained, which we continued to fix 5 years after migration. For example, separating ISSNs from ISBNs and placing them in field 022, or separating Computer File (CF) records from Visual Materials (VM) records and replacing all VM field tags with the relevant CF field tags.

**Symphony**

Following migration to Horizon 7.3.1 in November 2004, we started preparations for moving to the new version (7.4) of Horizon and the Horizon Information Portal (HIP) 4.1. The software was installed at KFUPM for testing by the library staff in March 2006. After a comprehensive testing of the new version, a report identifying problems and bugs was submitted to the local vendor. Those problems were never fixed due to a change of direction in the strategic plan at SirsiDynix. The vendor took a U-turn and announced in March 2007 that it would focus its R&D developments on a new product called Rome. In June 2007, SirsiDynix decided to abandon Rome and develop Symphony as the company’s a flagship system. The Horizon users became frustrated with the company’s decision to discontinue development of Horizon into the future. Many indicated distrust with the company and some of them decided to move to other systems. Those who decided to remain with the Horizon ILS system are faced with immediate challenges and difficult decisions. But, Breeding (2007) already considers Horizon as a legacy system and says “once the automation system passes from flagship to legacy status, the libraries that are running it must begin making plans to migrate. It’s only a matter of time until the product reaches its end of life, and it takes librarians a long time to make plans and to find funding for their next system. Migration can be
postponed until more desirable options emerge, but it’s inevitable."

The authors have provided a Horizon user’s perspective on Symphony and its design, strengths, complexities and limitations in another article (Khurshid and Al-Baridi, 2009).

**Symphony at KFUPM**

Considering the good standing of Dynix and its flagship system, Horizon, KFUPM wanted to continue with the system for a long time. However, the events following the merger of Sirsi Corporation and Dynix left us with no option, but to migrate either to Symphony or to a new system. In December 2007, Symphony was officially launched in Saudi Arabia. On this occasion, SirsiDynix, in coordination with their local vendor, Arabian Advanced Systems (AAS), arranged a number of presentations on the system design, functionalities and the proposed migration path from Horizon to Symphony. After that it became very clear to the Horizon users that Symphony is a completely different system from Horizon in all respects, including the architecture, relational database management system (RDBMS), interfaces, etc. The KFUPM library administration thought that if Symphony was so much different from Horizon, why not evaluate some other systems also? The library administration therefore decided to investigate Millennium, from Innovative Interfaces, Inc. (III). However, a number of factors such as the lack of local vendor support and Arabic support, and the high cost of software, forced us to decide in favor of Symphony.

This paper aims to discuss the library system migration from Horizon to Symphony at KFUPM. The difficulties in understanding the functionalities of the new system due to the lack of knowledge, and training and customization issues are also highlighted.

**Migration from Horizon to Symphony**

To motivate Horizon user libraries to migrate to Symphony, SirsiDynix offered the software free of charge with the condition that they have a maintenance contract with the vendor. SirsiDynix proclaimed that they would provide the necessary tools to facilitate migration from Horizon to Symphony.

**Implementation**

The migration project was planned and implemented at two levels. At the administrative level, a three-member Coordination Committee (CC), comprising the Systems Manager from the library, the Supervisor, Library Information Systems from the ITC, and the Systems Engineer from the AAS, was created to prepare an implementation plan with assigned tasks for each member, which would be carried out by a team under him. The CC was fully supported and its activities were closely observed by the Director General, KFUPM Libraries and the Manager of Academic Information Systems, ITC. At the user level, a team named Symphony Automation Committee (SAC), comprising resource persons from each functional area in the library, was created to carry out all the tasks of the plan assigned to the library by the CC.

**Installation**

Libraries always prefer to migrate to the latest version/release of the system. When we started planning for system migration from Horizon to Symphony in early 2008, version 3.2 was the latest version of Symphony available. The local vendor, AAS, delivered Symphony 3.2 software for installation on 3 June 2008. All four core modules and iBistro, the online catalog with Arabic interface, were installed. However, none of these modules was fully customized to the KFUPM requirements. A large test database was created comprising almost all bibliographic and non-bibliographic data converted from Horizon. The only records left out were the non-MARC Arabic bibliographic records. They were later fixed and converted into Symphony in the next data conversion. A set of 15 training guides was made available to the library staff for self-learning and practicing.

**Training**

The library staff found working with Symphony with the help of training guides very difficult due to the interface differences between Horizon and Symphony. Symphony modules are called ‘workflows’; each workflow has many ‘wizards’ (functions) and each wizard has many properties that let the user customize how the wizard should work. Properties are grouped into three types: Behavior, Defaults and Helpers. Behavior properties control how the wizard works. For example, the behavior properties of the ‘Add title’ wizard allow catalogers to ‘Add call number’, ‘Add item’, ‘Auto-generate item ID’ and others in creating a catalog record. If you want the system to work according to your need, then relevant Helper properties must be checked or unchecked. For example, in the cataloging module helper properties include ‘Validate headings’, ‘Delete current field’, ‘Display bibliographic description’, ‘Print label’, and others. Default properties are the values predefined for carrying out a task. For example, to create a catalog record,
catalogers may want to set certain properties such as MARC as catalog format, LC as classification scheme, and ‘Book’ as an item type beforehand so that they do not have to select them each time a new item is cataloged. Some wizard properties are defined at the client level and others at the server level. It was very difficult for librarians to understand those properties and to set them correctly at the client or server level. This created a lot of confusion among staff. The AAS trainer himself had some difficulty in answering some questions, but he tried his best to teach the staff how to do basic things in each module. Following the basic training, an arrangement was made with the local vendor to send the trainer to the library twice a week for 3–4 hours for providing onsite-assistance to the library staff as they tested core modules of Symphony. A training room was created with five workstations and workspace for the trainer. This arrangement worked very well as librarians took full advantage of the presence of the trainer in the library. Whenever they got stuck and did not know how to proceed, they sought and received immediate help from the trainer.

Testing
Most of the initial testing work was done by our staff without receiving any training, especially for Cataloging, Circulation and iBistro. The staff mostly worked on their own with the help of Symphony training guides and with some assistance from the AAS trainer. They tested various functions and features of each module. But many functions remained untested for the lack of knowledge and training, such as Electronic ordering, ILL, and Global authority change. By the time we completed testing, a new release of Symphony (3.2.1) came out in May 2008. At that time we decided to implement the latest release. The fall-out of this decision was redoing the entire process from installation to testing of the system. Our previous work and the time spent on testing were partially wasted, but we utilized what we learned earlier in retesting the next release. We therefore, decided that release 3.2.1 is the one we will work with until migration is completed, even if the next release comes out during this period. It was a timely decision as the release 3.3 came out in July 2009 and 3.3.1 in December 2009.

System design problems. These are the problems the local vendor could not solve because of system design limitations. Some of these problems were even referred to SirsiDynix.

1. To create a catalog record, a call number must be created. This is a problem for us as we have two types of records which do not require call numbers, such as Vertical File (VF) materials which include newspaper clippings, articles, etc. They are kept in VF files arranged alphabetically by subject. The other is the acquisition order created manually, which does not require a subject heading or call number. In such cases we are forced of all modules submitted to the AAS in October 2008 highlighted more than 70 problems, including bugs. Half of them were user problems which were to be fixed locally and the remaining were the system design problems. The following is a list of two types of problems with a brief description of each.

User problems. These are the problems which resulted from not customizing the system according to the local requirements. Once identified during testing, they were fixed by the AAS and the ITC without much difficulty.

1. SmartPort was not working for a few months because the ITC where the Symphony server is located had not opened Z39.50 ports for WorldCat and library catalogs such as LC catalog, OhioLink and Melvyl. As a result, catalogers could not import records from WorldCat and library catalogs for copy cataloging.
2. MARC indicators and subfield, country and language codes tables were not linked to the Catalog format.
3. The system was not generating AUTO item numbers as per our library’s requirement.
4. Because of a migration tool error, all subtitles and part of longer titles were missing. The problem was solved by correcting the migration tool.
5. Call number did not include volume/copy number.
6. For checking out items in Symphony, the item number must have 10 digits otherwise it will give an error – ‘item not found’. On the other hand, item numbers created by DOBIS/LIBIS and Horizon had 6 to 7 digits. This problem was later solved by adding the required number of zeroes preceding all items numbers to make 10-digit numbers.
to create dummy call numbers such as XXX12, but it confuses the users when they see dummy numbers in iBistro and ask questions about them.

2. Unlike Horizon, Symphony does not auto copy call numbers from 050 or 090 to the call number box in item records. The best we can do to avoid making any mistakes in manually adding call numbers is to use the old-fashioned copy and paste of data from 050 and (in the case of local call numbers) 090 fields.

3. Title control number (TCN) is a unique number that identifies a catalog record in Symphony. It is also used as a match point when overlaying bibliographic records. When we manually create a catalog record using the Add Title wizard, the system generates the title control number preceded by a lower case letter ‘a’. However, there is a problem in generating the TCN for records imported through SmartPort. The Title Control Number Source (TCNS) will match incoming records based on some attributes – ISBN, ISSN, LCCN, OCLC, accession number and others defined as default source values. If a match is found with any of the source values, the user can determine whether the Title control number of the existing record should be replaced or retained. If no match is found with any of the source values, the system will create a TCN based on the first source value. If your first source is ‘ISBN’, then ISBN in 020 becomes the control number preceded by an alpha character ‘i’. If your first source value is set as ‘LCCN’ the Title control number will be the Library of Congress Catalog Card Number preceded by a lower case letter ‘i’. The preceding letters for other sources are ‘s’ for ISSN, ‘o’ for OCLC number and ‘d’ for Accession number. The use of these TCNSs creates multiple sequences of control numbers. We tested most of these TCNSs for generating control numbers and finally decided to select the accession number as the one source which will never match with any control numbers of incoming records from WorldCat or LC catalog and thus Symphony will create a new TCN which will be in the same sequence as the TCNs assigned to local catalog records created manually. While the choice of accession number as the TCN solved the problem of sequence in Symphony-generated control numbers, it created a new problem for Horizon records that had only numeric control numbers. We solved it by adding ‘a’ at the beginning of all Horizon control numbers after they were converted into Symphony. Despite doing so much to maintain uniformity between old and new numbers, we had to compromise on accepting two sequences – one for the 7-digit numbers of Horizon and the other for the 10-digit numbers of Symphony. The advantage of having different sequence numbers is that we can easily tell which ones are Horizon records and which ones are Symphony records, if we want to.

4. Unlike Horizon, adding an item record to the bibliographic record in Symphony is done in two steps – one step to add the call number information and the other to add the item information. In Horizon, both call numbers and item information are added on a single screen.

5. Unlike Horizon, Symphony does not create authority records automatically from the bibliographic record. As a result, when we create a catalog record with new names or subject headings already verified in LC authorities as valid headings, the system treats them as unauthorized because it does not find matching headings in the local authority file. There are two ways of handling this problem – either for catalogers to manually validate these headings through a lengthy process of several steps, or to buy SmartSource authority records from SirsiDynix to create a large authority file of over 6 million records. We decided not to buy SmartSource as its subscription is costly, whereas LC authorities are available on the web free of charge.

The staff had difficulty in setting up wizard properties on their own and needed help in understanding them. As Horizon users, they not only found a number of wizard properties in Symphony different from those in Horizon, but the use of them took more time to perform any tasks. However, the staff also believed that providing every bit of information in Symphony could not be without a purpose. There must be some benefits of those wizard properties and we might see them once we fully understood and used them in the production system.

Data conversion

The initial data conversion was done in June 2008 for creating a database for testing Symphony functionalities. This gave us an opportunity also to check the converted data. However, our main focus was on testing various workflows, wizard properties, catalog format, code tables and others. The complete data from the Horizon database were converted into Symphony on 21 July 2009 for matching one-to-one data in Horizon and Symphony. The conversion result
Table 1. First data conversion statistics.

<table>
<thead>
<tr>
<th>Record type</th>
<th>Count in Horizon</th>
<th>Count in Symphony</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorities</td>
<td>343,777</td>
<td>343,777</td>
<td>Mostly serials solutions MARC records</td>
</tr>
<tr>
<td>Bibs without items</td>
<td>28,179</td>
<td>28,179</td>
<td>24 rejected</td>
</tr>
<tr>
<td>Bibs with items</td>
<td>223,605</td>
<td>223,581</td>
<td>24 rejected</td>
</tr>
<tr>
<td>Items</td>
<td>409,620</td>
<td>409,596</td>
<td></td>
</tr>
<tr>
<td>Borrowers</td>
<td>23,364</td>
<td>23,364</td>
<td></td>
</tr>
<tr>
<td>Departments</td>
<td>NA</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Staff accounts</td>
<td>NA</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>System accounts</td>
<td>NA</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Checkouts</td>
<td>4,204</td>
<td>4,204</td>
<td>Before converting to MARC holdings format</td>
</tr>
<tr>
<td>Unpaid fines</td>
<td>1,610</td>
<td>1,610</td>
<td></td>
</tr>
<tr>
<td>Items on hold</td>
<td>38</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Serials holdings</td>
<td>148,538</td>
<td>148,538</td>
<td></td>
</tr>
<tr>
<td>Periodicals copies</td>
<td>770</td>
<td>770</td>
<td></td>
</tr>
<tr>
<td>Vendors</td>
<td>22</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Vendor cycles</td>
<td>NA</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Funds</td>
<td>49</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Fund cycles</td>
<td>NA</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>POs</td>
<td>268</td>
<td>257</td>
<td>Missing 11</td>
</tr>
<tr>
<td>PO lines</td>
<td>11,411</td>
<td>11,403</td>
<td>Missing 8</td>
</tr>
</tbody>
</table>

turned out to be very encouraging (see Table 1). Of the 223,605 bibliographic and 409,620 item records, only 24 records of each type were rejected by the system. After checking these records we found that they had become corrupted for unknown reasons. Nineteen order records were rejected either because of broken links between order and bibliographic records or because more than one budget cycle was attached. All other types of records were converted with 100 percent success rate. Achieving such a high percentage of success in data conversion was also due to the enhanced database maintenance activities performed by the Library staff prior to system migration.

Following data conversion, the library immediately started checking all types of data to make sure that the converted data were complete and matched exactly with the Horizon data. The Library staff identified a number of problems in each type of converted data.

Bibliographic data

1. Because of limited field length, all subtitles and part of longer titles were missing. The problem was caused due to an error in the migration tool, which was corrected by the local vendor later.

2. The copy number was separated from the call number and was placed in a separate box, which made the call number misleading. We wanted to have the copy number as part of the call number. The problem was resolved by adding a subfield code ‘z’ to the call number field for repeating the copy information from the copy information box.

3. The display format of authority records lacked dashes between subject headings and their subdivisions.

Authority data

Initially all MARC and Non-MARC authorities were converted into Symphony thus achieving a 100 percent success rate. However, later we decided that in the final conversion we will drop all non-MARC authority data to keep the authority file clean.

Circulation data

A small sample of 100 records of all types of borrowers were checked in Symphony and 99 percent of them were found correct. Only 1 percent of the records had some minor problems, such as the fine amount SR 35 appeared as SR 385 in one case due to an error in the migration tool which added the waived fine and the current fines. In another case the User block field did not show the borrower’s accrued fines.

Acquisitions data

Acquisitions data have been messy in Horizon due to the lack of understanding of various functions and features on the part of acquisition librarians and their working through trial and error. They used to perform some basic functions only, such as ordering and claiming, and receiving invoices. Budgeting, accounting, and paying invoices were not done online and all
payment processes were carried out manually. Serials librarians did not make any serious efforts to use the Acquisitions module for creating subscription orders in Horizon. Therefore, we did not have a large amount of acquisitions data to convert from Horizon to Symphony, as is evident from Table 1. We missed out only one vendor record, which was not created correctly and was deleted. All 49 funds records were converted successfully. Both Horizon and Symphony assign one number to each Purchase Order, commonly known as PO. Each PO will have multiple orders called PO lines. In extracting order records from Horizon, the vendor used the following two conditions: (1) orders must be linked to bib numbers, and (2) they must not have more than one fund cycle. Only 11 POs were rejected for not meeting the first condition and eight PO lines could not be converted because they were attached to more than one fund cycle.

Serials data
Due to different structures of prediction and binding patterns in Horizon and Symphony, it was not possible to convert them from Horizon to Symphony. However, one notable achievement in data conversion was the transfer of serials holdings data from a non-MARC format (Horizon 7.3 does not support MARC Holdings format) to MARC Holdings format. The difference between Holdings data counts in Tables 1 and 2 is that Table 1 shows the serials total items count as 148,538 in Horizon and since all of them were successfully converted, the items count remains the same for Symphony. But when the serials item records were converted into the serials Holdings format in Symphony, the number count represents the serials titles and not the items.

Final data conversion. Between June and December 2009, we fixed or deleted most of the rejected data in the previous conversion. In addition, we speeded up our database maintenance work in order to further clean up our data before the final data conversion was done on 15 December 2009. Table 2 presents the final data conversion statistics. The difference in numbers of some record types in the two tables are visible; for example, the number for Bibs without item records drops from over 28,000 to 5,424 because over 22,000 Serials Solutions MARC records were deleted following the library administration's decision not to renew the subscription of Serials Solutions for 2009. Similarly, between June and December, we deleted thousands of non-MARC and duplicate authority records thus reducing the number by more than 8,000. Another 586 non-MARC records were rejected by Symphony in the final conversion. The increased number counts of certain record types are due to the addition of new items to the library collection and circulation, serials, acquisition activities performed between June and December 2009. Four POs with 151 PO lines were rejected by Symphony for one of the two reasons—either the link between POs and bib # was broken, or more than one budget cycle was attached to the four POs.
Conclusion

The KFUPM Library has been the leader in library automation in the Middle East since 1981. With the successful migration to Symphony, we have become the first academic library in the region to implement all core modules plus iBistro, the online catalog, and four optional modules—Reserves, Requests, Reports and Offline (Circulation backup) with full Arabic interface. Two more (ILL and Selection) will be implemented in the near future.

Libraries in the Middle East being far away from the parent companies of their ILS’s are at a disadvantage in not getting direct expert technical support. Even if they try to contact the parent companies for help or answers to questions, they are asked to contact their local vendors. Unfortunately, local vendors do not have the required expertise and resources to provide the level of support the parent companies provide to their user libraries in Europe and North America (Khurshid, 1998). The quality and extent of vendor support that western libraries get for installing or migrating to new systems enables them not only to learn system functionalities better but also to prepare a workable and achievable implementation plan within a stipulated time. Wang (2009) suggests four keys to a successful system migration, including solid system design, careful implementation, smooth production and thorough training. In this part of the world we do not get thorough training, as a result, the implementation plan runs into difficulty and the project deadline is extended several times. Our system migration experience should be viewed in this context and not compared with the experiences of western libraries. Having gone through some difficult times, the important thing for us is the end result—a successful migration from Horizon to Symphony.

References


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