

ABCD : a new FOSS library automation solution based on ISIS¹².

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Abstract : The new ABCD software for free and open library automation with ISIS is presented with its technological and practical characteristics. As a web-based integrated solution it combines most (if not all) functions of other systems such as KOHA with the flexibility of the (Win)ISIS software to create and handle databases of any structure. The main technical characteristics as well as some managerial issues are briefly presented. The planning on the further work is discussed along with some challenges related to the specific nature of the ISIS users community.

Introduction

The CDS/ISIS software, initially developed and supported by UNESCO since decades, has developed into a 'family' with many sister-software using the same database technology for text-retrieval, and evolved from main-frame to PC-DOS, PC-Windows now into web-based technology on various platforms. The main actor nowadays is BIREME (PAHO/WHO, Brazil) where the software is used in very advanced ways to run online databases (bibliographical and full-text) of millions of mostly medical documents.

For many people CDS/ISIS always has been a 'library software', which in essence is wrong since the software only provided a general-purpose text-retrieval database solution. It was and still is mainly used in libraries, and library automation indeed can be done nicely but with major development efforts to this needing added, as shown by e.g. the WEBLIS software with web-based integrated library functions.

Also BIREME has been developing specific library functions based on ISIS, such as a 'Serials Control System' (SeCS), a web-based OPAC (iAH) and advanced loan management (EMP). Based on modern web-technology possibilities, such as AJAX, PHP-scripting etc..., the idea has grown to produce a full-blown library automation system combining the available ISIS-technology into one all-encompassing software to finally provide the ISIS users with a real library system indeed.

With the (financial) support of the Flemish Interuniversity Council (Development Co-operation section) (VLIR/UOS), BIREME (OPS/WHO, Brazil) is now presenting the results of a major development effort on the 'Automatisación de Bibliotecas y Centros de Documentación' or ABCD software - the credit for the name goes to Abel Packer, BIREME director and long-time ISIS aficionado.

¹ This article is based on the presentation on ABCD held by the author at the 3rd International Conference on ISIS, Rio de Janeiro (Brazil), 14-16 September 2008.

² ISIS refers, as a more generic name, to the CDS/ISIS software standard, see a.o. its home page <http://www.unesco.org/isis>

ABCD also marks the shift – both by UNESCO and BIREME – towards full ‘Free and Open Source Software (FOSS)’ and builds on the free availability of both the sources of the codes and a ‘developers community’ (web-based) environment. The GNU Public License (GPL) is chosen as the most appropriate model.

The support of the Belgian VLIR/UOS is based on the need to offer such free software to its university library partners, many of them already using ISIS but in need of more advanced tools with respect for established standards or protocols such as MARC, METS, OAI/HP, Z39.50. Also full UNICODE-support is required (to allow usage of different scripts, e.g. Amharic language in Ethiopia); this technology allowing simultaneous use of quite different scripts is important in view of the international and multicultural mandate held by UNESCO.

ABCD technology overview

Basic technological features

ABCD uses the following technologies :

- A. Multi platform : it will run on Windows, UNIX/Linux and OS/X.
- B. Multi-lingual : it will run independent from the language and many language versions can and will be produced.
- C. ISIS databases : all data are stored in ISIS-databases, using current but extended capacity (1 Mb record limit, 4 Gb database limit, 60-character inverted file keys). However as soon as available, the new ‘Network Based Platform’ of ISIS will substitute for this older technology and take away all sexisting limitations and add full UNICODE functionality.
- D. ISIS-Script : for flexible retrieval and formatting of ISIS-records, the ISIS-Script language is used, of course – as this is the nucleus of ISIS – combined with the power of the Formatting Language to ‘mould’ data from the records.
- E. PHP : this very widely used FOSS software for web-pages scripting (currently in its 5.2 version), adds lots of existing functions, controls and tools to ISIS. For advanced interactivity in a web-environment AJAX-technology is used, emphasizing local ‘client-based’ processing to minimize of limited internet bandwidth usage, which is a typical problem of the mainly ‘developing world’ characteristics of the ISIS-users community.
- F. JavaScript : again very widely used, this technology adds possibilities to have information locally processed within web-pages and to make these pages more flexible/interactive.
- G. Client-Server : the meanwhile familiar web-browser (in principle any of the known ones : MS IE, Firefox, Opera, Chrome, Safari...) acts as the client whereas the server has a web-server (e.g. Apache) forwarding all page creation requests to an ISIS web-server executable (currently WXIS, to be replaced by the NBP version soon). ABCD will both provide classic CGI-based interaction (where all pages are requested through the http-protocol with web-server based security) and direct calling of the ISIS-server executable (faster in a well-protected ‘localhost’ environment).

The installation of the software therefore requires some carefully taken steps :

- A. installation of a web-server (the free Apache seems to be most the most likely candidate) with proper access rights given through 'aliases' (or virtual directories) to allow writing to the databases;
- B. installation of PHP with some advanced add-ons such as XSLT support and YAZ (for the Z39.50 client built into ABCD);
- C. installation/copying of the demo databases, the many scripts with help pages etc.;
- D. editing of the correct file system paths to system parts and variables, e.g. the responsible institute's name, in a simple text file 'CONFIG.PHP'.

Of course, after its current 'alpha' and soon upcoming 'beta' test versions the software will be presented with a full installation package, avoiding most of these far-from-obvious technical challenges. However being a sophisticated web-based software, simplicity cannot be fully reached, but examples of e.g. 'WAMP' or 'EasyPHP' are already showing the way in this respect.

Functionality and modules

ABCD is an integrated library automation software, which means that it offers all main functions in a library system. Some major bibliographic standards are offered by default : MARC, CEPAL, AGRIS. But, and this is special we think (and is reflected by the addition 'CD' for 'documentation centers' in the name), the system will also offer a very flexible environment for web-based management of all sorts of documents and textual databases, including full-text without pre-defined structures.

'AB' : modules for automation of libraries

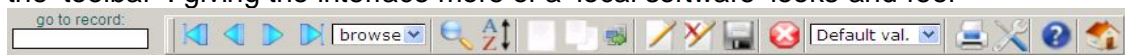
The classic library automation (automatisación de bibliotecas) modules are presented as follows :

- A. ***Users management and access control*** : a database is maintained with user-names and passwords and access control to an unlimited number of databases in 4 authorization levels (system administrator, database administrator, database operator, loans operator).

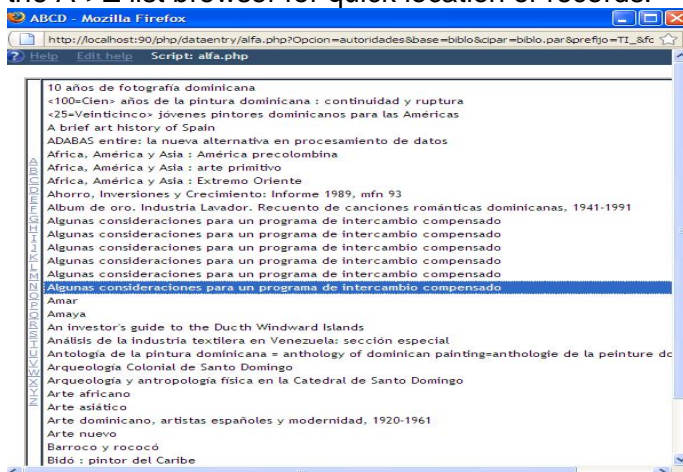


- B. ***Cataloging*** : one or more catalog databases in any of the defined bibliographic formats (MARC, CEPAL and AGRIS having been pre-defined) can be browsed, searched and edited. Records can be created, modified, copied, deleted, imported and exported (from ISO2709, TXT and XML input). A Z39.50 client can download MARC-records from existing online catalogs with, if defined, on-the-fly conversion (also applicable to exported records). The display formats (selectable from a menu) are based on the ISIS Formatting Language (meaning any number of formats can be used), editing forms and both field- and record-validation all are externally definable with access to thesauri, pick-lists from authority databases etc... with all values produced by the powerful Formatting Language. Two highlights in the cataloging module are :

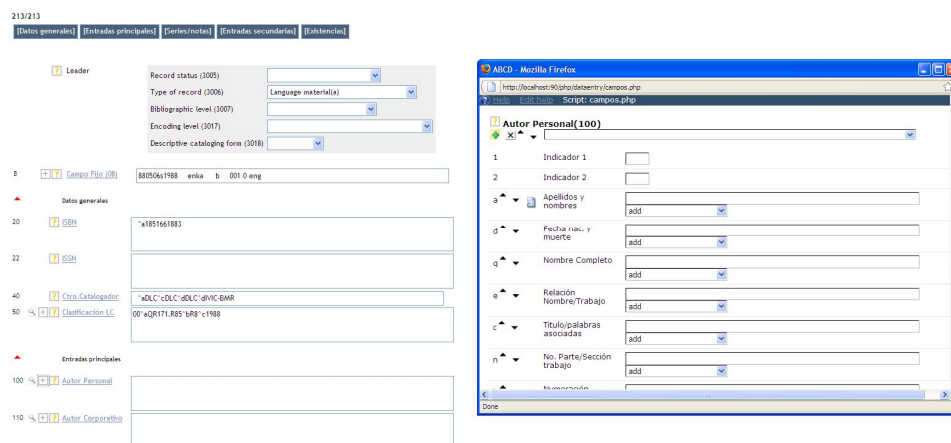
- a. the 'toolbar' : giving the interface more of a 'local software' looks-and-feel



- b. the A->Z list browser for quick location of records.

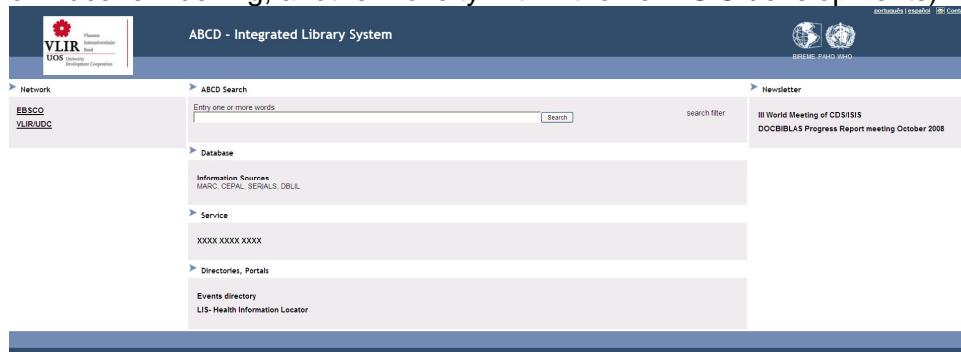


Needless to say that all ISIS-fields and subfields (as intensively used in MARC) can be edited individually without a need to know the internal coding, repeatable occurrences of fields can be easily added and all elements have help-pages documenting their meaning. In the MARC structure separate interaction with the so-called 'fixed-field' values is provided.



- A. Site with OPAC : a 'home page' integrating the end-user search (basic, with advanced as an option) with a CMS-editable environment page (for links with information resources, partners, news items etc... is based on the iAH software which BIREME uses for its main information products. This search-interface allows searching (and merging results) from several databases or individual databases, and ranked and cluster-based presentation of search results (based

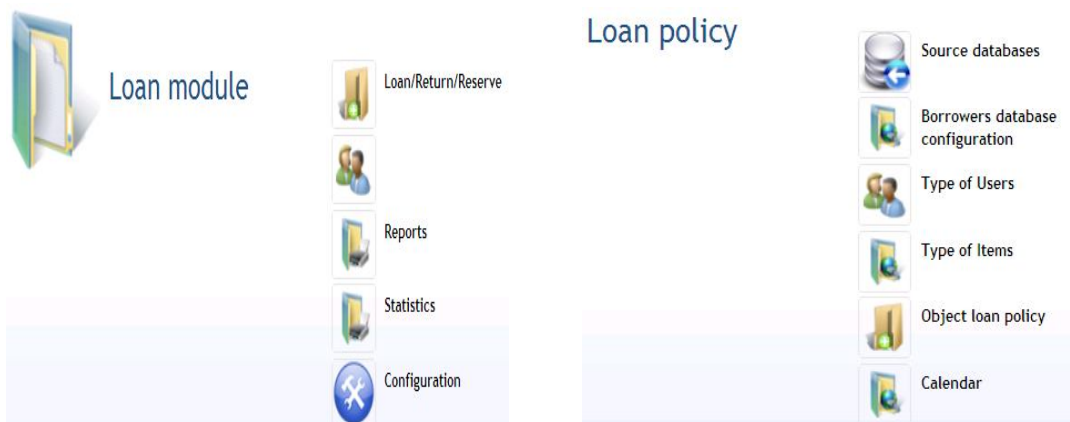
on Lucene indexing, another novelty within the new ISIS developments).



- A. Serials Control System : a separate module allows management of a database of serial publications along with individual editing of all issues.

ID	Titulos	Ações no Título	Ações nos Fascículos
513	Electroencephalography and clinical neurophysiology	Editar Título Apagar	Inserir Fascículo Editar Fascículo
827	Journal of the national cancer institute	Editar Título Apagar	Inserir Fascículo Editar Fascículo
863	Journal of reproduction and fertility	Editar Título Apagar	Inserir Fascículo Editar Fascículo
878	Journal of tropical medicine and hygiene	Editar Título Apagar	Inserir Fascículo Editar Fascículo
1172	Scandinavian Journal of clinical and laboratory investigation	Editar Título Apagar	Inserir Fascículo Editar Fascículo
1500	Jikeikai medical Journal	Editar Título Apagar	Inserir Fascículo Editar Fascículo
1523	Medical Journal of Osaka University	Editar Título Apagar	Inserir Fascículo Editar Fascículo
2355	International Journal of psychiatry	Editar Título Apagar	Inserir Fascículo Editar Fascículo
3094	European Journal of respiratory diseases	Editar Título Apagar	Inserir Fascículo Editar Fascículo
3117	Chinese medical Journal (Beijing)	Editar Título Apagar	Inserir Fascículo Editar Fascículo
3898	Italian Journal of biochemistry (English edition)	Editar Título Apagar	Inserir Fascículo Editar Fascículo
8631	Journal of Reproduction and Fertility, Abstract Series	Editar Título Apagar	Inserir Fascículo Editar Fascículo
9945	Journal europeen de radiotherapie; oncologie, radiophysique, radiobiologie	Editar Título Apagar	Inserir Fascículo Editar Fascículo

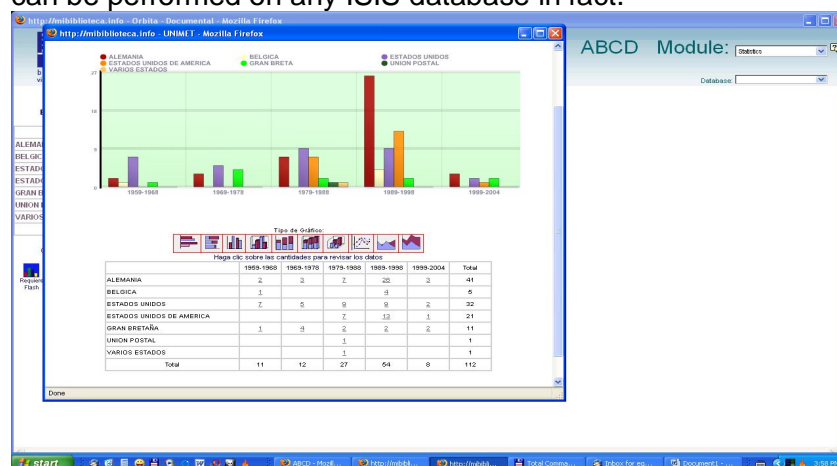
- A. Loans management and Statistics : the loans implementation is fully rules-based, meaning that any number of rules (regulations) can be defined on any number of object types for any number of users for reservations, loaning out and returning library objects. Book items can be either retrieved from a separate database of items or, alternatively (for simpler systems) from a repeated field in the catalog.



The Statistics module works in 2 steps :

- Definition of data to be table in a numerical table (from any field in any database)
- Graphical presentation of the tables based on existing advanced PHP graphing controls.

This means that not only the circulation system can be monitored, but analysis can be performed on any ISIS database in fact.



- A. Acquisition module : as this is probably the least important feature certainly in the Developing World (where acquisitions mostly are confined to gifts and exchange), this module will come last and only in a rather limited implementation, combining 'pre-cataloging' functions with the management of a providers' database.

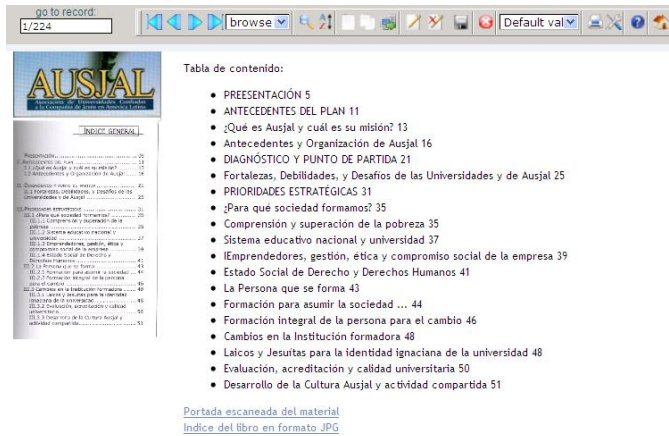
'CD' for Documentation Centres

ABCD wants to be more than just a library automation software. (CDS/ISIS always has been much more, i.e. a general-purpose tool for management of textual databases. This capacity has been, and still is, widely used throughout the world, both in the South and the North, by thousands of information and documentation centers where no pre-defined structures or standards were or are available.

ISIS-users used to use CDS/ISIS for DOS or WinISIS to define their own structures (with Field Definition, Field Selection, Print Formats and Worksheets) for any kind of data. Due to the built-in feature of ISIS to easily handle repeatable fields with variable number of occurrences and length, no relational capabilities are required for the designer – although by linking databases a semi-relational structure can also be used with the advantage that relations are only used 'as-needed' (run-time).

All this is now available also in the ABCD web-environment, with some additional capabilities based on the rich web-environment :

- full text documents : text-content from documents can be inserted in the rich-text editor provided by PHP (FCKeditor is used); current record limitation is 1 Mb but this limit will be dropped with the adoption of NBP in the ISIS Software Family soon;
- links : html-links ('') can easily be embedded to call upon the 'hypertext' navigation features of the web
- multimedia : the WWW is multimedia, so ABCD gives easy access to such multimedia documents.



ABCD therefore has been tested with databases on factual information (such as contacts databases, laws/regulation sets) and multimedia applications as well (image databases, museum catalogs – where ISIS is increasingly used - etc.).

The software provides full interfaces to create and manipulate database structures :

- field definitions, editing worksheets, print formats, field indexing tables
- validations on both field- and record-level
- copy structures from existing ones
- importing/exporting from existing databases or TXT (CSV), ISO2709 and XML-data

- [Field definition table \(FDT\)](#)
- [Field selection table \(FST\)](#)
- [Worksheet](#)
- [Display format \(PFT\)](#)
- [Type of records](#)
- [Record validation](#)
- [Advanced Search form](#)
- [List of available databases \(bases.dat\)](#)
- [dbn.par](#)
- [Help files on the database fields](#)
- [Configure Database in IAH](#)

- lock/unlock, initializing and deleting of databases.

As with the library automation part on cataloging, all fields can be entered using any HTML-Form element (textarea, select list, radio-button) and based on any authority database. To this end the 'classic' ISIS Field Definition Table was largely extended with new columns, e.g. name of authority database, validation formats, help-pages etc.

BIREME - in co-operation with VLIJ/UDC

ABCD

Field definition table (FDT): biblo

help

Add row before selected Remove Selected Row

Rows	Type	Tag	Title	t	R	Subfields	pre-literals	Input type	rows	cols	Type	Name	Prefix	browse	Display format (PFT)	Extract as	Default value	help
1	Heading		Datos generales															
2	Field	4	Tipo de literatura					Text-Textarea	2		Table	tag4 tab		browse				
3	Field	5	Nivel de registro					Text-Textarea	4					browse				
4	Field	9	Tipo de material					Text-Textarea	30		DB	TM_		browse	@autoridades.pft			
5	Field	3	Sign. topográfica			abocle	////	Text-Textarea			DB	ST_		browse	@autoridades.pft			
6	Field	104	Ubic. física					Text-Textarea			DB	UB_		browse	@autoridades.pft			
7	Field	10	Autores pers. (A)			-brfn	~(*)	Text-Textarea			DB	AU_		browse	@autoridades.pft			
8	Field	11	Autores inst. (A)			-b	/	Text-Textarea			DB	AI_		browse	@autoridades.pft			
9	Field	12	Títulos(A)					Text-Textarea			DB	TL_		browse	@autoridades.pft			
10	Field	13	Título traducido (A)					Text-Textarea						browse				
11	Field	16	Autores pers. (M)			-brfn	~(*)	Text-Textarea			DB	AU_		browse	@autoridades.pft			
12	Field	17	Autores inst. (M)			-b	/	Text-Textarea			DB	AI_		browse	@autoridades.pft			
13	Field	18	Títulos(M)					Text-Textarea			DB	TL_		browse	@autoridades.pft			

Test List Validate Update

The ABCD resource people think this feature of flexible, multi-purpose but relatively easy database creation differentiates ABCD from most other library automation solutions,

preparing the libraries for much more information provision roles than just their own catalog.

As all this is offered in a multi-lingual tool, with full UNICODE-support upcoming, it is argued that such initiative fully supports the ambitious aims of the '*IFLA Multicultural Library Manifesto*'³ (see : <http://www.ifla.org/VII/s32/pub/MulticulturalLibraryManifesto.pdf>) , which a.o. should "develop culturally diverse and multilingual collections and services, including digital and multimedia resources; allocate resources for the preservation of cultural expression and heritage, paying particular attention to oral, indigenous and intangible cultural heritage;".

³ This Manifesto was approved by the Governing Board of IFLA in August 2006 and endorsed in April 2008 by the Intergovernmental Council for UNESCO's Information for All Programme with the recommendation that it be submitted to the 35th session of the General Conference of UNESCO for consideration.

ABCD further development planning

Timing

At the Rio Conference (September 2008) a first test version of the ABCD software was distributed, mainly to allow people to get a sense and feeling of the software and to consider participation in the major translation efforts (of not only the software, but also documentation and training materials).

A real, full-fledged beta-release of the software is envisaged to be ready by the end of 2008. This version will then also contain the full Loans module (with statistics) which was only demonstrated at the Conference, and a rather basic Acquisition module. The project 'Development Of and Capacity Building in ISIS Based Library Automation Systems' (DOCBIBLAS) of VLIR/UOS needs a first release by mid March 2009 for its first pilot workshop on the software (for its own partner university libraries). Also this version for VLIR/UOS needs to become available in three languages : English, Spanish and French. BIREME of course will have added a Portuguese version as well, but more language versions are most welcome and for this the world-wide ISIS users community will have to be engaged, which requires good co-ordination and management efforts (see *infra*).

Migration to the new Network Based Platform of ISIS

Another major planning element is the migration of ABCD to NBP, the new underlying ISIS technology being developed currently by BIREME. This will provide full UNICODE support, database capacities only limited by hardware (not software) and technological co-operation schemes based on the 'ISIS-cell' philosophy, in which all different ISIS-implementations present themselves as independent but communicating units encompassing both the data, a command-line tool to manipulate the data and a gateway for allowing other protocols (e.g. http, cgi) to interact with the cell.

This migration in principle will be 'seamless', i.e. transparent to end-users but also system managers, as only the most basic layer of the system will be substituted (e.g. with another cgi-server in ABCD). Since NBP also, like J-ISIS, relies on Lucene indexing, full-text searching and ranked/clustered presentation of search results will become normal practice with ABCD in the course of 2009.

ABCD management issues

More and different co-ordination efforts needed

With the shift towards FOSS a new model of technical support and management of the software is needed. While ISIS always has been 'free' (no payment), the software development was rather well controlled : mostly within UNESCO, later within BIREME under quite strict 'closed' supervision. The basic software structures were published, allowing others to program their own solutions based on the same standard – which has been done indeed all over the world and a project 'OpenISIS' had run on SourceForge in

the years 2003-2006 – and the software itself had a very open architecture also promoting the production of diverse applications ⁴.

Building on the United Nations mandate

The limited resources of UNESCO to deal with these developments now require new management structures to be set up. At the 3rd International Conference on ISIS (Rio de Janeiro, Brazil, 14-16 September 2008) it was decided to establish therefore an 'ISIS International Steering Committee' whose main goal is to promote, through lobbying, co-operation in between UNESCO and BIREME (based on a Memory of Understanding) and organize the users' input into the development and documentation processes. One central idea is that UNESCO should not only welcome and fully adopt BIREME's technological achievements but also help in making these available to all partner countries (not only the Latin-American ones directly served by BIREME).

Two or three other UN-related organizations c/should also join this effort : FAO (Rome, Italy) has been using ISIS technology for more than 15 years in its world-wide 'AGRICIS' and 'ASFISIS' systems and libraries, and also UNEP (Nairobi, Kenya) uses ISIS for its libraries and bibliographic projects.

More joint efforts could reinforce the ISIS developments, now with even more focus on training and capacity building on the new ISIS-products presented in Rio. Training and capacity building are at the core of both the UN's development philosophy and the ISIS project to promote sustainability and self-sufficiency in the participation by the South in the global Information/Knowledge Society, esp. with the 'Information for All Programme' (IFAP) ⁵.

Working together to secure compatibility and preserve the ISIS identity

Co-ordination will also be needed to secure compatibility in between the new BIREME-based ISIS software products, for which the FOSS support is using a developers' environment at BIREME itself (redes.bireme.br) and the new UNESCO-based J-ISIS (a client-server JAVA implementation of the software, using Sun's java.org platform for open source development). Again co-ordination here requires both technical co-ordination (J-ISIS uses Berkeley DB as a storage engine, while BIREME's NBP is still identifying the best choice but taking Berkeley DB as an excellent candidate), but also working together at the more practical levels, e.g. using different developers' communities tools adds complexity into this big challenge.

The main challenge however will be the preservation of the identity of ISIS as a software family, with its own medium-level application development tool (mainly the ISIS Formatting Language) allowing local system managers to fully manipulate the software to a locally owned tool – 'ownership' in this case again requiring capacity building for self-sufficient control of the software. Through avoiding the – for documentary applications – unnecessary complexity of relational systems, while still using excellent document handling technology, ISIS provides such possibility more than most other solutions, at least in principle.

⁴ See : de Smet, E. 'The ISIS-software family : from 'Free and Open' to 'Free and Open Source Software'. Innovation, Journal of Appropriate Librarianship and Information Work, June 2008

⁵ See UNESCO's website, esp. <http://portal.unesco.org/ci>

ABCD aims at proving this point too, but will have to cope with the specific nature of most of ISIS' user communities : highly dedicated and motivated but with quite poor resources (in many cases even to connect with other users !) and relatively low levels of capacity and skills.

Final observation

This finally brings us to the core questions at stake, whose answers will get – hopefully – a catalyst factor from the ABCD project :

- A. Is library automation, at an advanced level incorporating currently available state-of-the-art software technology (such as WWW – even WEB2.0 -, full-text documents and ranked retrieval), omitting unnecessary complexity since such basic complexity is unavoidable in a complex environment, viable in developing environments, even if given for free ?
- B. Is international co-operation, lead by some major UN-bodies (UNESCO, WHO, FAO...), capable of indeed promoting this ?
- C. Is Open Source collaboration, not only in the software coding but also, perhaps more importantly, in the production of help pages, documentation and training materials, a suitable model, if properly set up, to reach such high goals ?

This article, which only aimed at initially presenting ABCD, will not give these answers of course. But we hope, by putting the questions clearly on the table, that efforts can be more focused towards reaching these goals, and that answers therefore not only will come well delineated but also more positive.