

An experience of collaborative work: Reengineering of IsisMarc. On the way towards ABCD

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1.- Introduction:

1.1.- IsisMarc. Context.

UNESCO-IsisMarc is a tool for cataloging bibliographic records that enables the use of the standard international format MARC21ⁱ on ISIS technology. This technology is the most used in Libraries and Documentation Centers in Argentina. IsisMarc is complementary and interoperable with UNESCO-Winisisⁱⁱ. Adopting the MARC21 standard for cataloging bibliographic information reported qualitative and quantitative advantages in the production of bibliographic databases: the librarians are direct beneficiaries as they execute copy cataloging processes, improving the productivity and generating an indirect benefit for the end users with the reduction of the lapse of the publication's catalogue and availability in the institution's online catalog. To cite an example, in the consortium of Universities of Catalonia, the level of use of copy cataloging reaches 70% of the publications received.ⁱⁱⁱ

IsisMarc is a free software product, available under GPL license. The SIU Consortium -a consortium of 27 National Universities with the mission of generating technological tools to support public management in a collaboration space by applying the concept of communities of practice- took over its maintenance in 2003, performing thenceforth various contributions, producing 2 official versions (1.53 and 1.542) that were reported in the UNESCO web portal.^{iv}

This work seeks to solve key requests of the current tool, such as: the adequate management of concurrent access, performance through the web, security and quality control of bibliographic records through the use of authority records. Being an open software tool, the SIU Consortium seeks to encourage and motivate the incorporation of new actors in the generation of improvements and innovations in the product.

Due to its nature of a Consortium of National Universities, the SIU Consortium makes use of the intellectual capital and the key competencies from the institutions that constitute it. Therefore, the SIU Consortium and the CVI-FACET (a Research and Development group specialized in documentary information of the Science and Engineering Faculty of the National University of Tucuman) contact each other and create a collaboration project. This project, of a limited duration of 8 (eight) months, specifies the tasks to be performed, the framework of technical collaboration, the financing and the means of communication and knowledge transfer to enable them.

Paralelly, the Brazilian BIREME/PAHO/OPS organization is developing an integrated management tool for libraries called ABCD, which will be released under GPL license. This tool, although still in development and evolution, but according to the available demo and specifications, is expected to become a de facto standard in the community of ISIS technology users in Latin America.

1.2.- Background.

1.2.1.- Considerations about IsisMarc:

- It has been implemented in different libraries in Argentina and abroad, with a high degree of acceptance.
- 12 (twelve) national and international training activities in relation to the tool and MARC21 format in general have taken place. There is a critical mass of users and knowledge concerning the tool.
- It has been translated to five languages and implemented in countries like Uruguay, Chile, Colombia, Venezuela, Ecuador, Poland, Brazil, France, Namibia and Panama.
- It has been created in Microsoft proprietary programming language Visual C++, due to the fact that its field of use is restricted to Windows environments.
- The application works on a network basis with constraints related to Data Access base technology (Isis-DLL).
- There are commercial initiatives concerning in-person and online training in the use of the tool in countries like Brazil and Peru.

1.3.- Objectives.

1.3.1: General Objective:

To formalize a first cooperative work experience between the SIU consortium and a Research and Development Team of the National University of Tucuman - Science and Technology Faculty (Tucuman - Argentina), throughout distributed synchronous and asynchronous interaction, using tools for the collaborative development of software.

1.3.2: Specific Objectives:

- Partial re-engineering of IsisMarc for its operation under client-server architecture, creation of server interface and implementation of the relations between bibliographic databases and authority records.
- Integrate the development with the BIREME-ABCD, tending to converge towards the same architectures and operation, in order to facilitate the gradual migration of IsisMarc's current users towards this tool, to the extent that it provides the full features it provides to this day.

2.- Materials and Method.

2.1: The group's interaction methodology was carried out throughout the use of the following tools:

- Google-code: Two source code repositories have been enabled (SVN): one for the client and one for the server interface. At the same time, this tool provides the events' management (errors, improvements, tasks, etc) as well as its states transitions, a wiki tool and a space for the final downloads open to the users.
- Phone communication
- E-mail – discussion groups.
- Virtual meetings and conferences: Gtalk and SKYPE

2.2: For the development's concretion, the following tasks were carried out:

- IsisMarc software analysis
 - Study of the architecture, layers of development and classes involved.
- Server component development: PHP based Application, Wxis.

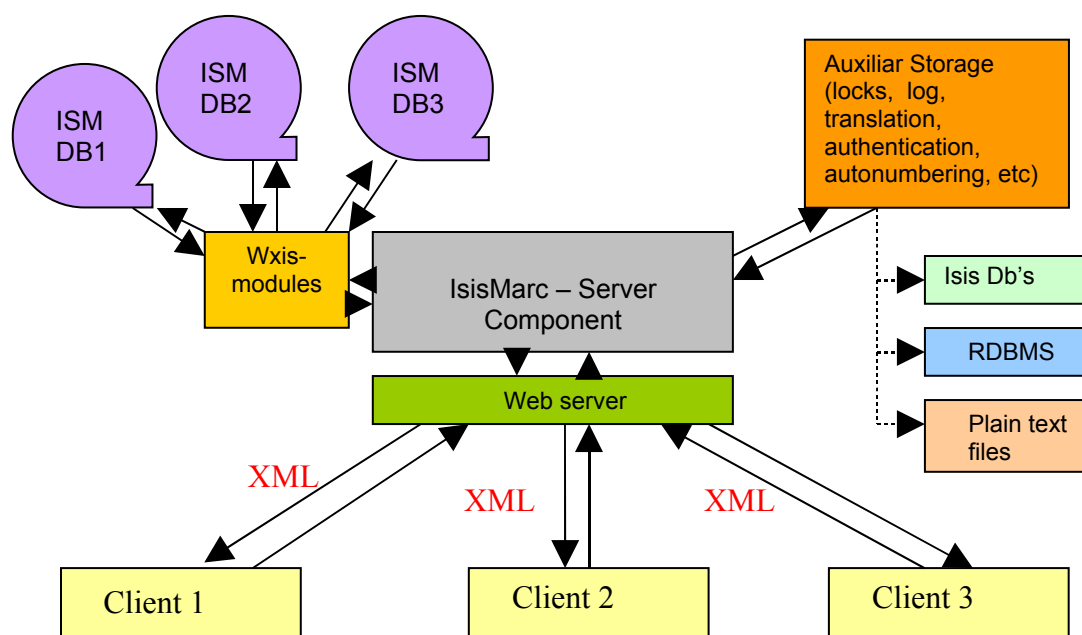
- The web server WosPortable is installed to test the client-server tool in a network of 4-interconnected computers, aimed at distributing and executing it on CD or Pen Drive.

3- Development of the tasks.

Once the internal implementation of IsisMarc is analyzed, the following step is to separate the features that will initially be converted to "consumables services". That analysis was conceptualized under a service-oriented architecture^v, which is to say that the storage layer is replaced by the consumption of a set of protected services through the web, which are provided by the so-called server component. This produces a radical change in its architecture, which must be as transparent as possible for the user, in terms of interface and behavior.

The solution proposed for the server component consists of a development in PHP programming language, which communicates with the bibliographic databases through the BIREME Wxis tool.

Figure 1



The bibliographic databases used in the clients can be transferred to the server using a wizard that will carry out the technological adaptations. This feature is particularly necessary in order to synchronize the tool's operation with BIREME-ABCD.

The authentication method provided by BIREME-ABDC has been used for the access authentications from the clients and in the servers web interface in order to avoid users' and keys' duplications, enabling its progressive integration this way. As for the internationalization of the web screens, the smarty-templates technology^{vi} has been applied (in combination with plain text files) to store the messages that the server component displays in each language. These messages are editable from internal features in the developed platform.

The protocol for information transport and, more generally, the communication between the client and server components, has been implemented through the XML markup language, being that the calls to each service can be called on through http-GET requests (REST-like protocol).

As for the Server component, as can be seen in figure 1, it features a Model View Controller (MVC)-like architecture “controller”^{vii}, that validates the client/s requests (service consumption) and executes a set of predetermined actions. As for the server’s own features, it includes a basic set has that contemplates the edition of the databases that contain the “knowledge” about the definition of the MARC21 fields and subfields, their routes of validation and control.

On the other hand, and in relation to the management of the concurrent access, a different conceptual structure has been added for the management of record locking in view of a significant scalability under a scheme of cooperative cataloging on the Internet. It holds a database implemented with a relational database manager (MySQL) that stores information about the sessions that are currently in use on the server and a log of each of the client’s actions. A monitoring of the server’s status has also been provided, through which it is possible to analyze the connections (services) that the server is taking on simultaneously, the accessed Isis database, the identified user, the duration of the session and each record’s block status.

As for the strategy of record locking, the one used by the legacy tool has been preserved: a pessimistic locking scheme whereby a user appropriates a record -and if nobody else is using it-takes read-write control of it. The duration of that ownership is part of the operating parameters of the server application. At the timeout situation, the client interface alerts of the need for saving to prevent data loss caused by the loss of complete control over the appropriated record.

As for the quality control of MARC21 records, a quality control incorporated in the record provision service has been introduced (which will be made compatible with the one in BIREME-ABCD). This implies that when the record is called in the framework of service provision, it returns to itself, as well as a summary of its quality control. Then, through the consumption of another service, it is possible to get the detail of its quality observations. In this regard, the check of the algorithm of ISBN of 10 and 13 digits, of ISSN and controls similar to those used by the Perl: Marc::Lint^{viii} programming language module have been incorporated.

As to the copy-cataloging features, new means of importing MARC21 records in the client interface have been added, implementing the processing in the MARC21-UTF-8 codification, towards which most of the Z39.50 free sources have a tendency.

A feature has been added related to the statistical analysis of the actions’ log to determine an indicator that is useful in the Libraries’ technical processes areas, such as the number of updated records over the number of new generated records.

3.- Results.

From a quantitative approach, the results of this project can be listed:

- 70 versions on the source code repository of the server component.
- 47 versions on the source code repository of the client component.
- 126 communications via e-mail.
- 47 communications by Gtalk messaging system. Average 1 ½ hour of conversation.
- 3 documents of formal evidence on the tools.

As for intangibles and from the viewpoint of the knowledge transfer, we can enunciate that the process has been successful to the point that the CVI-FACET Group has succeeded in gradually taking over the tool under development. This appropriation has led to autonomous features, for example, the creation of a version that improves the tool’s startup times by applying techniques such as cache tables for the information of higher costs of transmission in the startup of the client component.

4.-Conclusions and learnt Lessons.

The development of software in a collaborative way, when it involves the interaction of geographically dispersed development groups -communicated through technological tools- is a challenge both from the standpoint of management as from the operation. It is interesting to analyze the difficulties that the electronic means of communication introduce in communications of technical complexity, advances and modifications in the tool subject of joint development. This distortion or noise involves consumption of time required to perform an effective transfer of knowledge. That is why it is important to work on careful documentation, standardize terminology, clarify and limit the extension of communications, preserving –at the same time- the positive aspects of personal relations between the teams. In conclusion, we can infer that such a transfer is consolidated through experimentation (including testing) of the innovations introduced by each team. That means that ultimately it is about applying interactive learning, or simply "learning by doing."

An interesting aspect of this experience is the joint work between a technological solutions development unit (SIU) and an R&D group belonging to a National University (CVI-FACET-UNT), which is a small group in terms of HHRR, in consolidation and with an infrastructure for technological transfer in the making. This experience shows that even under the maturing conditions of the R&D group, the transfer is possible. The "negotiation" to combine the guidelines of "pure" research and development has provided interesting results, giving priority to the production of a tool destined for the users' community, combining analysis and experimentation tasks that the R&D group provides as added value to the final work.

As for the technical aspects, what stands out is that this partial re-engineering of IsisMarc has been possible thanks to the original architecture of the development of the tool. This architecture that clearly divided its layers has helped transform a layer of local storage into service consumption, which are provided by a server for remote storage. In any case of the initial analysis and the generation of concept testing, it showed that certain features of less use in the stand-alone tool should be restricted, since its conversion to consumable "service" requires resources that make them unworkable. This is how the massive data export and import operations have been relocated exclusively to the server component.

The experience of collaborative work has then been presented, which has resulted in a tool that begins its final testing phase by the users' community. Parallely, an instance of integration with a tool of higher order (BIREME-ABCD) is opening, which will involve learning and accurate and concrete knowledge of it to facilitate their integration and joint operation of both tools. It is then advisable to continue the joint development and research tasks to achieve the objective of a tool that reuses the existing knowledge in the users'community, meets the pending requirements and at the same time takes advantage of the new features introduced by the tool in a growth process, BIREME-ABCD.

5.- Referenced Links

ⁱ MARC21 Bibliographic Format.

<http://www.loc.gov/marc>

UNESCO-WinISIS.

<http://unesco.org/isis>

Ros Ramón, José. What do libraries use networks for? Red IRIS, Red Española de I+D

<http://www.rediris.es/rediris/boletin/46-47/ponencia14.html>

^v IsisMarc. Oficial Site.

http://portal.unesco.org/ci/en/ev.php-URL_ID=11041&URL_DO=DO_TOPIC&URL_SECTION=201.html

^v SOA Architecture

<http://www-01.ibm.com/software/solutions/soa/>

^v Smarty-Templates

<http://www.smarty.net/>

^v Model View Controller Architecture

<http://java.sun.com/blueprints/patterns/MVC.html>

^v MARC::Lint. Perl Module

<http://search.cpan.org/~eijabb/MARC-Lint-1.43/lib/MARC/Lint.pm>

6.-Bibliography

Innovación y Marketing estratégico en el sector Público. Mario Waissbluth. Universidad de Chile.

<http://www.mariowaissbluth.com/descargas/MarketingPublico2.pdf>

Méndez Rodríguez, Eva M. (2003) Catalogación/Organización de documentos digitales: estado de la cuestión, tendencias y perspectivas desde España, in Ontalba Ruipérez, José A, Eds. BIBLIODOC : Anuari de biblioteconomia, documentació i informació, pp. 119-148. Col.legi Oficial de Bibliotecaris-Documentalistes de Catalunya.

<http://eprints.rclis.org/archive/00008088/>

Dunsire, Gordon y Macgregor, George (2004) Improving interoperability in distributed and physical union catalogues through co-ordination of cataloguing and indexing policies. Report.

<http://ccinterop.cdrl.strath.ac.uk/documents/CCICatInterop.pdf>

Catalfo, Chris. LibLime. OSS Web-based cataloging tool. Code4Lib 2008. Oregon State University.

<http://www.code4lib.org/conference/2008/catalfo>