INTERCONNECTION AND SHARING THROUGH WEBSERVICES

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Introduction.

Current communication technologies permit to implement new cooperative work models in which most complex task may be achieved by dividing work among several participants, where communication gets much easier, process are automatized the huge amounts of information are freely shared. These work models offer important advantages for an increasing number of users and Institutions, standing out a higher efficiency, lower costs and higher quality services.

Webservices technology is one of the stilts on which the concept WEB 2.0 is sustained. This technology allows to send information between computers connected to the network, providing a high portability level communication mechanism that permits this interconnection to be made between different hardware platforms and internal data representation, many operative systems, applications developed in several languages or databases and mainly, a very simple language, standardized and efficient for information transport such as XML.

The Library Linkage Project (PrEBi – Proyecto de Enlace de Bibliotecas; www.prebi.unlp.edu.ar) of La Plata National University (UNLP) develops and supports software of internal use and systems widely used in Institutions and Universities of America and Spain. These developments take part in the different projects that PrEBi carries out or is involved in, which are:

- **PrEBi:** LibLink is an initiative generated in the Iberoamerican Science and Technology Education Consortium (ISTEC; www.istec.org) in which a huge number of libraries from ISTEC member Universities share their bibliographic acervus, which permits to researchers, students and teachers that belong to involved Institions to get bibliographic resources not available in its local libraries, in a relatively short time and with very low costs. PrEBi follows this project model and in an active member since 1996 (LibLink initiative operates since 1994). PrEBi is the center of Celsius software development, which is used for many partitipants for user requests managment and automated statistics obtaining.
- **SeDiCI:** The Intelectual Creation Difussion Service (Servicio de Difusion de la creacion intelectual ; http://sedici.unlp.edu.ar) in a project generated inside UNLP and carried out by PrEBi through which teachers, stutents and researchers of this University can publish their grade work, theses and research results, and spread them among the whole comunity. On one hand, the project pretends to return to the comunity part of the efforts invested in the University; on the other hand the aim is to set out a centralized site where anyone can access freely to all the intelectual production generated in UNLP, where creators may contact with researchers in related areas in all the world and where contents are openly spread using very diverse ways.

As can be seen based on the brieft descriptions, project carried out by PrEBi are strongly related with cooperative worjk, document sharing and transmition and contents diffusion. With the purpose of improving the quality of the services offered, all systems developed by PrEBi staff are constantly improved adding to them new functions and updated technolgy, distinguishing webservices addition in both projects for very different tasks and purposes, which shows the flexibility that this technology contributes with to web systems. In this article it will be explained how webservices technology has been adopted for PrEBi developments, and how each project is benefit with the use of these tools.

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SeDiCI: Spreading contents in UNLP libraries portals.

In the area of Digital Libraries, webservices technology is being adopted, specialy for intercommunication between online catalogues, allowing in this way to increase the offer to the end users. Under this premise, inside SeDiCi it has been implemented an access interface for its documents, which can be used for online catalogues for making queries to SeDiCI through a webservice in order to offer to its users both own documents as well as documents coming from SeDiCI servers. It is important to stand out that this operation it made in a total transparent way (for the end user), since communication is established between online catalog servers and SeDiCI servers.
Inside UNLP, this methology has been implemented in Physics Library; this OPAC (Online Publish Access Catalog) connects to SeDiCI to retrieve documents that belong to physics area which are hosted in SeDiCI. This way, when any user or visitor makes a query inside Physics Library website, he gets as result documents from this library as well as documents from SeDiCI. This presents several advantages, among which we can highlight:

- Users of Physics Library has a greater amount of available documents that appear inside search results.
- In these results, those belonging to SeDiCi count with many hyperlinks that let users download the document, navigate its parts or even access to SeDiCI website. It is very important to highlight that all this funcionality is provided directly from SeDiCI, which makes very easy to add a large number of new fuctions to Physics Library website.
- Authors of documents hosted in SeDiCI are benefit with the duffusion of their work, since they can be seen from SeDiCI website and from Phisics Library OPAC.
- By using an open and portable standar as XML, results are shown in each online catalog can be generated from any platform, software or programming language with XML capabilities. A clear example of this is the case of Physics, that uses Koha platform (developed in Perl), while Celsius DL (the software that sustents SeDiCI) was developed in PHP and JAVA.
- Since SeDiCI webservices access interface is freely available for any library, the possibility of spreading local contents has potentially no limits without the need of making big investments in software development and maintenance.

Celsius Network.

Celsius Network software was created at UNLP and adopted by ISTEC Consortium as the standard LibLink Platform, Celsius allow to do management over all user bibliographic requests generated by “clients” of PrEBi. Up to now, have been registered 31 Celsiu software instances installed in 9 American countries.

Management begin with user personal data registering, operation that users performs directly, after a normalization procedure over that information, this stage is performed by PrEBi administrators, who also check the latter bibliographic user requests, realize searching, localization, external request and finally the user delivery through paper or digital (upload) PDF document that users can download from his personal PrEBi site. Celsius provide a personalized site for each user, with all information related with historical and actual requests, status and statistics. Any website visitor can check more than 50 statistics related with quality of service: number of requests, delay to user delivery, document type (book chapters, thesis, articles…), country-institution-library request destination (external institutions providers).

Each LibLink participating Institution count with its proper Celsius instance, that serves to different purposes:

- Allow local users (inside the same institution) to do requests, download documents, access to statistics, follow the different requests, send emails,
- Allow the external administrators (in external institutions) to realize request in Celsius remote instances.

- Allow local and external management (named searching and provision requests respectively).

The constant growth of the Liblink initiative, both in users inside each institution and in institutions participating in LibLink initiative, has presented different challenges related with maintain constant Celsius upgrades and to provide new tools that make possible an efficient management with a constant growing external and local demand.

In addition to the problem over exposed, the inclusion of some participating institutions with low resources entail needs related with minimaze costs related with systems devoted to sharing and interlibrary information services, so the developers need to generate free FTP software like alternative to commercial document delivery software (for example Ariel) and also develop installation and configuration Celsius tools to allow using this software in different platforms without specialized personnel dedicated to maintain the software. Is important to emphasize:

- Celsius is a free software for LibLink participants.
- To develop Celsius have been used open source tools (PHP and MySQL)
- Celsius can be running without additional costs using a free web server, or example Apache, and an Open source Operating System like Linux or Solaris.

¿How using webservices en Celsius Network and which are the advantages?

The different Celsius instances are interconnected through web services , and share both documents and tasks. In this way a Celsius administrator can do different operations and generate different events from his own Celsius instance in another Celsius instance located in any country, avoiding to access the remote Celsius instance through login and password to do the requested task. This procedure help to a better time performance and also a strong human fault reduction, because the human participation is decreased.

There are two uses of webservices en Celsius:

- Request management: Celsius NT allows that a local operator do management over remote requests (requests generated by other institutions using Celsius NT) through its local Celsius NT platform: doing new requests, checking the status of current requests, sharing information and communications with other Celsius administrators, changing information inside requests and so on.
- Sending documents: the LibLink participants interchange user document requests in different ways. Ordinary, using Ariel software that is an Infotrieve commercial development, this is a proprietary tool that only works with window platform or sending a PDF document via email. With Celsius NT, operators can send the documents in PDF format directly through the system, without any external tool like Ariel. Celsius allows sending point to point documents from one instance to another, maintain statistics about deliveries, is fault tolerant (bothe network and software) because manage sending, pending and retrying queues. In addition the use of webservices exclude needs like configuring routers, firewalls in the different institutions networks because the information travel through http in port 80 like any webpage.

All the communications are possible thanks to the existence of a facility named Celsius Directory. CD also developed in PrEBi, permits that different instances exchange data in a secure and transparent way because password and permissions are managed between paired instances. CD also allows global statistics, here again the webservices technology has been an important tool because it provides the possibility to collect local statistical information on each Celsius instance, doing storage and on line global reports. These statistics not only give transparency to the initiative goals, also make possibly to save a lot of time consumed if we would need to access in each Celsius instance, to obtain data, make the

statistics and generate a report (with another external tool) and specially help to improve the global services detecting early possibly faults and problems.

Celsius Bloodhound.

Celsius Bloodhound (BH) in another member of Celsius family, specifically it is an application (currently being developed) that will allow to perform searches of bibliographic references inside Catalogs and Servers of libraries around the world. The idea of this development arises from the need of making more agile the bibliographic provision for PrEBi users: Celsius BH will automate the location of articles in libraries catalogs. In order to make this task possible, this software must accomplish some points:

- It must be connect to several servers, catalogs, libraries and so on (from now and on, just Catalogs), considering that they may use different technologies, both standardized (Z39.50, SRU, SRW) and personalized (webservices, cgi, just HTML)
- It must perform the searching inside Catalogs, retrieve data and present in some way to the administrator user
- It must permit queries from different origins, such as a web interface, a standalone application, an existent software (such as Celsius), another server or catalog, etcetera.
- Searchs must be performed in background, which means that the software will execute searchs in low charge hours and present the results together with the information of the requests inside Celsius.
- The list of catalogs on which BH will perform searchs will be dynamic, which means that the software will manage this lists allowing to add, remove or change items from the list.
- The development must be scalable: the main idea is to quickly develop a first version and gradually add new modules **(new technologies of new catalogs, new search criteria, and so on)**

As mentioned in point 3, the final purpose of Celsius BH goes beyond the optimization of Celsius searches; any application will be able to request to BH to search one or many documents and later receive the resultants. To permit this functionality it will use again webservices technology, exposing a set of available operations, with the required parameters, in order to let each application to invoke and obtain the results from the same means. This way very different applications, running under very different platforms and developed with any programming language will – with very few modifications – be able to use the facilities that the new tool will provide. This will permit an increasing number of institutions and libraries to access to quality documentary information (servers will be preselected according to the documents they provide). Again, LibLink participants will be benefit with this tool, since it will improve user requests search and final delivery times.

In order to accomplish what was mentioned above, this softwre will have many modules, each of them performing a punctual task and communicating with others in a standarized way. This makes this development more complex and it will take longer, but the coupling amoung modules will be mininum allowing to add, modify or delete modules even with the system running.

Conclusions.

With the enormous amount of information handled nowadays, it is essential to stress that not all the information located - specially in Internet – can be trusted; for this reason, a very important task is to make a distinction and selection as well as an appropiate. With the use of technology and the development of new tools, it is possible to have more catalogued information, with dependable sources for users, which forces to deliver services of access and obtaining of information in constant improvement in order to achieve a better attention. changing this way some of the services traditionally offered in libraries to make them automatic and discover Digital Libraries as a prominent complement to the paper acervus of the libraries.

The expansion of LibLink initiative presents constants challenges to Celsius administrators and systems developers, facing them to the need of improve process, low times and costs down for installation, update and set up of Celsius instances, improve communication among a each time bigger amount of administrators and users, offering transparency for all participant Institutions. Under this challenges, the constant improvement of software tools has permit to find useful and innovative solutions to common problems, and the adoption of new and open technologies, typical of Web 2.0 (distributed processing, interconnection through webservices, dynamic html, AJAX) allows these innovations to affect almost immediately to participant Institutions, administrators and end users.