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# Technological Convergence for access to electronic and print collections through UnibibliWEB Portal: the experience of the CRUESP/Libraries Consortium

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## Abstract

The Consortium CRUESP/Libraries formed by the three São Paulo State Universities Library System, USP, UNESP, and UNICAMP, seeks to offer specialized services and products to the academic community. With the expanding of the available information sources to the Universities, researchers need to visit various sites from diverse information providers, possessing different access interfaces. This demands time for the user to know these interfaces, which are not always user-friendly, and utilize the same search terms numerous times. With the technological advance it has become evident the possibility of the creation of a unified search interface, using the international communication protocols such as Z.39.50, OpenURL, among others. In this manner, CRUESP/Libraries idealized a unified search portal to do simultaneous searches to information sources available to USP, UNESP, and UNICAMP. This portal is the UnibibliWeb, available at [www.cruesp.gov.sp.br/bibliotecas](http://www.cruesp.gov.sp.br/bibliotecas), whose goal is help in the dissemination and access to information by the academic community. Besides the possibility of searching, the portal also provides a service entitled "Personal Library", where the user can select and store material of interest, helping in the organization of relevant information for his or her academic activities. The current work shows the construction, evolution and consolidation of this product which is much used by the academic community of the state universities of São Paulo, Brazil and other countries.

**Keywords:** Search portal; academic consortiums; electronic communication protocols; digital convergence.

## 1 Introduction

The technological evolution impacted library services, especially in university libraries. This is because there has always been the preoccupation of providing high quality services, since the library is present in a context of heavy research investments. It is not rare that great inventions are a result of projects developed within the universities, with the support of State or Federal government aid. In this context, the libraries are positively pressured to accompany the evolution of information technology.

In the 90s, it became aware of a great investment by libraries in selecting and identifying products (software) that could automate the traditional routines, and with this facilitate accessing and locating documents. The publication of public catalogs, through OPAC, should respect international standards in a way to allow cooperation and dissemination of information between libraries.

According to Buckland [1], two standards are of great importance to library automation. The first of them is the MARC format, which makes bibliographical data readable by computer, thus enabling its sharing through different systems. The second standard is the protocol for search and information retrieval Z39.50, which allows simultaneous access to bibliographical catalogs.

Miller [12], states that in the new generation of systems, the standards are essential to guarantee higher efficiency and connectivity. The use of the MARC format allows greater mobility to libraries when substituting software because the data is stored in this standard, avoiding risks of loss when migrating to another application.

In the period between 1995 and 1998, library systems in the state universities of São Paulo (USP, UNESP, and UNICAMP) chose their applications to automate bibliographical catalogs. Although the choices were distinct, international standards were respected, allowing for the future structuring of software that could integrate the catalogs.

## 2 The Board of Rectors of the State of São Paulo Universities Consortium (CRUESP/Bibliotecas)

The philosophy of the consorted work has its appearance in the middle of the nineties in the United States and in other less-developed regions of the world, mainly in the segment of university libraries and of research as a counter-point in the negotiation with providers of scientific and technological information, as an answer to the high costs imposed by these agents. (Giordano 2002). [7]

The joining of libraries in consortiums brought an additional force so that they could intervene in the conditions imposed by these providers. Adding to this factor, the joint

negotiations brought economic advantages to the participating institutions.

The consortium also presupposes cooperative activities among participating libraries, promoting services and facilities of interest to the community belonging to the consortium. (Krzyzanowski). [9]

In Brazil, the first consortium was founded in 1999, named PROBE – Electronic Library Program, which joined thirty-five institutions of the State of São Paulo to operate access to periodicals in full text. This consortium finalized its activities in 2001.

The Consortium CRUESP/Libraries was established officially in January 2004, with the signing of the “Term of Institution of Consortium and Institutional Cooperation for Access to Referential and Full Text Databases.” This term updated the functions established in the CRUESP 149/99 resolution, which instituted CRUESP/Libraries as a Work Group to search for shareable services and products. The three main areas of work of the Consortium are sharing, cooperation and rationing of resources.

CRUESP/Libraries joins ninety-two libraries, serving around 176,000 users (students, faculty, and researchers), counting with a collection of more than ten million bibliographical items, with a frequency of around seven million users per year in the libraries.

Various projects are maintained for the fulfillment of the consortium objectives, among which we can cite the planned acquisition of digital collections, digital preservation, team qualification, identification of new products and services, among others.

Of note is the product consolidation that joins the main sources of information of the Consortium, available to the community, the CRUESP/Libraries portal.

### 3 Regarding the CRUESP/Libraries Portal

The CRUESP/Libraries Portal

[[www.cruesp.sp.gov.br/bibliotecas](http://www.cruesp.sp.gov.br/bibliotecas)], is available since 2002, allowing access for the community to the following products and services:

- **UnibibliWEB**  
Allows simultaneous access via internet, with a unified search interface, to the bibliographical databases DEDALUS - USP, ACERVUS - UNICAMP and ATHENA - UNESP, integrated list of e-journals titles and other selected resources.
- **Referential Databases Acquired by the Consortium**  
Access to twenty-three referential databases, covering several subjects, available to the campuses workstations.

- **CRUESP Electronic Library**  
Formed by the archival of digital content from partnerships with commercial and institutional editors.

Another shared service is the Inter Library Loan (ILL), where the user can request in his or her own library, without any cost, the loan of bibliographical material to libraries of the Consortium.

Among the products and services offered, UNIBIBLIWeb received the most of implementations and improvements, as much in the question of keeping pace of technological innovations, as in attending to the needs of the users.

### 4 History of UnibibliWeb

Since the creation of the workgroup in 1992, there has been a concern in the formation of a collective catalog of the São Paulo state universities. In this way, there was a migration of the bibliographical catalog data, which was placed in a CD-ROM. This product received the name **Unibibli** which made possible searching the collections of the USP, UNICAMP and UNESP Libraries.

Considered as pioneering product, the UNIBIBLI CD-ROM, had a first edition printing of 200 copies, distributed without cost to national education and research institutions, presenting the following content:

- USP 25.000 theses e 75% of the book collection
- UNICAMP 5.800 theses e 35% of the book collection
- UNESP: 8.000 theses.

The initial Unibibli project had financial support from FAPESP (Foundation for the Research Support of the State of São Paulo), counted on the technical cooperation of BIREME (Regional Library of Medicine), and became the first Latin American catalog to integrate bibliographical records of universities in CD-ROM.

The second edition of the CD-ROM, launched in August 1995, contained around one million references, including information about 38,106 periodical titles, corresponding to 94,646 collections found in the libraries of the three universities.

The sixth and last edition of **Unibibli** was launched in 2000 during the National Seminar of University Libraries in the city of Florianópolis (Santa Catarina), with the integrated collections of automated databases up to 1999, comprised of 991,000 monographic items (books and theses) and more than 50,000 periodical titles.

The technological evolution stimulated CRUESP/Libraries to reevaluate the Unibibli CD-ROM because this support was disadvantaged in not having a continuous update, always having an imbalance, or a “gap”, making the user complement his or her research by searching in the specific library sites. Moreover, the Unibibli had the characteristic of being used only by one single-user.

In this manner, the model until then adopted by the CRUESP/Libraries became obsolete in face of technological evolutions. On the other hand, demand continued, by our users, for easy access to the information in these catalogs. Many times to get the desired information it is necessary to submit the same search terms to various databases. These transactions take up the researcher's time, making pressing the study of a new product to speed up the obtainment of information and later the document itself.

In light of this problem and in researching solutions, it was identified that the bibliographical catalogs installed in the three library systems had the Z39.50 protocol, which had not yet been explored on a national scope.

There began a study process of this protocol's potential in terms of developing one interface for simultaneous searching of the bibliographical catalogs of USP – Dedalus, UNICAMP – Acervus, and UNESP – Athena, fully operated on the internet.

With this premise the members of the CRUESP/Libraries began to prospect the market to materialize the UNIBIBLIWeb project (Project presented to the Board of Rectors of the State of São Paulo Universities, in 2002).

Among the solutions found, the one that best fulfilled the project requirements was the proposal presented by Potiron Informática, a national company, producer of software for library management (Ortodocs). In this manner, version 1.0 of UnibibliWeb was made, which after various tests, had its launch in 2002, during the XII National Seminar of University Libraries (SNBU), held in Recife, Pernambuco.

#### 4.1 Unibibliweb version 1.0

In the version 1.0 it became possible the simultaneous search of the bibliographical catalogs of USP, UNICAMP, and UNESP, in real time, without the need of replication or data migration. Diverse formats of exhibition of the results were offered:

- Summarized list: includes summarized information of the search made, presenting the type of material, authorship, title, year of publication, and indication of existence of "link" to a digital object.
- Complete description of the record: detailed visualization of the record fields, including hyperlinks, not only from the attributes as also to identified digital objects.
- Bibliographical analysis of the search results: compilation of the records found in each one of the search requests, extracting the following organization: results by host provider, time period, terminologies, authors, types of materials, bibliographical level of the materials and associated digital objects.
- MARC Record: Detailed visualization of the record fields, in the tag-attribute model (MARC), as delivered by the host provider.

Also presented was the time statistics of access: amount of hits processed by the UnibibliWEB through the Z39.50 Gateway for: hours of the day, days of the month and days of the week, as well as the originating access domains.

The standard-based format was projected to grant the cooperative cataloguing. MARC records from the catalogued contents can be selected and copied to the local library databases. This service is free, without restrictions on amount of copies, which helps greatly other libraries in the process of forming their automated catalogs. The acceptance of the product by the community was significant, motivating the managers of the Consortium to implement new features.

#### 4.2 UNIBIBLIWeb Version 2.0

The Consortium acquires referential databases and has access to other programs that contain information relevant to users, as is the case of the CAPES Periodicals Portal (Coordination for the Personnel Improvement of the Ministry of Education). Thus, it was added to the bibliographical catalogs the following features:

- ❑ Simultaneous search in 23 referential databases that cover the following areas: Health and Biological Sciences, Agrarian Sciences, Exact and Earth Sciences, Engineering, Social Sciences, Linguistics, Literature and Arts.
- ❑ A – Z List (joint listing of e-journals titles and databases available to the CRUESP/Libraries communities), summarizing around 18,000 access sources.
- ❑ Facility for locating and viewing digital theses and dissertations from USP, UNESP and UNICAMP through the bibliographical catalogs.

The incorporation of new functions provoked changes in the product management, because the A-Z List has to be updated whenever new information resources are added. Another aspect that complicates the maintenance of the list is guaranteeing that the "links" to periodicals or electronic resources are functional.

It is important to note that until this version, the only communication protocol used was the Z39.50 and restrictions were perceived in the adoption of a single protocol since various databases did not possess this protocol natively in their bases, impairing the unified search resource.

Four years following the existence of the product, new implementations were made necessary to allow for the inclusion of other communication protocols that help in searching and also in adding services.

#### 5 UnibibliWEB Today

The product that previously was going to be one simple service added by the consortium, available in the CRUESP/Libraries Portal, transformed itself into an

aggregator element of electronic resources. In this manner, a new version was structured where UnibibliWeb took a new dimension as a **Portal of Services and Digital Content** and not only a meta-searcher.

The main characteristic implemented in this portal in the last phase was the inclusion of the OpenURL protocol, standard ANSI/NISO Z39.88 -2004 "*The OpenURL Framework for Context-Sensitive Services*", which allowed the better exploration of contents, by integrating them through a menu of suggested links, whenever a metadata is shown to the user. The hybrid combination of features offered by the implemented protocols, plus special integrated tools, added to a trusted information database, made the UnibibliWeb Portal even more flexible, raising its coverage in the locating and recovering of digital services and content.

The main characteristics added are:

#### □ **OpenURL Link Resolver**

The Link Resolving service simplifies and facilitates access to digital content. The establishment of one knowledge base of the electronic periodical collection allows for connections in the article level and crossing between compatible hosts with the OpenURL protocol, allowing the user the locating of the appropriate full-text, independently of the platform it is offered on.

Through the button **CRUESP Services**, which shows up in search pages, once activated, a user can take advantage of the pre-built links with the purpose of facilitating the obtaining of the desired full-text. Given the enormous quantity of databases and existing online services in the ambit of CRUESP, the offering of connections is being gradually incremented.

#### □ **Exporting of MARC Records (Save MARC)**

In this version, the feature of exporting data was refined, allowing the user to save in his work station the records in MARC format, allowing it to be exported to other cataloguing systems used by libraries.

#### □ **Electronic Library in Full Text**

This relates to content from Elsevier Science publisher acquired in the period between 1995 to 2001 through the Electronic Library Program – ProBE. In continuing this work proposal, the Consortium CRUESP/Libraries acquired the content from 2002 to 2005 and is selecting other relevant content. This measure aims to strengthen the policy of developing collections, thus ensuring permanent access to retrospective content of high relevance to the academic community.

#### □ **Personal Library**

Additionally, a new feature was implemented, entitled "**Personal Library**", which offers users personal server space in the Services Portal, for storing and organizing of selected references. The stored references can be exported in the reference standard set by the Brazilian Association of Technical Norms (ABNT), and others such as MLA, XML, CSV and EndNote.

### **Comparative Analysis of Features Supported by the UnibibliWEB Portal**

CHACON [2] in his article "Management of Collections through consortiums: models of collective catalogs and organization of electronic resources", compares products for libraries and consortiums used in various libraries of the world, and emphasizes that a software for libraries should fulfill the following requirements:

- Communication Protocols
- Search
- Authentication
- Integration with SGBD
- Links Server
- Presentation of Search Results

In the table below, presented by CHACON[2], one more column was added for UnibibliWEB in order to identify how it fits before the indicated requirements.

Software Features	EnCompass	MetaLib	Vectors	MAP	SIRSI	CRUESP
Search	Endeavor	Exlibris	VTLS	Innovative	Sirsi	UnibibliWEB
Provides a unified search interface	Y	Y	Y	Y	Y	Y
Provides links to the interfaces of distinct resources offered by the library	Y	Y	Y	Y	Y	Y
Provides a simple search interface	Y	Y	Y	Y	Y	Y
Provides an advanced search interface	Y	Y	Y	Y	Y	Y
Allows search in databases, electronic magazines and OPACS	Y	Y	Y	Y	Y	Y
Allows search in Internet search engines	Y	Y	P	Y	Y	Y
Allows search by keywords and in full text.	Y	Y	P	Y	Y	Y
Allows search by distinct fields (author, title, ISBN, others)	Y	Y	Y	Y	Y	Y
Allows use of Boolean operators	Y	Y	Y	Y	Y	Y
Allows use of truncations	Y	Y	Y	Y	Y	Y
Allows use of proximity operators	Y	N	Y	Y	Y	Y
Shows the results in relevant order	Y	Y	Y	Y	Y	Y
Allows the setting of search limit	Y	N	Y	P	Y	Y
Allows the presentation of the search results in ascending or descending order	Y	Y	N	P	Y	Y
Allows the refinement of the search starting from the search results	Y	Y	Y	Y	Y	Y
Presents a single list of search results	Y	Y	Y	Y	Y	Y

Software Features	EnCompass	MetaLib	Vectors	MAP	SIRSI	CRUESP
<b>Authentication</b>	<b>Endeavor</b>	<b>Exlibris</b>	<b>VTLS</b>	<b>Innovative</b>	<b>Sirsi</b>	<b>UnibibliWEB</b>
Allows authentication by IP	Y	Y	Y	Y	Y	Y
Allows authentication by username/password	Y	Y	Y	Y	Y	Y
Allows authentication by domain name	Y	Y	Y	Y	Y	Y
Allows authentication by LDAP	Y	Y	Y	Y	Y	Y
Allows authentication by a proxy server	Y	Y	Y	Y	Y	Y
<b>Communication Protocols</b>	<b>Endeavor</b>	<b>Exlibris</b>	<b>VTLS</b>	<b>Innovative</b>	<b>Sirsi</b>	<b>UnibibliWEB</b>
Z39.50	Y	Y	Y	Y	Y	Y
ERL	N	Y	N	Y	Y	Y
OpenURL	Y	Y	Y	Y	Y	Y
http	Y	Y	Y	Y	Y	Y
Marc	Y	Y	Y	Y	Y	Y
DOI	Y	Y	N	Y	Y	Y
SQL	Y	Y	Y	Y	Y	Y
EAD	Y	Y	F	Y	Y	Y
XML	Y	Y	Y	Y	Y	Y
DublinCore	Y	Y	Y	Y	Y	Y
Own protocols	N	N	Y	N	Y	N
Other protocols	Y	Y	Y	Y	Y	Y
<b>Integration with SGBD</b>	<b>Endeavor</b>	<b>Exlibris</b>	<b>VTLS</b>	<b>Innovative</b>	<b>Sirsi</b>	<b>UnibibliWEB</b>
Allows integration between the Portal and the local SGBD	Y	Y	Y	Y	Y	Y
Provides information about local databases	Y	Y	Y	P	Y	Y
Allows integration between the Portal and the external SGBD	Y	Y	Y	Y	Y	Y
<b>Delivery of final document / presentation of results</b>	<b>Endeavor</b>	<b>Exlibris</b>	<b>VTLS</b>	<b>Innovative</b>	<b>Sirsi</b>	<b>UnibibliWEB</b>
Allows the copy or download of records	Y	Y	Y	Y	Y	Y
Allows the sending of selected records via email	Y	Y	Y	Y	Y	Y
<b>Links Server</b>	<b>Endeavor</b>	<b>Exlibris</b>	<b>VTLS</b>	<b>Innovative</b>	<b>Sirsi</b>	<b>UnibibliWEB</b>
Incorporates a Link Server	Y	Y	Y	Y	Y	Y

Table 1: Comparative evaluation.

The evaluation criteria used are the following:

Y = product fulfills the requirement

N = does not fulfill the requirement

U = unknown – information about the product unavailable

P = partial – product partially fulfills requirement

F = product will fulfill the requirement in newer versions

The results of this comparison produce the evidence that UNIBIBLIWeb has all the important requirements, figuring out as a qualified software product, compatible with all the modern information technology resources.

## 6 Final Considerations

As new implementations are added to the Portal, the challenge increases in continuing to satisfy users. Currently 2.5 million visits have been recorded, originating from the local community, Brazil and foreign countries. This demonstrates the acceptance of the Portal as a facilitating element in the process of searching and recovering information for the research community.

According to Maloff [11], information is of critical importance to organizations of all sizes. Those who discover ways of operating with high efficiency, who take advantage of new and beneficial approaches, will be victorious. It is important, however, to certify the logic of the costs and expected advantages for whatever solution before beginning any implementation.

In the realm of university libraries and their relationship with the university, according to Tarapanoff [15], this constitutes in a service-providing social organization which, in account of its functions and objectives, represents a subsystem of higher organization, equally affected by any modifications to them, requiring reactions of the same level to surpass challenges.

Thus, the CRUESP/Libraries proposal aligns itself with the premise of a service-providing social organization, with immediate results in the improvement of access quality and recovery of information by the local and remote scientific community.

Complementing are the resources offered by the portal, which act as a facilitating agent to other information units in the organization and standardization of services rendered to the community.

The consolidation of the CRUESP/Libraries Consortium, materialized in the UnibibliWeb Portal, constitutes a strategic element for the development of research and education in participating institutions, also acting as a source of extensions of services to the community in general.

In face of all perspectives of frequent innovation in the environment of CRUESP Universities, and through all the work already finished and projects being developed, the **Consortium CRUESP/Libraries** consolidates itself with innovative initiatives, clear management policies, partnerships narrowed to constant exchange of knowledge, and most of all, fulfills the ideals proposed by its members: **COOPERATION – SHARING – RATIONING OF RESOURCES.**

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