NILDE Reloaded: a New System Open to International Interlibrary Loan

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ABSTRACT

In 2010 we released the NILDE software version 4.0, introducing many innovative features for libraries and end-users. Thanks to the widespread participation in improving the new system, many enhancements have been made during these last 12 months since the software was first launched.

Librarians have to face several new challenges in Interlibrary Loan, such as sharing of electronic resources, licensing, and International ILL.

In this paper we present the new concepts introduced in the NILDE system and which may contribute to shape a different and more effective way of resource sharing among Italian libraries, including:

✓ The catalogs where libraries expose their holdings: NILDE offers the possibility to link to any union or national catalog to which a library belongs, that can be now searched via Z39.50 and library holdings retrieved in MARC21 and XML format. Print, electronic and consortial holdings are managed.

✓ The ranking of lending libraries: the new rank algorithm suggests the most suitable library to which a request be sent, based on the principle of maintaining the system in equilibrium between borrowing and lending requests.

✓ The multilingual user-interface: the NILDE user-interface has been redesigned and is provided currently in Italian, English and French.

These features make NILDE a suitable system to help librarians to face the new challenges, to support other library networks around the world and to support International ILL.
Introduction

NILDE (Network Inter-Library Document Exchange) is a web-based system designed and developed by the Library of the CNR (National Research Council) Research Area of Bologna, currently used by over 700 Italian libraries and about 15,000 users, of the most important Italian universities, public research and health institutions. In 10 years of activity NILDE has processed about 1 million document requests.

A community of libraries has grown around NILDE to share their bibliographic resources on the basis of mutual collaboration. The growth of the NILDE network has proved how great the need was in Italy for the adoption of standardized processes for ILL services by implementation of best practices. Analysis of the evolution of NILDE has led us to identify key factors in its success (Mangiaracina et al., 2008):

- Organizational structure has been similar to that of the Open Source Software (OSS) community, which guarantees “quality” of the system by continuous “feedback” coming from the overall community, where the consumers are also the producers.

- NILDE has become a successful tool because it has been able to listen to and incorporate feedback coming from a community which has proved active and keen to improve the system; a community to which the each member’s contribution is useful and necessary in promoting the interests of all.

- NILDE is a trust-based organization: by trust, we mean expectation of correct and cooperative behavior based on commonly accepted rules, whose formalization ensures the correct implementation of the activities. This has been accomplished by means of the NILDE Rules and Regulations¹.

- The dynamism and the flexibility of the network define NILDE as a learning organization, whose decentralized structure is based on a bottom-up approach and where the NILDE Administrator (the CNR Research Area Library of Bologna) acts as a functional leader, that is, a function of the community. NILDE Subscriber Assembly (ASN) selects by vote a member for the NILDE Library Committee (CBN) and reports suggestions or problems by mail-list. CBN members and the Administrator collaborate organizing open and dynamical working groups for problem solving (Filippucci et al., 2009).

The use of NILDE has often triggered the start of virtuous processes that have impacted on the overall system of Italian libraries:

- Performed Turnaround time has been steadily decreasing

- NILDE has been recognized by publishers as a secure electronic system to supply a copy of licensed materials, either in paper or electronic form. A database to collect ILL clauses in electronic licenses negotiated between publishers and Italian consortia of libraries has been created and called “Help-licenses” database, in order to support lending libraries to select the allowed way to send copies.

- Analysis of the NILDE ILL transactions has provided insights into the relationship between ILL and journal subscriptions, confirming important previous results that publishers

¹ https://nilde.bo.cnr.it/learn.php?inc=rules
should not be concerned about ILL services, since these are not being used as a surrogate for journal subscriptions. Data analysis has also allowed the study of the most requested journals in Italy, and to single out a core collection of titles which should probably be maintained nationwide with perhaps more than one copy over several libraries, or should be accessed through a consortia project. Despite the widespread availability of e-journals acquired through consortia purchasing we have observed in Italy a continuous growth and vitality of ILL requests, mainly due to more recent publications (Bernardini and Mangiaracina, 2011).

- NILDE Library Committee is presently promoting the importance of cataloguing electronic serials in the Italian union catalogues.

More than 1,000 Italian librarians have been trained on NILDE courses. The robust technical infrastructure of NILDE has supported workflow of activities and sometimes has led libraries and institutions to common behaviours. Continuous attention to the evolution of library services (for instance, the integration between electronic resources and the request function) has been paid from the beginning. The continuous Research & Development of NILDE and all of these elements have led us to design the new version NILDE 4.0.

### Innovation in NILDE software

The overall architecture of the NILDE system has been rethought, in order to guarantee future scalability and high performance operations and to add new features.

The NILDE Reference Manager module for end-users has been available since 2008 (Mangiaracina et al., 2008), but was not fully integrated with the NILDE Inter-library module.

The complete NILDE 4.0 release, for libraries and end-users, was presented to the NILDE community in May 2010 (Tugnoli et al., 2010). Afterwards a large pilot test with 60 volunteer libraries was run until September 2010, resulting in a lot of feedback and suggestions for future implementations, many bugs were removed and the user-interface improved. Both versions of the software (old and new) were running until December 2010. From January 2011 all users moved to the new software, thus more than 15,000 users changed their familiar user-interface for requesting documents or for managing ILL.

A wiki has been prepared 2, to collect tutorials, training material and to show the schedule of ongoing training courses which have been organized in many of the biggest universities, thanks to the direct involvement of NILDE librarians. Thanks to the continuous feedback from the community, many new features have been implemented during the first year of activity.

In the following Sections the new features are presented.

### New general concepts

Many new concepts have been introduced in the new software, including:

#### Multilingual support

NILDE 4.0 provides support for multiple languages, thanks to UTF-8 data encoding and the user-interface which may be easily translated in any language. It is currently provided in Italian,

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2 [https://nilde.bo.cnr.it/wiki/](https://nilde.bo.cnr.it/wiki/)
English and French: the user can specify the preferred language for their personal account, or use their browser default language. It is possible to switch from one language to another on the fly.

**User Interface**

The goal of the new user interface is to offer an innovative and fully functional user environment.

Design has been driven by the following aims:

- to achieve a user oriented interface with a high level of ergonomics and full control of operations;
- to develop a feedback system from NILDE to the user;
- to restyle graphics and the logo, for effective communication of the NILDE identity and a pleasing design for the user, in the long as well as in the short term.

Web technologies used are a careful mix of AJAX, CSS, PHP and others that allow the creation of seamless web pages, dynamic contents and a continuous and rapid work-flow. While the previous user-interface was based on textual communication, the new one is based entirely on visual communication: icons and images are always active elements to be used to access a function or to get more detailed information (see Figure 1). We suggest librarians have a curiosity driven approach, when using NILDE for the first time.

![Figure 1: Different approach to the user-interface between NILDE 3 and NILDE 4](image)

**Material types and supported operations**

While the previous software managed only the “journal article” type of material, the new one also allows one to manage the “book” type. Enriched descriptors for both types are provided, for instance, for journal articles: ISSN, publisher, abstract, DOI, PMID,… and for books: ISBN, publisher, year and others.
Supported ILL operations on these materials are: “copy supply” for journal article or part of a book and, in the future, “loan” on books will be implemented.

NILDE for end-users

Institutional authentication through the Shibboleth framework
As in the legacy approach, the previous NILDE software assigned a system login/password to newly registered users. In a federated approach, based on an Authentication and Authorization Infrastructure (AAI), a user registers only once at their home organization (i.e. their university), receives a username and password, and then uses these to access any other resources. The authentication process is always carried out by the user’s home organization, while authorization is up to the external service, such as NILDE.

The solution was to adopt Shibboleth, a standard-based, open source middleware which implements OASIS-SAML protocols (Maler, 2003) and has attribute handling features. Developed by the Internet2 Association, Shibboleth is one of the prevalent frameworks for Authentication, Authorization and inter-institutional Single-Sign-On. It is being adopted by an increasing number of scientific information providers, such as Elsevier, Ex-Libriss, JStor, Ebsco, CSA, Dspace, etc... This fact makes it even more interesting, because of the potential for integration with most of the electronic resources available to the user and means of accessing them.

In NILDE 4.0 the user may choose between legacy or Shibboleth federated authentication. If they choose the latter, they will be presented with a list of organizations within the federation, and from this they will select their own. In a transparent way for the user, it will actually be their own home organization’s authentication system that will give them access to the protected NILDE service.

NILDE is currently partner of the IDEM-GARR³ (Italian Authentication and Authorization Identity Management of the GARR network ) federation.

Reference Manager
The NILDE End-Users module, which previously was just a basic tool simply for managing document requests, has evolved into a reference manager, which allows the user to organize their own bibliography as well to initiate a request to the library service, if the document is not directly accessible.

References can be inserted either manually by the end-user or automatically from an OpenURL compliant bibliographic database. In addition to traditional bibliographic data, it is possible to store other useful information such as abstract, internet location, user personal notes, reminders, etc.

The most important feature added to the end-user module is the facility to manage their entire bibliography by labelling, sorting and exporting references as well as inserting, modifying and deleting them.

Other features
The user status within the institution has been standardized, so that a library may get usage statistics by user-type. Costs acceptance policies have been introduced, for the basic cost of

³ https://www.idem.garr.it/
the ILL service and for accepting or refusing additional costs. In the future, the user may be registered to more than one library, for instance, their university and their public library.

### NILDE for libraries

The NILDE module for libraries has a very simple, coherent and user-friendly interface. It presents six panels, where a library can manage: its own account information, its borrowing and lending requests, its users, history and statistics of their service.

Many features have been added, the most important are:

- the possibility to link to any union or national catalog a library belongs to, which can now be searched via Z39.50 and library holdings retrieved in MARC21 and XML format;
- the ranking of lending libraries, based on a principle of maintaining equilibrium between borrowing and lending requests of each library;
- the possibility to register borrowing and lending requests to/from libraries outside the NILDE system;
- the possibility to implement library groups, allowing the creation of national or thematic groups in the future.

### Connecting to Union catalogues

To “make holdings available on Union Catalogues and keep them up-to-date, with an indication of availability for resource sharing” is a general principle asserted in the IFLA Guidelines for Resource Sharing, as well in the Rethinking Resource Sharing manifesto and the NILDE Rules and Regulations.

For this reason, the possibility of connecting NILDE to union catalogues, integrating the search for the proper holding library within the management of a user initiated request, is very important. Several requirements have to be satisfied, such as the independence from catalogue systems and from journal medium, and problems to be solved, for instance, the “invisibility” of electronic holdings in Italian union catalogues, and the fact that serial electronic holdings may belong to a single library, to an institution or to a consortium of institutions.

In the new software architecture it is easy to add a new catalogue, since a catalogue is defined by a certain number of proper descriptors used to uniquely identify a library inside it or to keep other useful information. For instance, when managing ACNP, the Italian Serials Catalogue, we need to know for each library its ACNP-code and whether the NILDE request function for that library may be recalled directly from the ACNP OPAC interface. For another catalogue we could have one or more different library identifiers and other kinds of additional information.

Catalogues are searched via the Z39.50 search protocol, their output received in MARC21 and XML is interpreted by NILDE and presented to user. The ISSN and ISBN identifiers are used to search and retrieve library holdings.

Searching for a bibliographic serial reference is exemplified in Figure 2. The Italian Serials Catalogue ACNP\(^4\) is used to look for a serial title and to find its ISSN code. In fact, when the ISSN code is not known, a search for title words in ACNP usually returns a list of possible titles, with

\(^4\) The ACNP catalogue has 177,000 serial titles (the ISSN Register is used for derivative cataloguing) and 1,000,000 holdings records belonging to 2,500 Italian libraries.
their ISSN associated codes. The operator has to select the proper title, in this way the proper ISSN is also selected and saved in the bibliographic reference. Once a title has been identified through its ISSN, a new search for holdings is run over all the connected catalogues. Currently, search is performed on the ACNP and the SBN (the National Library System) catalogues.

Searching for a bibliographic book reference is still experimental, and performed only through the SBN Catalogue.

![Diagram of searching for a serial reference](image)

**Figure 2: Work-flow when searching for a serial reference**

Searching the ACNP catalogue allows a richer interaction and the retrieving of more complete information about holdings. Once a title has been identified through its ISSN code, the search in ACNP is run using the ISSN code and the publication year. ACNP actually associates all the related ISSN codes for a serial (for instance print ISSN, electronic ISSN, ...) and thus it returns the library holdings for each of the related ISSN, filtered by the publication year. This is very useful, since usually we look for a document content, while the medium used to deliver that content is not very important. Information on the holdings record’s “last update date” is also reported. The selected lending library will also receive the location information to easily retrieve print material from the stacks.

Example of ACNP holdings displayed at the NILDE interface (the “@” is used for electronic holdings):


**Ranking of lending libraries**

Since the NILDE network stands on principles of library reciprocal collaboration and cooperation among peers, an analysis to monitor the degree of cooperation has been carried out from the beginning, using several indicators, such as “reciprocity factor” in the exchange, turnaround time and success rate (Filippucci et al., 2009). The best performance would infer that libraries
balance their borrowing with their lending requests. NILDE 4.0 introduces a rank algorithm to calculate the imbalance between borrowing and lending requests issued/received by each library. The “rank” suggests the most suitable library to receive a borrowing request, to help that library equilibrate any imbalance. However, the borrower library is free to choose the preferred provider. The introduction of the ranking algorithm will be monitored after one year, to assess its benefits.

Outside NILDE libraries

On the basis of a participant library request, NILDE maintains a registry of libraries which are outside the system. This way, it provides the possibility to register borrowing and lending requests to/from libraries outside the system, and to obtain complete statistics about the overall ILL service. The “Outside NILDE libraries” registry contains a complete list of international document suppliers and other non-participant Italian libraries (for instance, private documentation centers and others). This will provide in the future a better understanding of what is not available in Italy, but required by users and has to be found abroad, and perhaps suggest a more efficient policy of acquisition at the national level.

Library Groups

The possibility to define library groups is a feature not yet implemented, but the software has been designed to support it. The very simple idea is that each library may exchange borrowing requests only within its group, so creating library sub-networks. Each library may belong to one or more groups. It will be given the possibility of limiting certain NILDE functionalities within a group. These features will facilitate the implementation of national or thematic groups of libraries allowing document exchange across national borders.

Discussion and further developments

Helping users to find journals and journals articles in a library’s electronic collection is a challenge, and libraries use multiple tools to manage their electronic collections in order to provide access to their users. Such tools include, amongst others, OpenURL link resolvers and A-Z lists. The new landscape of e-serials access may marginalize the library catalogue as a tool for access to e-serials, as well as union catalogues as essential tools for resource sharing.

The cataloguing of electronic serials in Italy is incomplete and often inadequate. The majority of research and academic institutions acquire entire packages of electronic journals, i.e., the “big-deal” contracts, through consortia and are moving from “print and online” to “online-only” subscriptions. Closing a print subscription without cataloguing the corresponding electronic one may result, in the long term, in a serious loss of information for resource sharing in a national, cooperative environment. However, cataloguing a large amount of e-serials, often accessed by many institutions, is a new challenge, for librarians and for catalogue managers. From the library manager’s point of view, it may be difficult to organize an ILL service where many points of service may deliver the same electronic material and the fear of being overloaded may discourage one to augment the e-serials visibility in union catalogues. From the catalogue manager’s point of view, cataloguing large consortia acquisitions implies that all libraries belonging to a consortium share the same holdings, and this could create a “noise problem” in the cataloguing system.

In a certain sense, the advent of the NILDE 4.0 software has shown how “hot” these topics were: thanks to complete integration with the Italian Serials Catalogue, NILDE provides in just “one
shot” information that at the OPAC level has to be found in a series of steps, and may often be hidden. In fact, the ACNP catalogue solves the noise problem by implementing different levels of holdings, creating “virtual libraries” which may be composed of all the libraries belonging to a consortium, or by all the branch libraries belonging to the same institution. In this way, the holdings of the virtual library is “inherited” by all the real libraries. However, it takes several interactions with the ACNP web user-interface to find out whether an e-journal may be found in a library that has directly linked its holdings to it, or to many libraries because they are part of a consortium. Looking for the same journal through NILDE, has proved to be a much faster process, and moreover, has shown how incomplete was the information about electronic holdings in Italian libraries.

For these reasons the NILDE Library Committee is promoting the importance of cataloguing electronic serials in the Italian union catalogues, with several recent initiatives. An Italian survey on “Cataloguing E-Serials” has been sent to all the main libraries and experiments on the semi-automatic uploading of electronic serials from SFX to ACNP have been fostered (Bernardini, 2011), (Simonetti and Gargiulo, 2011).

**International Interlibrary Loan and conclusions**

NILDE 4.0 has been well received by Italian libraries, which have suggested many improvements during its first year of usage.

Many issues arise when moving from a national to an international perspective (and their analysis goes beyond the scope of this paper). Factors such as the existence of different copyright laws, different payment systems, shipping costs, time of delivery and limits imposed by publishers which allow ILL only within national borders has to be taken into consideration. However, NILDE could be exploited by other libraries around the world, requiring easy access to Italian literature, or to share their resources within an international thematic network.

The new features make NILDE a suitable system for managing international Interlibrary Loan requests among libraries which do not necessarily share the same language, the same cataloguing system for resource sharing or even the same user-authentication system.

**Acknowledgements**

The authors wish to thank all the colleagues who helped with their work and for fruitful collaborations: Diego Malipiero, NILDE 4.0 software developer, and Daniele De Matteis, NILDE 4.0 graphic designer; Vincenzo Verniti, Orietta Bonora, Gabriella Boninsegna and Christian Rossi, from the ACNP Italian Serials Catalogue, University of Bologna; all the members of the NILDE Library Committee and working groups: Elena Bernardini, Francesca Brunetti, Marco Chiandoni, Paola Domina, Marida Fasano, Gustavo Filippucci, Luisa Fruttini, Laura Garbolino, Marina Grazioi, Stefano Guarise, Gianfranco Maiozzi, Rosella Magno, Monica Ortolan, Stefano Stabene, Elisabetta Tamburini, Ingvild Unterpertinger.

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