NILDE: developing a new generation tool for document delivery

Silvana Mangiaracina
National Research Council
Bologna Research Area Library
Tel: +39 051 6398026
Fax: +39 051 6398130
silvana.mangiaracina@area.bo.cnr.it

Daniele De Matteis
National Research Council
Bologna Research Area Library
Tel: +39 051 6398031
Fax: +39 051 6398130
daniele.dematteis@area.bo.cnr.it

Alessandro Tugnoli
National Research Council
Bologna Research Area Library
Tel: +39 051 6398035
Fax: +39 051 6398130
alessandro.tugnoli@area.bo.cnr.it

Marta Zaetta
National Research Council
Bologna Research Area Library
Tel: +39 051 6398080
Fax: +39 051 6398130
marta.zaetta@area.bo.cnr.it

Giacomo Tenaglia
National Research Council
Bologna Research Area Library
Tel: +39 051 6398031
Fax: +39 051 6398130
giacomo.tenaglia@area.bo.cnr.it

Enrico Beghelli
National Research Council
Bologna Research Area Library
Tel: +39 051 6398031
Fax: +39 051 6398130
enrico.beghelli@area.bo.cnr.it

Abstract

This paper presents the most recent progress and implementation of the NILDE (Network Inter-Library Document Exchange) system, which was developed by the National Research Council (CNR) Bologna Research Area Library.

NILDE is a web based document delivery (DD) software for libraries and end-users. It allows libraries to manage the entire workflow of DD activities, both borrowing and lending, through the provision of synthetic and analytical statistics, DD performance indicators "fill-rate" and "turn-around time", and support for secure electronic delivery.

As new challenges in electronic publishing (such as increases in the price of journals, cross-access and licensing issues) have led libraries from all over the world to organize in consortia, the rise in NILDE users has allowed the building of a cooperation network to promote resource sharing based on a degree of standard quality of service and fair behaviour, and to establish an efficient communication channel among libraries, consortia and publishers.

It has been proved that, in order to accomplish effective resource sharing, libraries should be willing to fulfil document delivery on a reciprocal basis, both requesting and providing documents. In particular, each library should make its best effort to expose and update its holdings by actively participating in collective national OPACs or in Italian meta-OPACs. It has been shown how, by adhering to these principles, libraries start up a virtuous cycle within the NILDE network, increasing its own value. As a result, the growth rate of numbers of NILDE libraries has accelerated, showing that the above said resource sharing policy is a real building block for success.

In order to guarantee scalability and high performance operations, the overall system architecture has been rethought, ending up in the design of a brand new piece of software. New technologies, referred to as Web 2.0, have been incorporated into NILDE, making it an even more user-oriented and friendly tool for document delivery and scholar work.

Introduction

The Document Delivery (DD) Service plays an important role in Italian public research and university libraries, but the overall picture is more fragmented than that of any other European country. The Register of Libraries in Italy shows about 12,000 records[1]. The main Internet services for the sharing of resources are the Archivio Collettivo Nazionale dei Periodici (ACNP, the National Union Catalogue of Periodicals) which includes about 1,500[2] active libraries, mainly from universities and research centres, which regularly update their holdings, and the Sistema Bibliotecario Nazionale (SBN, the National Library System Catalogue) in which about 3,000[3], mainly public, libraries participate, grouped geographically. As ACNP is a specialized serial catalogue, it is considered to be the most authoritative Italian resource for DD.

As well as the two centralized national services a repository of the Italian OPACs is managed by the AIB (Association of Italian Libraries), which also provides meta-search facilities through the MAI (Italian Azalai MetaOPAC). Presently there are almost 900 registered OPACs, 250 of which are connected through the meta-search engine[4].

In the last decade, the large increase in DD mutual requests has corroborated a general trend which has led to the need for reorganisation of services in libraries, through a rethinking at a broader national level. In fact, as noted during the 45th National AIB Congress, there was a maze of DD internal rules, both written and unwritten, and the percentage of unfulfilled requests was cause for concern, i.e. higher than 25% (Minetto, 1999). A proposal for a national "DD and ILL Customer charter" was issued (Mazzitelli, 2000), aiming to establish general criteria for efficient DD management, in terms of:
-   visibility of holdings;
-   transparency of terms and conditions;
-   promptness of response;
-   completeness and exhaustivity of data to start a DD/ILL request.

The great differences present among so many types of libraries and their "customs" were considered to be the principal obstacles; in fact, the only successful cooperative projects involved a restricted number of Italian libraries generally belonging to the same disciplinary field. Solving the problem of "Payment for services", given the huge variety of existing rules and the many accepted means of payments, appeared to be the main task.

Given this scenario, it is easy to understand how low management costs and short turnaround times in satisfying library and end-user document delivery requests were unattainable.

The NILDE (Network Inter-Library Document Exchange) application was initially developed at the Italian National Research Council (CNR) Bologna Research Area Library in order to take advantage of new Internet technologies and to promote cooperation among CNR and Italian university libraries (Mangiaracina, 2002).

NILDE was inspired by Mary Jackson's pioneering study, the results of which identify characteristics of successful high performance document delivery services (Jackson, 1998).

---

[1] *http://anagrafe.iccu.sbn.it/iccu/abi*

[2] *http://acnp.cib.unibo.it/cgi-ser/start/it/cnr/co-p.tcl*

[3] *http://www.iccu.sbn.it/genera.jsp?s=5&l=en*

[4] *http://www.aib.it/aib/opac/att06.htm*

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

Jackson's results had actually marked the starting points in the design of the NILDE software requirements. The initial vision for NILDE in the year 2000 was:

- to create software to computerize the entire DD workflow, reducing library operator working time and avoiding highly-repetitive tasks, such as manual data input and photocopying;
- to integrate in the automation software DD performance indicators, such as cost, fill-rate and turnaround time;
- to allow secure electronic transmission of documents in the same software package;
- to promote a cooperative model based on quality of service, that libraries might pursue on a national, regional or disciplinary affinity base;
- to start a virtuous interactive cycle in the Italian zone: if each library has the chance to measure its lending turnaround time and compare it with the performance of other participants, it has been proved that this will stimulate libraries to improve their service. As a consequence, not only will the requesting libraries have benefitted, but so, eventually, will the overall system and the end-users;
- to propose an unified DD payment system.

A short history of the NILDE project

The first prototype of NILDE software was tested during the year 2001 and presented to the librarian community in Rome at the First Italian Workshop on "Internet Document Delivery and inter-library cooperation", where all the attending libraries were invited to join the pilot testing.

In 2003 the Second Italian Workshop on Internet Document Delivery was held in Bologna. Results of the 2 year experiments, relating to 14,000 documents provided by 79 Italian libraries, were presented and discussed. For the first time it was possible to compare the performance of libraries with a wide range of characteristics and exchange volumes, since all requests were carried through the same system. Since NILDE automatically saves request and delivery dates, turn-around time could be compared; it was demonstrated that participating libraries had improved their service performances during the two year experiments (Mangiaracina, 2003). However, the workshop highlighted a lack of equilibrium between "providing libraries" (79) having actively joined the project, and "requesting libraries" (400). It was clear that libraries often saw the advantages of the requesting side of the DD service, but easily disregarded the lending side of the same service. Reasons for this may vary: small and specialized holdings, one-person libraries, not yet belonging to the union catalogues, not having an OPAC, etc…However, resource sharing may work only when all libraries participate at the same level. A very intense mailing list discussion followed the Second Workshop, focusing on the need to establish a policy of reciprocal exchange and eventually leading to the decision to establish a set of 'best practice' rules to be shared among all.

In 2004 the NILDE Rules and Regulations became effective[5]. These assert that "NILDE aims to promote reciprocal exchanges among libraries and to facilitate the use of homogenous quality standards, in order to develop inter-library cooperation in Document Delivery services". The establishment of the Rules and Regulation has truly sped up the

---

[5] *http://nilde.bo.cnr.it/index.php?st=11*

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

growth of the NILDE network, open to any publidy funded or not-for-profit institution wishing to joining it.

A mailing list was set up devoted to the exchange of ideas, problems and solutions and to keep participants informed about ongoing improvements and developments in the software.

In 2005, the Third Italian Workshop on Internet Document Delivery was held in Pisa, focused on "Quality at the service of cooperation". The new NILDE End-users module was launched, allowing library end-users to forward a document delivery request from any OpenURL-compliant database (e.g. Web of Science, PubMed, etc...) and to check the status of their requests. More than 250 librarians attended the workshop, proving that NILDE was no longer only an "application", but also a wide "library network". Integration with the ACNP national catalogue and ease of use for library staff are determining factors for the success of NILDE. Training courses have been periodically arranged.

Since 2006 NILDE has become a national service managed by the CNR Bologna Research Area Library, based on an economically sustainable model: annual NILDE maintenance costs are shared among all participant libraries. The Fourth Italian Workshop on Internet Document Delivery was held in Naples, in May 2006, focusing on the latest developments in the NILDE service, on the relationships of DD with electronic resources, and on copyright issues, aimed at encouraging collaborative discussion among libraries, consortia and publishers.

Successful key factors

The evolution of NILDE, thanks to the rapid and ongoing growth in membership (Figure 1 and Tables 1-3 show current figures for the NILDE network) has proved how great the need was in Italy for adoption of standardized and structured processes for DD services by means of the implementation of best practices in order to share library holdings.

As in any organization what matters are the abilities and the degree of participation by the components: "human capital is created by changes in personas that bring about skills and capabilities that make them to act in new ways" (Coleman, 1998).

It should be noted that participation in the NILDE network has been acknowledged by the libraries as a real sense of belonging to a community to which the each member's contribution is useful and necessary in forwarding the interests of all.

It is worth highlighting similarities with the Open Source Software (OSS) community organizational structure. First of all, the NILDE case study demonstrates two factors essential to the success of OSS: quality and degree of personalization, due to the consumers also being the producers. Despite the fact that they are not real "software developers", libraries do feel like the protagonists of system development. According to Linus' Law (Raymond, 1998), 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.

Analysis of the evolution of NILDE leads us to identify key factors in its success as falling under two headings:
– the policies, i.e. the rules the community has imposed on itself
– the processes: the procedures through which the libraries provide services using tools supplied by NILDE.
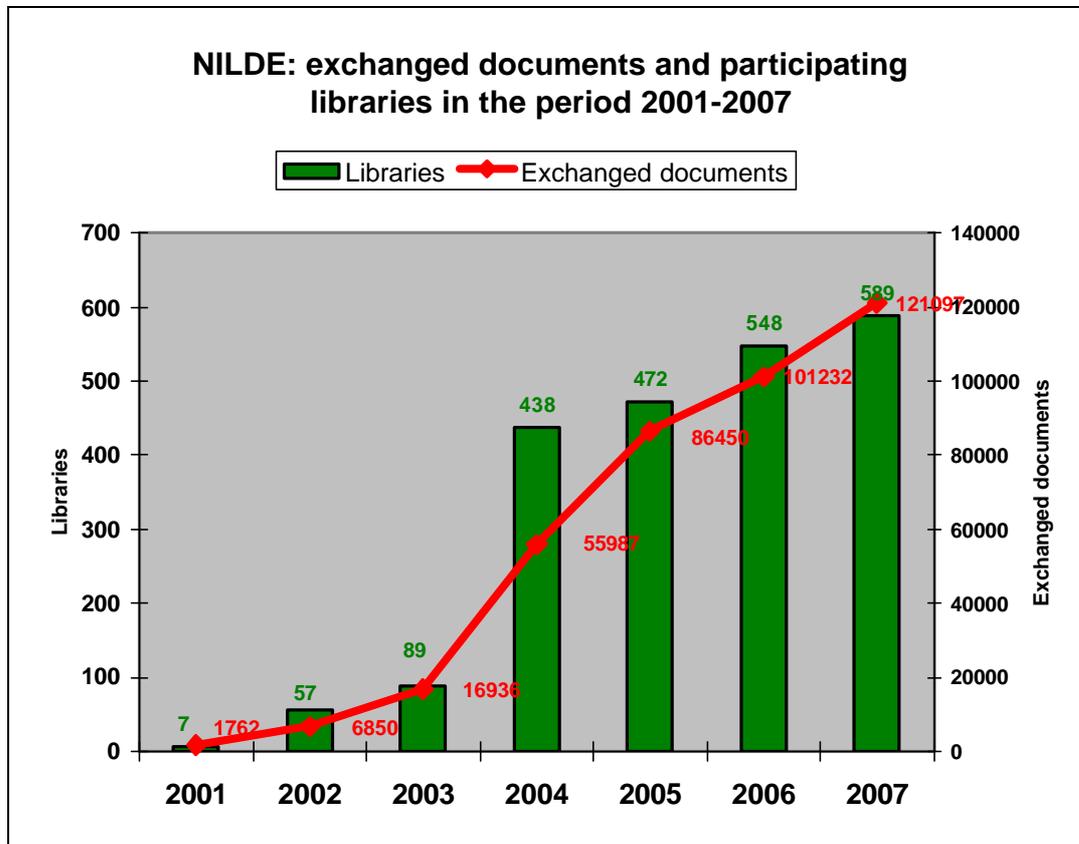
Figure 1 Growth of the NILDE network from 2001 to present (note: the number of exchanged documents in 2007 is a projection of the first 7 months).

Libraries	Requests/month	Fill rate	Turnaround time
589	10091	86,4	1,5

Table 1 Figures for the NILDE network, 2007.

University	419
Health	63
Research	50
Other	57

Table 2 NILDE libraries per institution type, 2007.

Technical-scientific	245
Biomedical	200
Law-economics	46
Multidisciplinary	43
Humanistic	43
Architecture	12

Table 3 NILDE libraries per disciplinary field, 2007.

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

NILDE's policies

NILDE is a trust based organization. By trust we mean expectation of correct and cooperative behaviour based on commonly accepted rules whose formalization ensures the correct implementation of the activities (Muffato, 2004). Currently this is accomplished by means of the Rules and Regulation to which libraries subscribing to NILDE agree:
a) Supply documents on a reciprocal basis.
b) Facilitate access to their holdings, through their participation in at least one of the Italian union catalogues or meta-OPAC (such as ACNP, SBN, MAI).
c) Supply documents within 2 days (average) and 5 days (maximum).
d) Supply documents at no charge and, in case of heavy usage, ask for a one-off payment at the end of the year.
e) Equally distribute their borrowing requests among all libraries (and send a maximum of 5 requests per week to a single library).

Reciprocity of the DD service (point a) is the most important point of the Rules and Regulations and is the building block of the DD cooperation: indeed it identifies the commitment of each individual towards the whole network. The scope of such a commitment was initially a very controversial issue: in fact, NILDE could have been used by separate groups of libraries as simply a software tool or could have become a common base for broad and national cooperation.

The choice to create one broad cooperative network has proven to be the correct one. In fact, analysis of the DD mutual exchanges over the period 2004-2006 shows that about one third (30%) are carried out between libraries belonging to different disciplines and institution types (Mangiaracina 2005, 2006). Another interesting example is provided by data gathered over the period 2005-2006 from the Bibliosan libraries. Bibliosan is a project headed up by the Italian Ministry of Health which aims to create the library network of Italian Biomedical Research (63 participating libraries). Its objectives are: resource sharing, document exchange, ratio of purchases and greater document availability. Bibliosan has chosen to use ACNP coupled with NILDE as the base for resource sharing among its libraries (Mangiaracina, Giannuzzi, 2005). Figure 2 highlights something unexpected: only about 50% of the information needs were satisfied within the Bibliosan sub-network while the other half was fulfilled within the wider NILDE network. This underlines how cooperation is useful and necessary for everyone.

In this context it is fundamental to have a policy that protects the interests of the community by avoiding restricted intra-institutional or intra-project exchanges.

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

Documents exchanged by BIBLIOSAN libraries in 2006
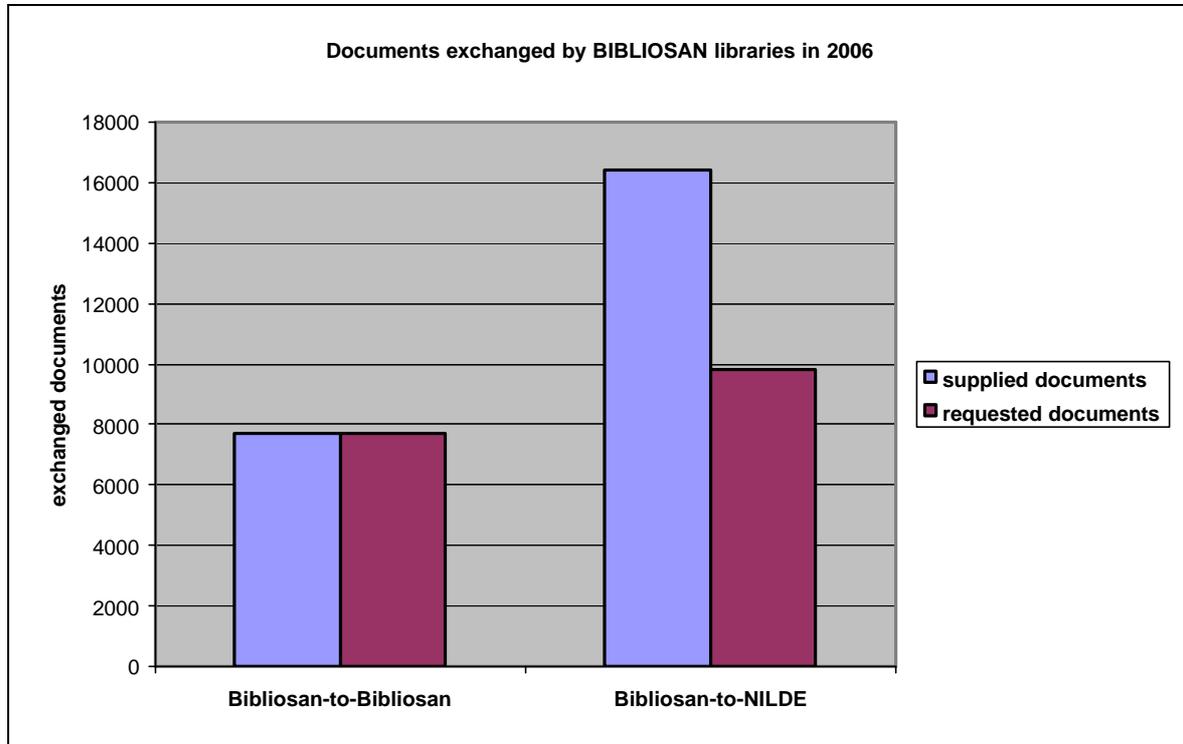

Figure 2 Exchanges within the Bibliosan sub-network and between Bibliosan libraries and the whole NILDE network in year 2006

Point b) of the Rules and Regulation states that libraries must make their holdings visible to the whole community by actively joining at least one national catalogue: this is the first instance of NILDE imposing a duty (in a previous version of the Rules, this point was framed as a recommendation).

It was noticed that 99% of the total number of documents are supplied by libraries that actively join ACNP. Conversely, non ACNP libraries have supplied 1% yet requested 21% of the total number of documents (Olimpieri, 2006). Before the introduction of this policy, searching for a supplier on individual OPACs was very difficult due to:
- the impossibility of simultaneously querying the holdings of more than one library;
- slow and difficult identification of contact information for sending requests;
- the increasing intolerance of suppliers to requests from those libraries which clearly had no intention of providing reciprocal service.

Given the fragmented Italian situation, it is essential to share resources through common tools, which function as a national knowledge base. By actively joining the national catalogues it is clear that libraries commit themselves to supplying a quality service, rather than just using it.

Point c) of the Rules commits libraries to guarantee promptness of response (2 days on average and 5 days maximum) with the aim of improving service quality. From the beginning, NILDE's main purpose has been to improve DD practises, raising awareness and allowing any library to benchmark its own service against a standardized set of data.

Initial evidence (Mangiaracina, 2003) that libraries participating in the pilot project improved their performance has been borne out during the three year-period 2004-2006. Table 4

10th Interlending and Document Supply Conference

Resource Sharing for the Future Singapore, 29th – 31st October 2007
Building blocks to Success www.nlb.gov.sg/ilds

shows that the yearly general indicator for turnaround-time has been steadily decreasing; Figure 3 shows the yearly turnaround-times reached by each library and the positive trend appears even more evident: 70% of libraries have improved their turnaround time after two years. This highlights how the policy has been generating a virtuous cycle thanks to which average network service quality has been improving step by step.

	2004	2005	2006	2007
Turnaround time	2,6	1,8	1,8	1,5

Table 4 Despite the increase in the number of participating libraries, general turnaround-time has been decreasing steadily since 2004

Libraries agree to supply documents at no charge and, in case of heavy usage, ask for a one-off payment at the end of the year (point d).
The goal of this policy is to simplify all the administrative procedures due to payment transactions thus avoiding unnecessary overburdening of staff. According to policy a), no payments should be necessary at all; however, the option of asking for a one-off payment in cases of a high number of requests between two libraries functions as a mechanism of self-regulation.
Figure 4 shows library distribution in 2006 in terms of the difference between supplied and received documents. 76% of libraries have found a negligible difference between provided and received documents (between –200 and +200). This fact highlights how the policy leads to balance the entire system. However, cut-off points highlight the existence of some libraries that cannot balance: the big suppliers and the big consumers. The reasons for such imbalance may be:
- lack of visibility of holdings of those libraries which do not join or update the national catalogues, which underlines how important point b) of the Rules and Regulations is;
- participation of small libraries with few holdings, which highlights how important the concept of cooperation network is;
- the unavoidable existence of the "free rider" library, i.e. libraries that act as parasites within the network: heavy consumers that refuse, more or less openly, to supply reciprocal service.

NILDE libraries are actively looking for a solution to reward the institutional effort of big suppliers, given the importance of their role within the network. While a lot of suggestions have been made, NILDE has yet to reach a final decision on policy. This is because of payment not being considered so important by the majority of suppliers who, according to a survey, never ask for it. They seem to be willing to make their resources available to the community as a whole, as long as this seems to be common behaviour (Filippucci, 2006).

Point e) invites participants to distribute the requests among all the possible suppliers equally. This policy leads towards the adoption of responsible behaviour towards the entire network. It is necessary to the forwarding of everyone's interests to avoid overloading a small number of supplying libraries.
Practice of this policy is actually favored by the self-regulation mechanism previously discussed (point d).
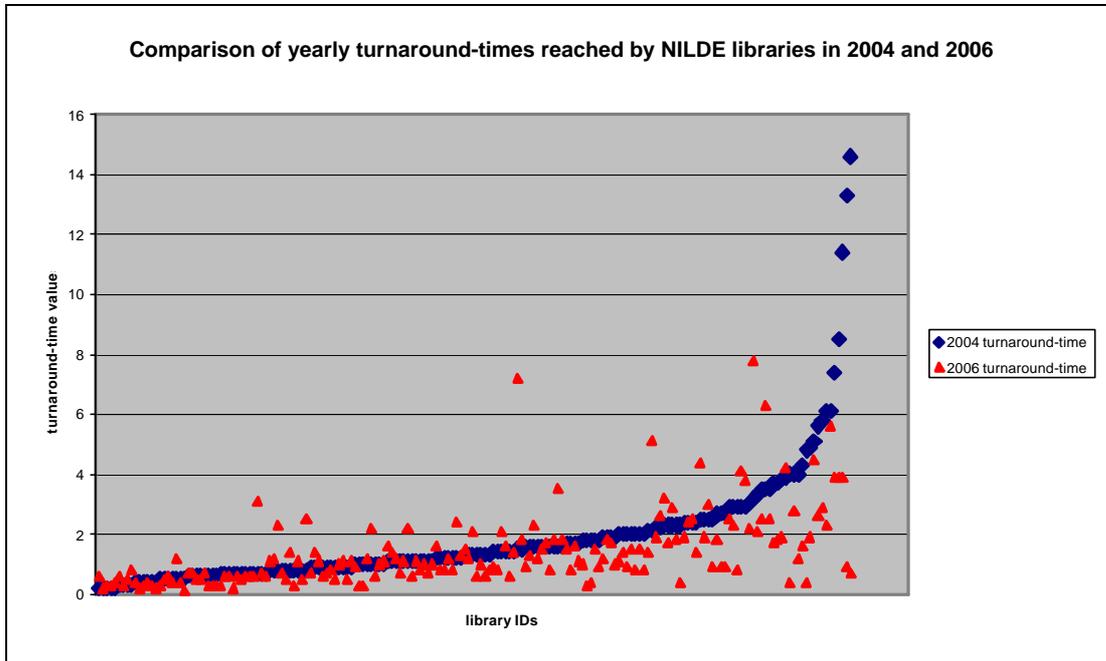
Figure 3 Yearly turnaround-times reached by 186 NILDE libraries that have supplied al least 50 documents in each year between 2004 and 2006. The graphic is ordered by the 2004 turnaround-times (blue points). It stands out that 70% of libraries have improved their turnaround time after two years (red points below the blue ones).
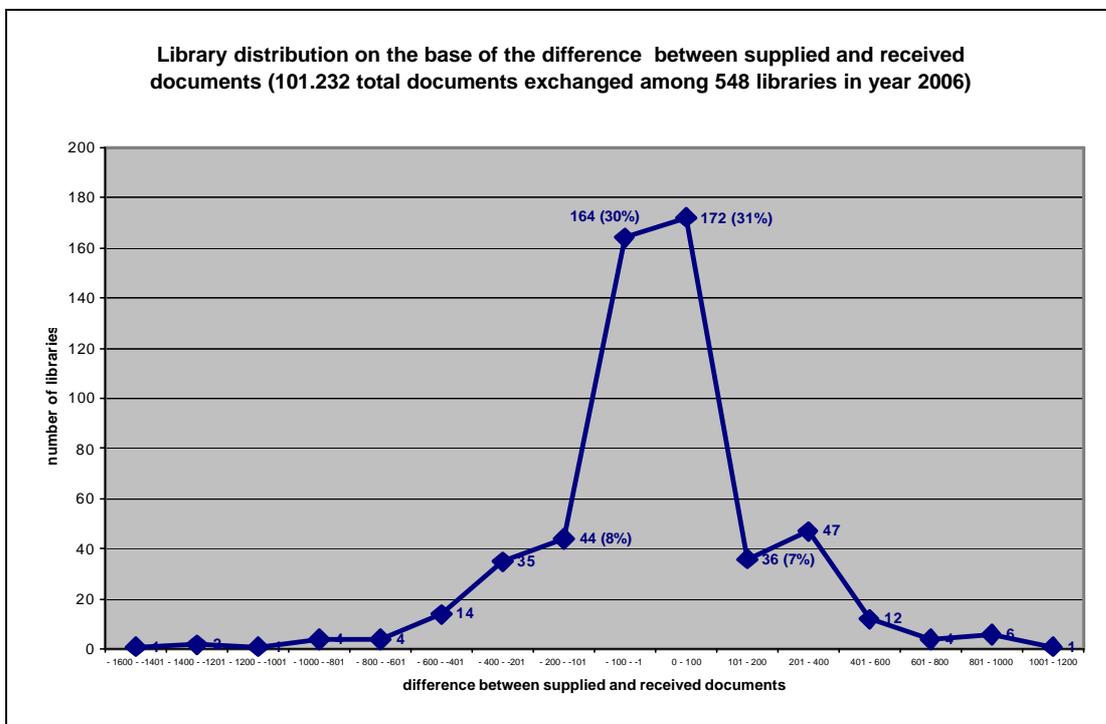

Figure 4 Library distribution according to the difference between supplied and received documents in 2006

The continuous growth of the network has made institutionalization of the community necessary: feedback and new suggestions need to be collected and analyzed in a structured way in order to get democratic, shared and also organized solutions.

NILDE governance is organized as follows:

1) the NILDE Administrator: i.e. the CNR Bologna Research Area Library, where NILDE was created and developed. Its responsibilities are to guarantee good service and provide technical support to the libraries;

2) the NILDE Subscriber Assembly (ASN), i.e. the whole community. Its tasks are:
   a) to elect the NILDE Library Committee (CBN);
   b) to vote to modify the Rules and Regulation;
   c) to meet at least once every three years, normally within the NILDE biannual conference;

3) the NILDE Library Committee (CBN),elected by the ASN. Its tasks are:
   a) to guarantee compliance with the Rules and Regulations;
   b) to act as the negotiator between ASN and the Administrator: when a criticism is raised or a problem detected, one or more CBN members recruit collaborative volunteers from the ASN and organize a working group. The aim is to quickly reach a solution that can be presented to both the ASN and the Administrator.

   Freedom of participation in this kind of activity is the bottom-up strategy base and enables wide "exploration" (Muffato, 2004).

   Previously there have been active NILDE Working Groups on Payments, on Licensing of Electronic Resources and on Catalogues.
   c) to monitor the network and report any unfair behaviour to the Administrator.

The dynamism and the flexibility of the network define NILDE as a learning organization, whose decentralized institutionalization is based on a bottom-up approach that focuses on "exploration" but can also effect rapid "exploitation". In this context the NILDE Administrator acts as a "functional leader": a function of the community and not vice versa: in NILDE what matters is the entire system (Antonacci, 2006).

NILDE's processes

The policies are applied within the network through structured and organized processes. A process is any library action carried out by means of NILDE functionalities. From a practical point of view, collaboration means adoption of common standards (processes) according to common policies, in order to achieve common goals.

The processes that have made NILDE a successful tool are related to the following functionalities:

- the high number of reports used to obtain quality service measurements through performance indicators: any NILDE policy in the Rules and Regulations requires real-time monitoring of both interlibrary exchanges between two libraries and those between one library and the whole community;

- the integration with bibliographic OpenURL compliant databases through the implementation of the Z39.88-2004 standard (NISO, 2005): such integration has brought advantages both to the end-user and to libraries. The end-user may make DD requests with only one click, directly from the bibliographic database, avoiding manual data entry. In this way libraries may obtain standardized DD requests fullfilled with all the parameters that a bibliographic database provides;

- the implementation of a communication protocol with ACNP that allows the requesting library to directly obtain a list of probable suppliers, thanks to the ISSN

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

parameter. This clearly brings considerable optimization to the interlibrary request procedure: searching for a supplier library becomes automatic and totally integrated into NILDE;

- the electronic transmission module, incorporated into the NILDE system, that performs Secure Electronic DD (SEDD) by means of uploading files to a web server. Recently a Hard-Copy module has been added to the SEDD process in order to deal with DD clauses in electronic resources licenses that do not allow sending of the publisher's original pdf file, but only of a printed copy. The Hard-Copy software emulates manual operations such as printing the pdf and digitizing it through a scanner[6];

- the "Help Licence" section, is a resource available through the NILDE web site[7] that contains information about DD/ILL clauses on Italian licensed electronic resources. The section was born as a consequence of the study carried out by the NILDE Group on Electronic Licensing (Zaetta, 2006) with the aim of pushing librarians to easily and quickly verify what they can and cannot do with their electronic material (Brennan, 2002) . The archive is updated by the Italian consortia. The initiative has led to the achievement of two important goals: promotion of communication between consortia and libraries about DD/ILL in licensing, encouraging the libraries to be more proactive and the consortia to be more aware; and publisher recognition with respect to NILDE as an SEDD system: this is already true with respect to the latest Kluwer and Casalini contracts.

As new challenges in electronic publishing have led libraries from all over the world to organize in consortia, NILDE has led libraries to cooperate in order to ensure that end-users have a rapid and efficient service based on electronic delivery and also to guarantee publishers the adoption of fair behaviour. As exemplified in Europe by the Subito case, this is actually a tricky point (to learn more about the current state of the STM market in the EU see (Dewatripont, 2006) and about the implications of the SocInfo EU 2001/29/CE directive for Document Delivery see (Vezzoso, 2005)).

In summary, it is clear that from the outset libraries have been cooperating in response to a task requiring completion, in order to deal with a less than ideal situation. In this context processes and policies are not subordinate to the task but rather they are an integral part of it: it is the organization of the community that continuously adjusts itself in accordance to the network needs (Muffato, 2004).

Ongoing developments and new features

NILDE is presently used by about 600 libraries[8] and it currently counts 4,000 registered end-users. As only 20% of libraries have started to implement end-user functionalities, it is reasonable to predict a rise in the number of registrations. Thanks to integration via OpenURL with most electronic resources, NILDE has indeed become a very simple and direct tool for end-users the expectations and behaviour of whom are definitely changing in the Internet era. In this context it makes sense to wonder what difficulties will be faced by libraries in offering end-users a quality DD service and which opportunities will arise from integration with other library services.

---

[6] *to learn more about NILDE as an SEDD system, see http://nilde.bo.cnr.it/index.php?st=201*

[7] *http://nilde.bo.cnr.it/index.php?st=105*

[8] *http://nilde.bo.cnr.it/index.php?st=2*

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

Given all of these reasons, the overall architecture of the NILDE system has been rethought out, not only to guarantee future scalability and high performance operations, but also to add new features:
- management of ILL requests in addition to DD requests;
- compliance with the SRU/SRW protocol (Sanderson, 2004) in order to implement a standard way of communication with OPACs;
- reference management added to NILDE End-user module, making it an even more user-oriented and friendly tool for document delivery and scholar work;
- federated end-user authentication support via Shibboleth, in order to provide inter-institutional Single Sign-On and federated identity management to those organizations belonging to the network;
- design of new user-interaction styles, based on new graphic design, a new logo, and increased usability;
- multilingual support and compliance with W3C guidelines for an accessible and usable web development.

In the following paragraphs the new end-user reference manager module, federated authentication and the new user-interface are presented.

NILDE Reference Manager for end-users
The NILDE End-Users module, initially conceived as a basic tool simply for managing document delivery requests, has evolved into a reference manager, which allows the user to organize their own bibliography and, if the document is not directly accessible, to initiate a DD or ILL request to the library service.
The module supports three types of references: article, book and extract. References might 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 that has been 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.
The user is also allowed to send DD/ILL request during new insertions or after them (if the reference has not been requested before). In this context the module provides functions to track and revoke requests. In addition, there is a historic DD section to guarantee access to the whole list of DD made requests (in case of deletion from the bibliography).
The NILDE End-User module also provides an account manager section where the user may modify their data such as name, surname, password, contact details, employee qualification, institute or department they belong to, etc... and also get a synthetic picture of the libraries they are registered to.
Even if the NILDE Reference Manager cannot be compared to a professional Reference Manager System, it can certainly be considered a useful tool, especially for novice research or academic users, such as graduating students, given the fact that it is totally integrated in an efficient and acknowledged DD system.

Federated Authentication
The most important feedback received by NILDE has come from academic library systems regarding end-user management.

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

It has to be pointed out that the NILDE End-User authentication module did not communicate with external institutional information systems. As in the legacy approach, NILDE 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 (Paschoud, 2005). The authentication process is always carried out by the user's home organization, while authorization is up to the external service, such as NILDE.

In NILDE it is necessary to avoid:
- registration/management of end-users already registered into institutional directories;
- providing end-users with a new login/password.

The solution has been to adopt Shibboleth, a standard-based, open source middleware software that implements OASIS-SAML protocols (Maler, 2003) and has attribute handling features. Developed by the Internet2 Association[9], Shibboleth is one of the prevalent frameworks for Authentication, Authorization and inter-institutional Single-Sing-On. It is being adopted by an increasing number of scientific information providers, such as Elsevier, Ex-Libris, 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 the new version of the NILDE software 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.

A GARR[10] pilot project is currently ongoing with the aim of creating an Italian AAI based on Shibboleth. In this context NILDE has been chosen as the reference test application.

New User Interface Design
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 an high level of ergonomics and full control of operations;
- to develop a feedback system from NILDE to the user;
- to guarantee separation between elements of interface and presentation and those of content, both static and dynamic;
- logo design and graphic restyling, in order to realise both effective communication of the NILDE identity and a pleasing design for the user, in the long- as well as short-term.

A unitary web platform has been developed, constantly updated and easy to navigate, that provides access to services and informative resources. Web technologies in use are a careful mix of AJAX, CSS, PHP and others that allow the creation of fluid web pages, dynamic contents and a continuous and rapid work-flow. High contrast graphic design maintains the right balance between sobriety and informality and between hi-tech and classical decoration elements. Compliance with W3C guidelines for a accessible and usable web development has been assured.

---

[9] *http://internet2.edu*
[10] *the GARR consortium manages the Italian Academic and Scientific Research Network. http://www.garr.it/*

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

Figures 5-8 present screenshots of the new NILDE home page and reference manager user interface.

Conclusion

In this paper we have presented the key factors that have made NILDE a successful tool and a "de facto" standard for document delivery among Italian libraries. Such key factors fall under two headings: the policies, i.e. the rules the community has imposed on itself, and the processes, i.e. the procedures through which the libraries provide DD services using NILDE. The development of the system has been driven by the needs of the library community, thanks to its proactive participation and to the will to set up collaborative relationships among different organizations. The ongoing and steady growth of the network has allowed the establishment of trusted relationships, based on commonly accepted rules whose formalization ensures the correct implementation of the activities. This has been generating a virtuous cycle thanks to which average network service quality has been improving step by step.
The NILDE community's openness to new suggestions and feedback has demonstrated the extent to which cooperation is fitting in order to achieve determinate common aims such as resource sharing, quality of service, and recognition of Secure Electronic Document Delivery in licensing.

Acknowledgements

The authors wish to thank all the colleagues who helped with their work and fruitful discussion: Maria Grazia Balestri, Patrizia Salamone, Silvia Roda and Cosimo Alfarano (CNR Bologna Research Area Library), Vincenzo Verniti, Orietta Bonora and Gabriella Boninsegna (ACNP), Paola Rossi and Antonella De Robbio (CILEA and MAI-AIB), Paola Gargiulo, Anna Ortigari and Marta Plebani (Italian consortia), and all the members of the NILDE working group: Moreno Curti, Elena De Carolis, Marida Fasano, Gustavo Filippucci, Marina Grazioli, Rosella Magno, Gabriella May, Stefania Olimpieri, Monica Ortolan, Giancarlo Piolanti, Barbara Pistoia, Stefano Stabene, Ingvild Unterpertinger.

Figure 5 NILDE home page with login panel: user may select legacy or Shibboleth authentication. In the second case, a list of institutions belonging to the Italian AAI federation is presented. After selecting it, the user will be authenticated by their home institution
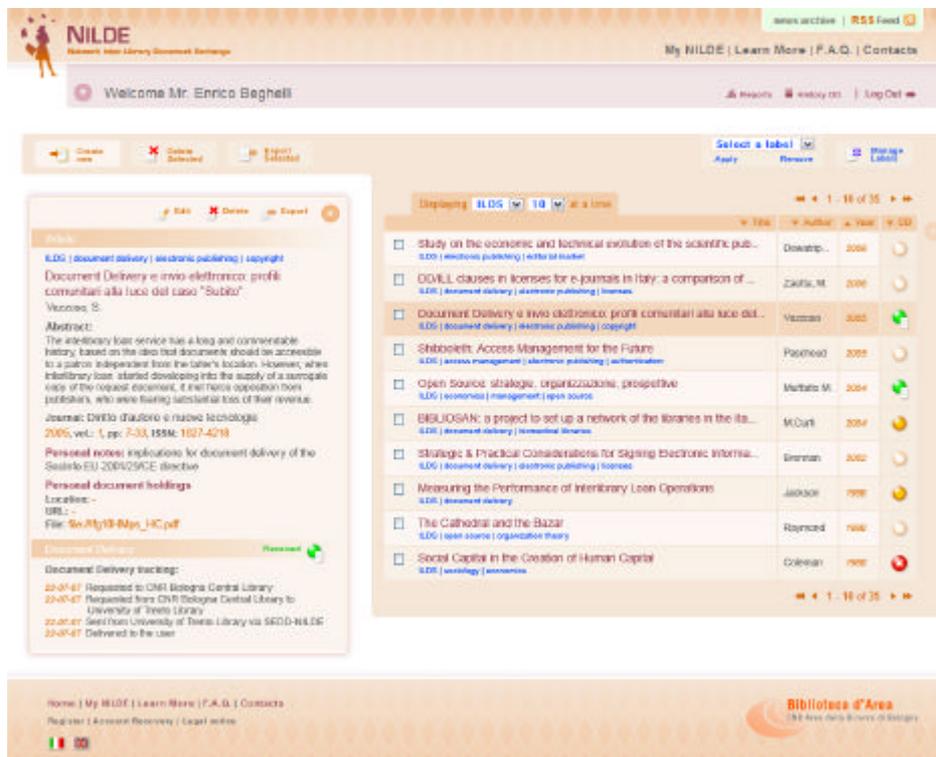

Figure 6 Reference manager with the bibliography and an expanded reference

10th Interlending and Document Supply Conference

Resource Sharing for the Future Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

Figure 7 Reference manager with the bibliography and the expanded document delivery status for each reference
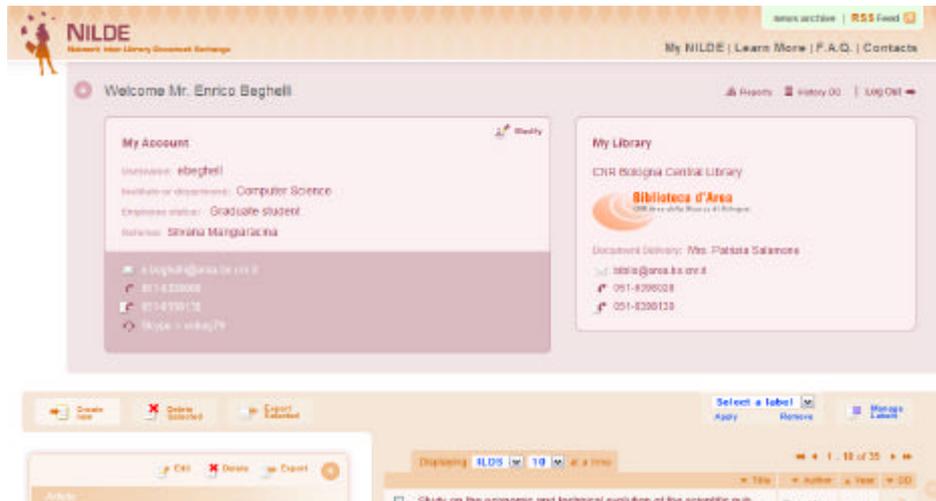

Figure 8 Reference manager with the expanded account manager

Bibliography

1. (2001-2006) *Proceedings of the I – IV Italian Workshops on Document Delivery and Inter-Library cooperation.* Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site http://biblio-eprints.bo.cnr.it/view/departments/WRKS.html

2. Antonacci, F. (2006). *Condividere la conoscenza, l'esempio del software libero.* Milano, Italy: Edizioni Unicopli.

10th Interlending and Document Supply Conference

Resource Sharing for the Future Singapore, 29th – 31st October 2007
Building blocks to Success www.nlb.gov.sg/ilds

3. Brennan, P., Harset, K., Harper, G. (2002). Strategic & Practical Considerations for Signing Electronic Information Delivery Agreements. Retrieved July 18, 2007, from ARL web site: http://www.arl.org/sc/licensing/licbooklet.shtml

4. Coleman, J. S. (1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology.* 94, S95-S120.

5. Dewatripont, M., Ginsburgh, V., Legros, P., Walckiers, A., Devroey, J. P., Dujardin, M., Vandooren, F. et al. (2006). Study on the economic and technical evolution of the scientific publication markets in Europe. *Commissioned by DG-Research, European Commission.* Retreived July 31, from The European Union On-line web site: http://europa.eu.int/comm/research/science-society/pdf/scientific-publication-study_en.pdf

6. Filippucci, G. (2006). Condizioni di fornitura e 'forte scompenso': prime linee per la definizione di un nuovo modello economico. *Proceedings Document Delivery via Internet e cooperazione bibliotecaria. Servizi DD e risorse elettroniche: le esigenze degli utenti, le risposte delle biblioteche, Napoli*. Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site: http://biblio-eprints.bo.cnr.it/archive/00000070/

7. Jackson, M. (1998). *Measuring the Performance of Interlibrary Loan Operations in North American Research and College Libraries*. Washington, D.C.: Association of Research Libraries.

8. Maler, E. et al. (2003, September 2). Assertions and protocol for the OASIS Security Assertion Markup Language (SAML) v.1.1. Retrieved July 31, 2007, from OASIS web site: http://www.oasis-open.org/committees/download.php/3406/oasis-sstc-saml-core-1.1.pdf

9. Mangiaracina, S. (2002). NILDE: a Document Delivery System Supporting Document Exchange via the Internet. *Library Hi Tech News,* 19(8), 39-41. Retrieved July 31, 2007, from E-LIS web site: http://eprints.rclis.org/archive/00000109/

10. Mangiaracina, S. (2003). Il sistema NILDE: obiettivi, stato dell'arte, risultati della sperimentazione. *Proceedings Document Delivery via Internet e cooperazione bibliotecaria, Bologna*. Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site: http://biblio-eprints.bo.cnr.it/archive/00000030/

11. Mangiaracina, S. (2005) The development of NILDE (Network for Inter-Library Document Exchange): discussion and future perspectives. *Proceedings Document Delivery via Internet e cooperazione bibliotecaria. La qualità al servizio della cooperazione*, Pisa. Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site: http://biblio-eprints.bo.cnr.it/archive/00000057/

12. Mangiaracina, S. (2006) Current issues on Italian document delivery: first results from NILDE. *Proceedings Document Delivery via Internet e cooperazione bibliotecaria. Servizi DD e risorse elettroniche: le esigenze degli utenti, le risposte delle biblioteche, Napoli.* Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site: http://biblio-eprints.bo.cnr.it/archive/00000090/

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

13. Mangiaracina, S., Giannuzzi, M., Zaetta, M., Toni, F., Motta, S., Curti, M. (2005) NILDE, a system designed to manage and to evaluate the quality of document delivery services: a case study in Italian biomedical libraries. *11th European Workshop of Medical and Health Libraries, Palermo, Italy, June 23-25.* Retrieved July 31, 2007, from EAHIL web site: http://www.eahil.net/conferences/palermo_2005/eahil_posters_docs/pdfcd/Mangiaracina.pdf

14. Mazzitelli, G. (2000, May 24). Carta dei servizi o libro dei sogni? Retrieved July 31, 2007, from AIB web site: http://www.aib.it/aib/congr/c46/s33f.htm3

15. Minetto, S. (1999). I servizi nazionali nella prospettiva delle biblioteche universitarie. *I servizi nazionali nella prospettiva delle biblioteche universitarie. 45th National AIB Conference.* Retrieved July 31, 2007, from AIB web site: http://www.aib.it/aib/congr/co99index.htm

16. Muffatto M., Faldani M. (2004). *Open Source: strategie, organizzazione, prospettive.* Bologna, Italy: Il Mulino.

17. NISO (2005, April 15). ANSI/NISO Z39.88-2004, The OpenURL Framework for Context-Sensitive Services. Retrieved July 31, 2007, from NISO web site: http://www.niso.org/standards/standard_detail.cfm?std_id=783

18. Olimpieri, S (2006). Partecipazione delle Biblioteche Nilde ai Cataloghi collettivi Nazionali. *Proceedings Document Delivery via Internet e cooperazione bibliotecaria. Servizi DD e risorse elettroniche: le esigenze degli utenti, le risposte delle biblioteche, Napoli.* Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site: http://biblio-eprints.bo.cnr.it/archive/00000089/

19. Paschoud, J., Garibyan, M. (2005). Shibboleth: Access Management for the Future. *Proceedings of IADIS (International Association for Development of the Information Society) WWW conference, Lisbon, Portugal, October 2005.* Retrieved July 31, 2007, from LSE web site: https://gate-test.library.lse.ac.uk/dspace/handle/1988/2783?mode=full

20. Raymond, E. (1998, November 22). The Cathedral and the Bazar. Retrieved July 31, 2007, from Free Software web site: http://www.free-soft.org/literature/papers/esr/cathedral-bazaar

21. Sanderson, R. at al. (2004). SRU/SRW (Search and Retrieve URL/Web Service). Retrieved July 31, 2007, from Library of Congress web site: http://www.loc.gov/standards/sru/

22. Vezzoso, S. (2005). Document Delivery e invio Elettronico: profili comunitari alla luce del caso "Subito". *Diritto d'autore e nuove tecnologie. 1*, 7-33.

23. Zaetta, M. (2006). DD/ILL clauses in licenses for e-journals in Italy: a comparison of publisher policies. *Proceedings Document Delivery via Internet e cooperazione bibliotecaria. Servizi DD e risorse elettroniche: le esigenze degli utenti, le risposte delle biblioteche, Napoli.* Retrieved July 31, 2007, from Biblioteca Area di Ricerca di Bologna E-prints web site: http://biblio-eprints.bo.cnr.it/archive/00000074/

10th Interlending and Document Supply Conference

Resource Sharing for the Future   Singapore, 29th – 31st October 2007
Building blocks to Success   www.nlb.gov.sg/ilds

Biographical sketch of authors:

Silvana Mangiaracina is the Head of the CNR Bologna Research Area Library. She has a degree in Mathematics; her scientific interests focus on Digital libraries, Open access and scientific publishing, User interface and usability studies, Library and information management.

Marta Zaetta is an analyst and software developer at the CNR Bologna Research Area Library. She has a bachelor's degree in Computer Engineering. She studies Information Technology & Management and she is actively involved in the Master in Free and Open Source Software Technology at the University of Bologna.

Daniele De Matteis is a Graphic and Web Interface designer and he is graduating in Communication Sciences at the University of Bologna.

Giacomo Tenaglia is a graduating student in Computer Science at the CNR Bologna Research Area Library, with a thesis in Federated Authentication and Shibboleth.

Alessandro Tugnoli is a senior analyst and software developer at the CNR Bologna Research Area Library. He has a degree in Computer Science.

Enrico Beghelli is a graduating student in Computer Science at the CNR Bologna Research Area Library, with a thesis in Library Reference Management Software.