# A New Vision for Resource Sharing:

## *TRLN Document Delivery Project*

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Successful resource sharing efforts among libraries in a consortium have two major components: the shared resources themselves and how they are made accessible to consortium members and their patrons. The member libraries of the Triangle Research Libraries Network (TRLN) — Duke University, North Carolina State University, the University of North Carolina at Chapel Hill and, since 1994, North Carolina Central University — have a history of cooperative collection development well documented by other authors.[1] Agreements between some member libraries date back more than sixty years, and studies of collection overlap demonstrate the effectiveness of these efforts. A recent study revealed that nearly 75 percent of the items in all members' online catalogs were available at only one institution; less than 7 percent were owned by all three.[2]

Building a coordinated collection is only one side of the equation; providing equivalent access for patrons of all member libraries is just as important. "Equivalent access" in this sense means that when a library chooses access over ownership — deciding not to purchase an item available elsewhere within the consortium — that library's patrons must not be penalized for the choice their library has made. Providing equivalent access may require a library to rethink its definition of core services to patrons along three dimensions: bibliographic access, borrowing privileges, and delivery services.

***Bibliographic access:*** Since the library has opted to defer purchase of some items within scope for its own collections, it must provide convenient access not only to its own catalog, but also to catalogs of all other consortium members. If this is not through a union catalog, member libraries' catalogs should be linked for easy searching. If patrons have dial-in or networked access to their own library's catalog, they should have similar access to all catalogs in the consortium. Shared access of this type has been the objective of automation efforts within TRLN since its formation in 1980: first, through the locally developed online system, BIS,[3] which permitted simultaneous searching of all catalogs, and since 1993, by linking each institution's DRA online catalog to the other online catalogs for ease of sequential searching.

***Borrowing privileges:*** Though agreements have existed between some libraries for years, in 1987 the TRLN libraries established reciprocal borrowing privileges for faculty, staff, and graduate and undergraduate student patrons of all member libraries. After registering at his "home" library, the patron obtains a Cooperative Library Privilege Card to borrow materials directly from any other TRLN library.[4]

***Delivery of materials:*** Every day, the library van makes a four-hour circuit of the Triangle area to deliver library materials between TRLN member libraries and selected other libraries in Research Triangle Park. At present, the van carries mainly items requested via interlibrary loan and mail between libraries, and is also used to return books borrowed from a library on another campus.

This is an excellent beginning, but readers will note that in order to use materials in another TRLN library's collection, patrons must either travel to that other library in person, or request those materials on interlibrary loan. Neither of these options are as easy as finding the needed items in the patron's home library, and informal studies of reciprocal borrowing have confirmed that most patrons do not take advantage of the other collections available to them.[5]

In 1991, when the TRLN Executive Committee expressed its concerns about improving access to all shared resources, a grant proposal was submitted to the U.S. Department of Education under the Title II-D pro-

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gram, College Library Technology and Cooperation. The proposed project had two components: first, the development of an automated document delivery system that could be a model for other libraries and consortia; and second, the development of the related policy, staffing, and procedural changes required to implement improved document delivery services.[6] The proposal was approved in 1992; federal funding for the Document Delivery Project began in 1993 and continues through September 1995. As a part of the project, TRLN will integrate the aforementioned service components into a comprehensive system that makes it easy for patrons to request items, and to receive those items quickly and conveniently, whatever the source.

## Interlibrary Loan and Document Delivery Environment

TRLN comprises ten separately administered libraries—each university's main library, plus six independent libraries serving graduate schools of law and business, and the medical centers. Every library maintains its own interlibrary loan unit, each with its own policies, procedures, fees, and array of services; two libraries have a second, separate ILL unit. All ILL offices use the OCLC PRISM ILL system; three also are heavy users of NLM's DOCLINE. One library is also an RLG ShaRes member and occasionally uses the RLIN system.

In addition to traditional interlibrary loan services, most libraries offer staff-mediated photocopying for patrons, though not always administered within the interlibrary loan unit. Some libraries will mail nonreturnable items to patrons, while others require pickup and payment in person. A book delivery service — retrieval, check-out, and delivery of books from the patron's own library — is available only on one campus.

Taken in the aggregate, the TRLN libraries are heavy net lenders, supplying several times as many items as they request. Requesting is fairly evenly divided between returnables and nonreturnables overall, with the main libraries borrowing more returnables, and the independently administered libraries (especially the medical libraries) handling mostly nonreturnables. Recent statistics indicate that between 30 to 50 percent of all requests could be filled by another TRLN library.

Nationally, research libraries have seen significant increases in demand for interlibrary lending and borrowing over the past eight years (averaging 50 percent and 99 percent, respectively).[7] Some of the TRLN libraries have experienced even greater increases: one main library reports that borrowing requests have tripled over that same period. Significant increases in lending certainly present challenges to library staff, but they may not get much attention from top management except when they compete for resources with service to the library's primary clientele. Comparable increases in borrowing (including requests for nonreturnables) however, *should* receive more urgent attention. Changes in borrowing requests should be studied closely because they raise questions about the library's collection or collection policies, and they directly affect service to the library's primary clientele. Furthermore, borrowing costs represent roughly two-thirds of the total costs in interlibrary loan, primarily labor costs.[8]

## The TRLN Document Delivery System

Although not originally described in those terms, the TRLN document delivery project essentially is a process for reengineering document delivery services and procedures, in conjunction with the development of a new automated system. In a traditional model (Figure 1) of interlibrary loan and document delivery, several potential inefficiencies easily can be seen:

- Library staff — in this case, the interlibrary borrowing staff — are involved in every step of processing every request, and must make *all* the decisions, even the very routine ones.
- Staff must interact with many different systems and networked resources, which for the most part are not connected or integrated.
- Libraries make heavy use of other libraries — they are more likely to supply items at little or no cost, and they are familiar (the type of organizations that library staff are used to dealing with), even though they may not be the fastest way to get the requested item.
- Most libraries make relatively little use of alternative suppliers, such as commercial vendors or full-text databases, that may be able to fill requests much more quickly. The traditional argument is that these sources cost more, though the staff time expended in seeking materials from several libraries is often not acknowledged as a real and significant cost.

*Figure 1. Traditional model of interlibrary loan and document delivery.*

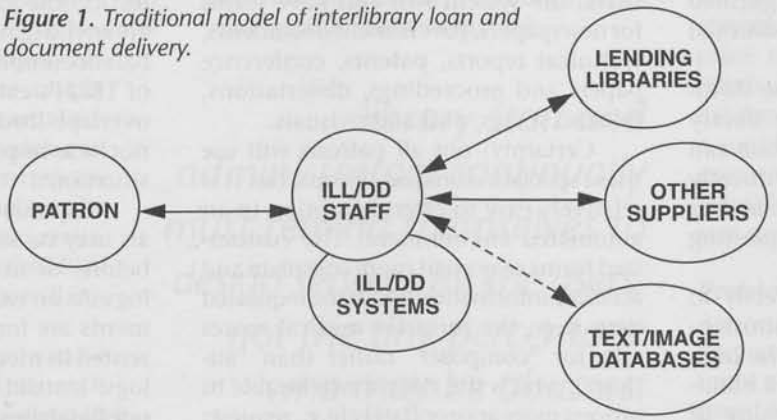
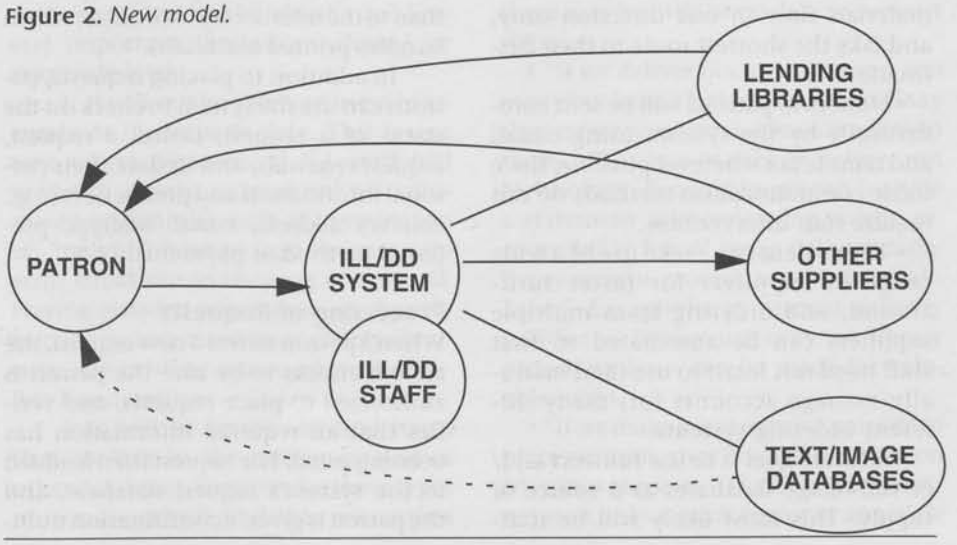



**Figure 2.** *New model.*



## The New Model

Is this really the best we can do? Most practitioners would agree that something like an "80-20" rule holds true in interlibrary loan, that is, that the vast majority of requests are relatively straightforward to handle, with the remainder of requests requiring most of the time and resources. Since interlibrary loan — and interlibrary *borrowing* in particular — is at present a labor-intensive process, it seems natural that automation efforts should focus on reducing the staff time needed to process requests.

The new TRLN system is intended to do just that: one key objective is to automate the processing of the "straightforward 80 percent" of requests as much as possible, freeing library staff to concentrate on the others. (System developers and policymakers are seeking ways to automate parts of the processing of all requests, even though some always will need personal attention by library staff.) The initial emphasis is on automating the borrowing process, since that is where the greatest labor savings can be achieved. The new model (Figure 2) TRLN has envisioned is distinguished by several changes from the traditional model:

- All requests go through the document delivery *system*, not the library staff; requests for items the system can verify and locate should be sent directly to the lending institution, without ever being handled by staff in the requesting library.
- Materials are delivered directly to the patron whenever possible, shortening the length of time before the item reaches the patron's hands, and eliminating time-consuming processing of materials that are only "passing through" the ILL office. Decisions and materials flow in one direction only, and take the shortest route to their destination.
- Notices to patrons will be sent automatically by the system, using e-mail and remote fax wherever possible, since those communication methods do not require staff intervention.
- The system can make use of a wide range of suppliers for faster turnaround, and ordering from multiple suppliers can be automated so that staff need not learn to use (and manually manage accounts for) many different ordering systems.
- A future goal is to use full-text and/or full-image databases as a source of supply. This most likely will be staff-mediated to begin with, but as technologies and standards develop, it eventually could be automated completely.

## Functions Available to Patrons

The system still is very much a work in progress. In the present initial phase of development, efforts have been concentrated on those components of the system that support resource sharing within the TRLN libraries, while reducing library staff time and providing the greatest service improvement to patrons. This includes:

- patron-initiated requests
- automatic routing of requests directly to the supplying TRLN library
- direct delivery of most items to most patrons
- policy changes required to support these services

Patrons will be able to place requests in two ways: either by filling in a request form online (using any forms-capable WorldWideWeb browser software), or by marking an item retrieved while searching a database or online catalog. The system will support a variety of request forms: in addition to forms for requesting books and journal articles, the system will also have forms for newspapers, government documents, technical reports, patents, conference papers and proceedings, dissertations, musical scores, and audiovisuals.

Certainly, not all patrons will use these specialized request forms, but it is relatively easy to offer the option in an automated environment. The customized forms may elicit more complete and accurate information about the requested item (e.g., the form for musical scores asks for "composer" rather than "author"), which the system will be able to process more appropriately (e.g., requests for audiovisuals can be routed directly to media center staff for processing, rather than to the interlibrary loan office, which handles printed materials).

In addition to placing requests, patrons can use the system to check on the status of a request, cancel a request, request renewals, and update their personal information and preferences (e.g., delivery address, e-mail address, preferred method of payment).

## Processing of Requests

When a patron enters a new request, the system checks to be sure the patron is authorized to place requests, and verifies that all required information has been supplied. The request then is added to the system's request database, and the patron is given a confirmation number that can be used to query the system at a later time. The remainder of the process happens "offline," i.e., while the patron is not logged on.

From here on, processing of the request is managed by programs called "executives," which are rule-based expert systems. To begin with, they will be fairly unsophisticated, but are expected to grow in complexity and intelligence as the system's designers better understand how to model an expert ILL practitioner's decision-making processes. As directed by the executives, the system will search all new requests against the patron's local online catalog, rejecting any that it finds available locally and notifying the patron that the requested item is in the _____ library on campus, and he must get it himself. This restriction is one of policy, not technology: the system has been designed to accommodate requests for items from libraries on the patron's own campus, but because not all of the TRLN libraries offer an on-campus delivery service, this capability of the system has been blocked — at least for the present.

Requests next will be searched against the other TRLN member libraries' online catalogs. System designers are investigating different ways to load-balance among institutions, but because of TRLN's exceptionally low collection overlap, load-balancing probably will not be as important as it may be in other situations.

Requests for some types of materials may be searched in other databases before, or instead of, the online catalogs. As an example, government documents are for the most part not represented in member libraries' online catalogs; instead, TRLN maintains a separate database of government documents, tagged with each institution's holdings symbol. Requests for government documents therefore will be searched in that database, rather than the online catalogs, to identify the most likely supplier.

Journal articles may pose a particular challenge to the system, since many patrons will use abbreviated titles in their requests, which will not match against any fields in the online catalog record. Access to a separate database of serial title abbreviations may be necessary for accurate processing of these requests.

Regardless of the database, the system searches to find a bibliographic match, its next task is to locate an available copy; for a book request, this means finding a copy that is available to circulate but not already in use. Once an

available copy has been identified, the request will be routed directly to the branch or department which owns the item. In this case, the request will move from patron to staff at the lending library, without any assistance from the interlibrary borrowing staff of the patron's home library. Only requests that cannot be located by the system will be referred to local ILL staff. Once the ILL staff (or the patron) augment or correct the bibliographic data in the request, or supply a location within TRLN, the document delivery system will continue processing the request.

In addition to verifying and routing the request and handling communications with the patron, the system also automatically will capture information needed for statistical reporting, accounting, copyright tracking, collection development, and other management information needs. Since the core of the system is a Sybase database, standard query language (SQL) tools can be used to analyze and extract data in any way the libraries desire.

The description so far affects only the requesting or borrowing side of the process. Unfortunately, as long as most materials that patrons request are available only in hardcopy, less can be done to automate lending or supply activities. Some parts of the supply process can benefit from partial automation now, and libraries can look to electronic document repositories for fulfillment, which *can* be automated, as that becomes realistic. Lending processes that the TRLN document delivery system will automate initially include:

- Pull slips (paging slips) can be directed to, and printed at, each branch or department, as close to the stacks as possible, rather than at a single, central location where they must be distributed by hand.
- Patron data required to create a borrower record and circulate items will be uploaded into the lending library's circulation system automatically.
- Notice of an item's availability for pickup or delivery, and notices about problems with a request, can be formatted and sent to the patron automatically.

TRLN also is investigating the use of fax and other transport modes to deliver items directly from lender to patron. This may not always involve automation, but it is an aspect of re-engineering that will reduce the staff time required to get the requested item into the patron's hands.

## Launching the New System

The first public test of the TRLN document delivery system is planned for this academic year, perhaps as early as October-November 1995. All TRLN libraries will participate in a two-month trial of the new system, with all faculty, staff, graduate students, and undergraduates eligible to place requests. Patrons may request materials from anywhere except libraries on their own campus, and materials will be supplied directly to the patron's office or lab (for faculty, staff, and graduate students). Requests for items that cannot be supplied within TRLN will be filled through existing interlibrary loan/document delivery channels.

To help assess the demand for long-term implementation of document delivery service, during the trial period, all fees normally charged to patrons will be waived for requests filled within TRLN. Any library-to-library fees that would normally be billed on a transaction basis will be logged and "settled up" at the end of the trial. Following the trial, document delivery project staff and library staff will evaluate the service, make necessary adjustments, and begin planning for full implementation.

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What will TRLN's new document delivery system *not* be able to do? Several important limitations should be acknowledged:

1. It will not be able to correct inaccurate or incomplete data. This is one area where experienced ILL staff will probably always outperform an automated system, although the system can be "taught" how to handle common error situations as they are discovered. Having patrons enter requests directly into the system should completely eliminate one existing source of error: illegible handwriting.

2. It will be unable to find items that are not in the online catalog or other databases. Requests for these types of items — which probably encompass many older imprints, collections of technical reports and government documents, audiovisuals, and special collections — will have to be handled manually by library staff who can recognize what is being requested and know where to look for it.

3. It will not always make accurate decisions about serials holdings. This is because of the lack of detailed holdings in the online catalogs for all participating libraries, the difficulties of parsing holdings statements accurately, and problems already noted concerning the use of title abbreviations.

4. It probably will have difficulty dealing with documents that exist in multiple formats, multiple languages, or multiple editions. When more than one online catalog record matches the search, which is the best one?

The document delivery system that will debut later this year certainly will not be complete. Future development plans include: the automated transfer of requests that cannot be filled within TRLN into OCLC's ILL system, DOCLINE, or to commercial document suppliers; importing requests from other libraries outside TRLN (via OCLC and DOCLINE) for processing by the expert system; giving patrons the ability to place requests from a wider range of databases; using full-image and full-text databases, such as UMI's PowerPages, as a supply source; and delivery of documents to patrons in electronic formats, possibly via e-mail, FTP, ARIEL, or other still-developing technologies.

## Problems and Missing Links

Anyone seriously contemplating major changes in interlibrary loan and document delivery services should be prepared to deal with these or other "zombies" — images of abuse by patrons that never seem to die, despite the fact that there may be little or no data to support them:

- "If we deliver books to patrons, too many books will be lost. Patrons will say they never received the book we sent to them." This is a matter of policy, not technology. Request forms can include a statement acknowledging patron responsibility for all items delivered; delivery receipt procedures can be established. Exceptions to normal delivery policies — library use only, or library pick-up only — can be made for valuable items.
- "If we make it too easy for patrons to place requests, they'll waste our time on frivolous requests." If a faculty member requires only a quick glance at an article

to know it is not relevant to his research, is that a frivolous request? One of the unfortunate consequences of the "access vs. ownership" tradeoff is that patrons cannot browse before requesting an item. Some "frivolous requests" may be unavoidable to compensate for the inability to browse in the stacks.

• "The floodgates will open and we'll be overwhelmed with more requests than we can handle." When lines get too long at the reference or circulation desks, the library adds or re-assigns staff to handle the increased volume. Viewing established levels of document delivery requests as normal, and anything more as excessive, is a holdover from the days when libraries believed their collections could be self-sufficient.

• "If we allow them to place requests without talking to a staff member (or "...without showing proof of identity..."), students will charge documents to someone else's ID." Contrary to popular opinion, prank orders are not a big problem even for pizza delivery services.[9] Surely library books are not at any greater risk! If library patron ID numbers are not protected, requiring a PIN number or password, or asking patrons to visit the library to authorize and initiate document delivery service, can provide the necessary extra measure of security.

There is no question that to accept a new model that places much of the control in patrons' hands is a significant change and a challenge for overburdened staff — whose traditional role has been to retain control over materials while trying to keep a lid on demand. In the design of the TRLN document delivery system and the adoption of policies and services to support it, library staff and administrators continually must remind themselves to design services for the users, not the tiny percentage who may be *abusers*.

## Missing Linkages

Most of the technical building blocks needed to transform document delivery services already exist. Several gaps in standards, however, could hinder efforts to implement the TRLN system on a wider scale. Solutions to some of these problems are already in progress.

• The TRLN system will be the first U.S. implementation of the international Interlibrary Loan Protocol (ISO 10160/10161). The ISO ILL standard is very powerful, and very complex. There is no established source for training or technical support for new developers, so prospective implementors should allow for long learning curves.

• No standards yet exist for the retrieval and transfer of holdings, circulation and patron data (though standard data elements have been defined). Some vendors have established proprietary schemes for transferring these data, but an extension to the NISO Z39.50 standard probably will be needed before different systems can interoperate.

• Location- and database-independent unique identifiers will be needed in order to automate the retrieval and supply of documents from electronic repositories completely. The SICI (Serial Item and Contribution Identifier) and developing URN (Uniform Resource Name) standards show promise, but are not complete.

• Through ARL's North American Interlibrary Loan and Document Delivery (NAILDD) Project, efforts are underway to define a set of minimal-level statistics for interlibrary loan and document delivery. Such an agreement would simplify efforts to automate the capture, analysis, and presentation of statistical data, and will make benchmarking and comparisons with other libraries more possible than they are now.

• Standards also may be needed for the various financial transactions associated with interlibrary loan and document delivery, similar to the work done on X12 transaction sets by SISAC and the acquisitions/serials community (e.g., purchase orders, invoicing, claims).

## Take a Test Drive

A prototype of the document delivery system is available on the World Wide Web to anyone with a forms-capable browser (**http://152.1.139.32:8000/** ). Comments, questions or suggestions can be submitted using the links on each screen, or may be e-mailed to the author. Technical documentation is also available.[10] The basic design of the TRLN document delivery system is vendor-independent and scalable, and the system is intended for implementation in other libraries or consortia.

### *References*


[1] Patricia B. Dominguez and Luke Swindler, "Cooperative Collection Development at the Research Triangle University Libraries: A Model for the Nation," *College and Research Libraries* 54 (November 1993): 470; Joe A. Hewitt, "Cooperative Collection Development Programs of the Triangle Research Libraries Network," in *Coordinating Cooperative Collection Development* (New York: Haworth Press, 1986), p. 139.

[2] Triangle Research Libraries Network, "TRLN Database Overlap Study," unpublished data, May 1992. North Carolina Central University was not included in the analysis because it was not a member of TRLN at the time of the study.

[3] Joe A. Hewitt, "The Triangle Research Libraries Network," *North Carolina Libraries* 42 (Summer 1984): 68; Willy Owen, "The Triangle Research Libraries Network: A History and Philosophy," *North Carolina Libraries* 47 (Spring 1989): 43; Gary D. Byrd, et al., "The Evolution of a Cooperative Online Network: Lessons from the History of the Triangle Research Libraries Network," *Library Journal* 110 (February 1, 1985): 71.

[4] Triangle Research Libraries Network, "Reciprocal Borrowing Guidelines," August 1987; "Trial Cooperative Library Lending Agreement," April 1990; "Cooperative Library Lending Agreement," September 13, 1994.

[5] Unpublished data from member libraries. Reciprocal borrowing accounts for approximately 1-3 percent of annual circulation; more materials are circulated to patrons of other TRLN libraries via interlibrary loan than by reciprocal borrowing.

[6] As used here, "document delivery" includes interlibrary loan, on-campus delivery services, commercial document suppliers, or any related services that supply materials in response to a patron's request, regardless of source.

[7] Association of Research Libraries, "Supply and Demand in ARL Libraries, 1986-1994"(**http://www.lib.virginia.edu/arlstats/1994/graphs.html**).

[8] Marilyn M. Roche, *ARL/RLG Interlibrary Loan Cost Study* (Washington, DC: Association of Research Libraries, 1993).

[9] Bill Snodgrass, Manager, Pleasant Valley Pizza Hut and Pizza Hut Regional Office (Raleigh, NC), personal communications, July 10, 1995. Prank orders represent less than .05 percent (one-half of one percent) of total weekly orders and are relatively easy to detect based on ingredients ordered, items ordered, and the delivery address. CallerID service or a confirmation phone call can be used to eliminate the problem.

[10] Design documentation is available on the document delivery project's WorldWideWeb server at (**http://152.1.139.32:8000/docs/design.html**). Additional documentation is available on the TRLN gopher, with links from the WWW server at the same URL.