
The Changing Nature of Networking in the Research Library Community

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Networking among libraries is certainly nothing new; to the contrary, libraries have long been pioneers in networking activities. Today, I want briefly to summarize that history, but in keeping with the theme of this session, my focus will be on future plans and prospects. We are in an exciting period now — one where the technology and our collective imagination are at such a confluence as to yield exhilarating results for libraries, especially the research library community.

From the beginning, networking among libraries has been propelled by our strongly held tradition of resource sharing. The 1960s and 70s witnessed libraries turning increasingly to the computer and the possibilities it held for automating library operations. The development of the MARC format at LC, the acceptance of the format by library practitioners, the adoption of the format structure as a national and international standard, and LC's distribution of its cataloging data in this format, marked the beginning of the true era of library networking as we define it today.

There then appeared organizations that were new on the scene, namely, bibliographic utilities. These organizations, created to serve the needs of libraries desirous of a central source for cataloging records at a reasonable cost, built growing files of cataloging data to which access was limited to institutions who were members of the particular utility. By the mid-1970s several large databases — OCLC, the Research Libraries Group's RLIN (Research Libraries Information Network), and WLN (the Western Library Network), along with the one at LC — coexisted in the United States, but could not be accessed and shared directly. To remedy this situation, efforts were initiated to enable libraries more easily to share data housed on dissimilar systems and thus was created the Linked Systems Project or LSP.

The International Organization for Standardization's Open Systems Interconnection (OSI) Reference Model was chosen by the LSP architects as the appropriate protocol package to run LSP because OSI would substantially reduce future development necessary to accommodate new systems, new applications, and new standards being developed in accordance with the OSI model.

Two LSP applications modules were developed —

Record Transfer and Information Retrieval. Record Transfer enables records of any type and any number to be transported between systems. Information Retrieval permits users of one system to access a remote system and to view data found in the remote systems. Information Retrieval permits users of one system to access a remote system and to view data found in the remote system on their own system, invoking the familiar query command of their local system, effectively overcoming the problem of multiple syntaxes.

The OSI-based protocols for LSP were fashioned to be of general service and not application specific. Thus LSP applications can be expanded to other purposes, e.g., the Information Retrieval protocol, which is now an American National Standards Institute standard, is the basis of several projects being planned in the U.S. for accessing remote databases of all kinds, e.g., full text, abstract and indexing, and others.

Currently, LSP is being used to support the exchange of authority records. LC has distributed via LSP connections more than 2.5 million authority records to RLIN and over 1.5 to OCLC. LC has received via LSP, over 88,000 authority records created by RLIN and OCLC libraries which have been added to the file at LC and distributed via LC's Cataloging Distribution Service to libraries all over the world.

The next step is to support the exchange of bibliographic records which will enable records to be searched between systems, retrieved and then added to a particular database for use by its patrons. By this augmentation of LSP, a cooperative operation located at LC, NCCP (National Coordinated Cataloging Program), will gain increased efficiency. NCCP brings together eight research libraries that have agreed to contribute national-level cataloging records to the national database at LC for distribution to the Nation's libraries.

While the library community was availing itself of advances in technology to forge a national bibliographic network via LSP, using OSI protocols, other networks were evolving in the U.S. using different standards. The academic and scientific community was busily laying the foundation for a supernetwork supported by TCP/IP (Transmission Control Protocol/Internet Protocol) that

will support research and scientific investigations. This network, known as the Internet, connects universities across the U.S. and links them to supercomputer centers. The Internet is a long-haul network that provides national connectivity through the linking of regional networks which cover large geographic areas. NSFNet, the National Science Foundation Network, acts as the backbone of the Internet.

Because of the difference in standards used, the two networks being built were incompatible. The first step toward reconciling this incompatibility was to seek cooperation with EDUCOM (a consortium of U.S. institutions of higher learning). Accordingly, in 1987, Henriette Avram invited Ken King, President of EDUCOM, to come to LC for exploratory talks.

These initial meetings opened our eyes as librarians to the enormity of what was happening, what was being planned on the academic side, and also what was missing, i.e., much of what libraries were already doing or had already accomplished. The aim was to connect scholars' workstations on the Nation's campuses to each other as well as to supercomputer centers via the Internet to support research needs. Besides NSF, the players in this grand scheme were influential and represented big money interests — IBM, AT&T, and New York Telephone.

As more was learned of what was envisioned, an additional strong concern emerged — the research libraries on university campuses being wired to each other and to supercomputer centers were also part of the LSP environment. These libraries are the keepers and organizers of much of the information and data that feed the research process. It is the ability of libraries to organize information for retrieval and end user access that makes sharing data over networks viable. We should not lose sight of the importance of the organization of information and the critical role standards play in this process of organization. Indeed, it is this technical processing aspect that underpins and makes possible the research and reference functions that will become increasingly important as the supernetwork takes shape and the variety of data on it mushrooms.

EDUCOM has been instrumental in pushing and tracking legislation currently before Congress (S. 1067, sponsored by Senator Albert Gore). If approved, the evolution of the Internet will take on immense proportions. Of keen interest to research libraries is Title II of the bill, which calls for the creation of a high capacity National Research and Education Network (NREN), which will interconnect over 1,000 colleges, universities, research organizations, and, we hope, their libraries. Title II further specifies that — working with other agencies —

by 1996, NSF would establish a multi-gigabit NREN capable of transmitting 100,000 typed pages or 1,000 satellite photographs in one second. The network is to be phased out when national, commercial high-speed networks can satisfy research needs.

Now that the networking infrastructure that will serve the Nation in its various components has been described, it is well worth spending a few minutes discussing the "content" of the Network, i.e., what kinds of information and data will be accessible over the Network. As I've tried to make clear, in terms of describing and formatting bibliographic data for efficient searching and retrieval, we're pretty much there. The standards are well defined and broadly applied within the library networking environment. For non-bibliographic data, however, we have some way to go yet. But strides are being made.

Having spent its first fourteen years focused primarily on networking of bibliographic data, the Library of Congress Network Advisory Committee (NAC, an umbrella group comprised of library and networking professionals) recently shifted its attention to non-bibliographic databases (which it defines to include full-text, numeric, and graphic data). NAC devoted an entire program meeting to this topic last year. Entitled "Beyond Bibliographic Data," its goals were to gain a better understanding of the term "non-bibliographic" in the library network context and to begin to appreciate the range and potential of such electronic information. Among other things, by the end of the meeting, it was agreed that librarians must be able to cope with the multiplicity of forms of information; a user interface that will enable scholars and the public to access and display bibliographic and non-bibliographic data files must be devised; standardization and information selection issues remain outstanding; and libraries with local systems and how they affect the relationship of libraries to bibliographic utilities is emerging as a problem: At risk is resource sharing as librarians have known it as attempts are made for economic reasons to seek lower cost alternatives to cataloging on the utilities and thereby not adding expensive cataloging records to a large national database for sharing. The complete proceedings of the meeting are available as part of the Library Congress [Network Planning Papers](#) series.

EDUCOM has recently accepted a project proposal, "The Library and the Electronic Document Environment Infrastructure," submitted by Mrs. Avram on behalf of the Library of Congress that calls for a full-scale effort coordinated by EDUCOM, in conjunction with the various stakeholder communities (libraries, researchers, information processors, publishers, professional organization, etc.). The proposal concentrates on three areas of activity:

1) to carry out major studies in three core areas of the electronic document environment:

a) technology and formats

What information resources are needed and in what electronic format?

How will the information be organized for retrieval, transmission, and exchange?

Will the technologies provide solutions to problems of storage, preservation, and presentation of information?

b) economic issues and choices

Who pays for and owns information resources in the electronic document environment?

c) roles and responsibilities for libraries

How will the library exercise its role as organizer, classifier, and preserver of information and knowledge in the national network?

2) to devise several structural models conducive to the growth of electronic document environment; and

3) to offer programs, seminars, and publications which present findings about the library in the age of electronic research, production, and publishing.

What has emerged from this discussion is the notion that through the application of technology to networking, libraries will become boundless and that users, by accessing networks, will become patrons of "libraries without walls." Right here in this state, a plan has been issued by the New York State Library which details how all libraries in the state — academic, school, public, or other — can become electronic doorways for citizens of New York. An electronic doorway library would make needed information available electronically to users from any part of the state via links to databases and resource sharing programs with computers.

Research libraries are moving ahead on several fronts through various organizations, both singly and collaboratively, in dealing with non-bibliographic data in a network environment. One of the most promising involves ARL, CAUSE (the association for the management of information technology in higher education), and EDUCOM forming the Coalition for Networked Information. The Coalition will consist of a large and influential group of institutions of higher education, not-for-profit organizations, corporate sponsors, and government agencies. It has set for itself an agenda that includes crafting a set of initiatives to deal with the provision of information resources on the National Research and Education Network. The Coalition will focus on issues related to intellectual property rights, standards, licensing, service arrangements, cost recovery fees, and economic models. So far, as of May 4, over sixty research libraries in the U.S. and Canada, including the Library of Congress, have committed to joining the Coalition.

As we move into the 1990s, it is fair to say that the implications for research libraries of networking and the changing network infrastructure are immense. But, as can be seen, this final decade of the century holds great promise to be an exciting and innovative one as well. And while the task before research libraries in servicing non-bibliographic data in the network setting is staggering, some excellent first steps are being taken.

¹ Presented at the IASSIST 90 Conference held in Poughkeepsie, N.Y. May 30 - June 2, 1990.

NARA Job Announcement - Center for Electronic Records

Job Announcement - March 1, 1991

Within the next two weeks or so, the National Archives will announce one or more vacancies for senior archivists to deal with computer records. Starting salary is \$37,294 with all fringe benefits of U.S. Government employment. U.S. citizenship required. If any one is interested, or knows anyone who may be interested, please contact the following:

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