

## Introduction

Wide area computer networks, such as those comprising the Internet, are providing teachers, students, researchers, businesspeople, the general public, and librarians with access to a growing array of information resources. They are also opening new channels for communication both within and beyond organizational boundaries, allowing librarians to develop new electronic communities with their colleagues and patrons. Electronic information resources and communication networks may facilitate, even transform, many aspects of library work. The push for libraries to get “on the net” is getting stronger as the costs of the technology fall, the number of network-accessible resources grows, staff and user expectations regarding network capabilities in the library rise, and librarians’ familiarity with the benefits of networking broadens. As part of its current emphasis on the National Information Infrastructure (NII), the federal government has developed a number of policies that support the growth of the National Research and Education Network (NREN), the creation of digital libraries, and the use of electronic means for disseminating government information. The gradual introduction of networking workshops and formal coursework into schools of library and information science has begun to create a cadre of new entrants to the profession who have some familiarity with the latest networking technology and applications.

In spite of the factors that encourage libraries to make greater use of computer networks, we face a number of problems and issues related to the integration of networking into libraries and related settings, making the transition to a networked environment far from easy. Beyond the obvious problems of constrained financial resources, lack of expertise with networking technology, and the chaotic and unstable state of information resources on the network, other barriers also exist. Federal information policies related to networking, many people believe, favor private sector stakeholders and don’t go far enough in their mandates to support the public interest and library participation in the NII. Perhaps most importantly, networked resources—by their nature—often necessitate a departure from the kinds of collections and services familiar to many librarians and library users. Little is known about the costs and benefits of networked information services or about how best to integrate them into library settings. This is true whether one approaches the equation from an

economic or a social perspective or whether one focuses on the information professional, his or her institution, or the needs of patrons.

Thus, libraries are currently seeking models for providing network access, training network users, incorporating networked information into existing services and operations, and evaluating the impact of networked information on their operations. This situation led to "Emerging Communities: Integrating Networked Information into Library Services" being chosen as the theme of the 30th Annual Clinic on Library Applications of Data Processing. The conference, sponsored by the Graduate School of Library and Information Science of the University of Illinois at Urbana-Champaign, was held on April 4-6, 1993. It provided an opportunity for information professionals from a wide variety of settings to discuss their experiences and concerns related to computer networking, with over 25 speakers sharing their research, expertise, and insights with about 200 conference attendees. Conference topics included:

- the use of computer networks in public, school, academic, and special libraries to accomplish institutional goals, provide traditional and new services, and communicate with users;
- legal, economic, and policy issues related to the electronic dissemination of information;
- bibliographic control of networked information and the new generation of networked OPACs; and
- new roles for information professionals in the networked environment.

In addition, pre-conference workshops allowed participants to explore some aspects of networking in depth. Greg Newby and Brett Sutton (University of Illinois at Urbana-Champaign) provided a hands-on introduction to the basics of Internet use. Tracy LaQuey Parker (Cisco Systems, Inc.) and Philip Doty (University of Texas at Austin) discussed options and procedures for obtaining an Internet connection. Anne G. Lipow (Library Solutions Institute) presented principles and techniques for training staff and end-users in network use. Finally, a workshop led by F. W. Lancaster (University of Illinois at Urbana-Champaign) provided attendees with an opportunity to learn more about methods for assessing networking needs and impacts. This workshop included a panel of experts made up of librarians and system designers (conference speakers Pat Molholt, Pam Sandlian, and Hope N. Tillman), along with a sociologist noted for her ethnographic research into the behavior and habits of scientific communities (S. Leigh Star of the Department of Sociology at the University of Illinois at Urbana-Champaign).

The Clinic also included an evening of informal demonstrations of network tools and resources. Two new systems designed to encourage the development of network communities were highlighted. Joseph Hardin and Marc Andreesen (National Center for Supercomputing Applications at the University of Illinois) demonstrated NCSA Mosaic, a globally distributed hypermedia information system that allows users to browse the Internet and associated multimedia resources. Bruce Schatz (University of Illinois at Urbana-Champaign) presented the Worm Community System, a distributed, multifunctional digital library system used worldwide by members of a particular research community. And

finally, a number of conference participants came prepared to "show and tell," demonstrating their institutions' OPACs, their favorite networked information resources, and networking tools they had developed. Another special feature was a "Meet the Authors" event: Tracy LaQuey Parker, Ed Krol, and Anne G. Lipow—authors of popular new Internet guides—were on hand to sign copies of their books and describe how they came to be written.

This volume represents the presentations delivered at the 1993 Clinic; the papers contained here range from edited transcripts of authors' remarks to more formal and lengthy papers. Linking libraries and local communities through networks was the focus of both the Clinic's keynote address by Tom Grundner and the first conference session. Grundner discussed the role of the National Public Telecomputing Network in the development of community computer networks called Free-Nets, describing their costs and benefits to the community and the potential role of NREN and other federal initiatives in relation to community-based computing. Cisler's paper presents a range of current models for community networks, places them within a historical framework, and speculates on the future of such networks, given changing technologies. Doman describes the Community Connections service at MAGGIE'S PLACE (the online catalog of the Pikes Peak Library District) and discusses its history and impact on the library. Erbes and Beechler-Rusch describe the outcomes—both positive and negative—of the Illinois Valley Library System's involvement with the Heartland Free-Net and present conclusions that are applicable to libraries connecting either to community networks or to the Internet itself. There is also a role for academic institutions in this realm. Ongoing efforts at Princeton University to use computer networking to forge links with the local community are discussed by Stokes. Princeton's approach is notable in its assumption that universities have a responsibility to use their networking resources in support of local communities; it is less unique in that campus libraries were not as involved in these activities as were campus computing organizations.

The second group of papers center on networked information and library catalogs. Dillon, Jul, and their colleagues at OCLC provide an overview of results from OCLC's Internet Resources project, which investigated the nature of electronic textual information available through remote Internet access and the practical and theoretical problems associated with creating MARC records for these resources. Drabenstott and Cochrane conducted an empirical investigation of online catalogs accessible over the Internet and discuss what they learned about the problems in subject searching that challenge users of these catalogs. Recognizing that the success of the electronic library will depend on distributed computing, storage, and retrieval standards that enable multiple user interfaces to multiple information stores, Troll examines the lessons learned by Carnegie Mellon University Libraries in building their library system. Her paper is of interest for its thoughtful exploration of theoretical issues as well as the practical guidance it offers. Charles Hildreth discusses advantages and problems associated with extending the online catalog to encompass "nontraditional" networked information resources.

Lynch presented a special address at the conference that examined possible roles for libraries in the new networked environment and draws insight from the history of mass media broadcasters and their relationship with advertisers

and sponsors. His paper sketches provocative conclusions about legal and economic shifts due to networking and their potential implications: the breakdown of the current interlibrary loan system for access to networked resources, the great costs of electronic information, and attempts to market information directly to consumers, bypassing libraries entirely.

Many networking activities today focus on how electronic information and communication services can be employed to enhance learning and information access for children, and several conference papers explore this area. Sandlian asserts that the development of customized networked information for children is one step that serves to help them become sophisticated information users. Her paper outlines the conceptual and empirical foundations of the design of the Denver Public Library's Kid's Catalog (which is now available commercially) and provides valuable guidelines for the collection of the user-based data on information needs and behavior that should be incorporated in any system design project. Waugh and Levin provide an overview of their research into the nature and impact of educational interactions on computer networks and suggest instructional strategies that anyone involved in using networks for education can employ. CICNet's Pioneering Partners project is discussed by Hankins. The project was designed to foster the adoption of innovative technologies in primary and secondary schools and included instructional components as well as mechanisms designed to give participants some experience with the use of networks to communicate and exchange ideas. Hankins presents a candid assessment of the project's outcomes and offers some thoughts on the potential contributions of electronic networking applications to education.

One conference session was devoted to the use of networked information in special libraries and other settings. In their paper, Tillman and Ladner present the results of the empirical study of Internet training and use that they conducted among special librarians. Especially valuable to those trying to understand the real benefits of networking to librarians, and to predict where difficulties might arise, are the comments their survey elicited about how and why networks are used. Stam reports that museums have been slow to adopt electronic networking, and she analyzes the institutional characteristics that impede the more rapid and widespread adoption of networking in museums. Her discussion of networking barriers suggests that information science professionals have a role to play in making networked information more accessible and useful for a variety of audiences. Janet Vratny, an information scientist in the Apple Library, gave a presentation that focused on how networked information can be integrated into corporate libraries and also described her unique role as a participant in the development of new products intended to improve the delivery of networked information. We were unable to include the complete text of Vratny's presentation in this volume; an abstract is provided, and readers are invited to contact Vratny for more information.

Issues and initiatives in networking policy are gaining increasing attention as publishers, policymakers, and network service providers struggle to envision, create, and reap the benefits from the emerging global network. Peters provides an insider's description of current initiatives in the Clinton/Gore administration related to "information superhighways." He also discusses four constituencies

(those anxious to secure networking's advantages for the research and education community, those interested in the implications of networking as a foundation for 21st-century life and enterprise, those contemplating how best to use global networking to create "a retail paradise for couch potatoes," and those who believe in the power of global networking to create a new social order) that have been instrumental in shaping how issues are defined and how public policies in the area of networking are formulated. Garrett explores the philosophical basis for emerging electronic communities. He examines the dynamic integration of evolving technologies, the transformation of thought and society, and ideas about democracy. Garrett addresses, thus, the critical questions of "What kind of world do we want?" and "What can and will we do to get it?" His paper offers readers a chance to pause and think about the broader implications of our increasing reliance on computer networks to transmit our thoughts and recorded knowledge. Love describes a range of specific federal activities related to the electronic dissemination of government information. His analysis allows him to discuss, with great force, critical issues such as who will own and control the information resources and systems created with federal funds, what types of value-added services federal agencies will be authorized to provide, how federal electronic information products and services will be priced and made accessible, and what the role of the average citizen will be in shaping federal information policies.

Several conference papers address the integration of computer networks into academic library services. Larsen describes the transition in academic libraries from using networks to supplement information resources to using networks to enable, more broadly, a range of scholarly activities. After describing current constraints facing academic libraries, he argues that networks are able to provide the demand-based, location- and time-independent access to resources that scholars demand and libraries must supply. In their separate papers, Garrison and Entlich present a wealth of specific information related to academic libraries and their attempts to integrate networked information into their services. Based largely on their participation in projects at Cornell University's Mann Library (a recognized leader in the adoption of new technologies), they offer excellent insights and guidance related to justifying, planning, implementing, managing, and assessing networked information services. Kovacs and Fleming offer guidance in another important area as they describe the range of humanities information resources currently available on the Internet. Frequently, it is science and technology disciplines that capture attention and support when new networked information services are considered. Kovacs and Fleming offer ample evidence that people in humanities disciplines are significant users of such new services as well, and they include some tips for offering Internet access at the reference desk.

The concluding set of papers in this volume deal with new roles for librarians in the world of networked information. Bruce Schatz describes the digital library—integrating biology data, archival literature, and informal material—that he designed for the community of molecular biologists who study the nematode worm. This networked system serves as a model for understanding both the technology and "sociology" of networked research communities. Its development allowed Schatz to identify roles that information

professionals can play in the creation of digital libraries, where there is a critical need for people who can collect data, transform it into canonical format, and interconnect related items; understand how researchers want to interact with the knowledge they use; and design and build customized information systems. Molholt describes current efforts at Columbia University to develop a networked system that will better integrate the library into the curriculum by providing a student-centered electronic environment based on a knowledge model that links unique, local information resources with those established elsewhere in the world. Her discussion of project goals and potential problems and outcomes suggests both the need for librarians to participate in such efforts and the skills and characteristics that librarians should develop if they want to become active participants. The conference concluded with a paper by Watson and Hartman of Bradley University, who described how the vision of the wired university was brought to fruition on their campus. Their experiences lead them to conclude that important success factors for the survival of the academic library in the networked environment include involving the library and librarians in the sociopolitical matrix of the university and making proactive use of new technologies and services. The authors outline "real world" strategies for academic librarians seeking to take advantage of networked information, including teamwork, professional development, creating an explicit statement of expectations and making a commitment to quality service, and, perhaps most difficult, removing from the library staff those persons who are unable or unwilling to support the transition to the networked environment.

The purpose of this year's Clinic was not so much to provide an introduction to the latest and greatest networked information technology and tools; rather, we attempted to put together a program that would offer information professionals some guidance as they strive to make efficient and effective use of what is already available to them. We feel that the papers collected here do indeed provide, from a variety of perspectives, insights and information that will be valuable to librarians and others as they attempt to integrate networked information into their current operations. Taken together, the papers raise important issues related to the emergence of new electronic communities that we invite you to contemplate and help resolve.

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