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1.0 Introduction

The member libraries of the Committee on Institutional Cooperation (CIC) are building the CIC Electronic Journals Collection (CIC-EJC), a World-Wide Web resource that will be the largest fully managed collection of electronic journals available on the Internet. The CIC is a thirty-five-year-old collaboration among the following universities: the University of Chicago, the University of Illinois, Indiana University, the University of Iowa, the University of Michigan, Michigan State University, the University of Minnesota, the Pennsylvania State University, Purdue University, the Ohio State University, Northwestern University, and the University of Wisconsin-Madison. The CIC libraries hold 57 million volumes, accounting for more than 17% of the collective holdings of the Association of Research Libraries. They serve over 500,000 students and 33,000 faculty. Today, there are over 75 separate and unique cooperative activities operating under the aegis of the CIC. Ubiquitous Internet access within research universities and the increasing popularity of the Web have made scholarly electronic publication and research more desirable and prevalent. The expansion of Internet-based publishing provides opportunities and challenges for libraries interested in the shared development and management of electronic collections. The low marginal cost of distribution compared with print journals, regardless of user location, argues strongly for building multi-institutional electronic collections. Internet tools and communication methods also make it possible to distribute the collection development and management tasks across multiple institutions. While building its electronic resource collections, the CIC has been faced with two challenges related to electronic journals management: the growing number of scholarly journals, monographs, and preprints that are being published by the academic community independent of any commercial publishing organization; and the inherent lack of central coordination or management of such resources.

Currently, it is unclear whether publishers will preserve and provide continuing access to the electronic materials they produce. This is a critical problem for research libraries. The CIC-EJC will allow the CIC libraries to define their role (and librarians' broader role) in managing scholarly electronic materials. The CIC-EJC directly addresses the growing need for managed, networked information tools and resources. This comprehensive management role includes the selection, cataloging, provision, and preservation of electronic journals. This paper outlines the history and development of the CIC-EJC, and it concludes with a discussion on the future of this resource as a component of electronic librarianship. Collaborating organizations in the development of the CIC-EJC include the CIC university libraries, the CIC Center for Library Initiatives, [1] and CICNet, Inc. [2]

2.0 The CICNet E-Series Archive

In 1991, the CIC Collection Development Officers asked CICNet to create an archive of freely available electronic serials. Individual CIC libraries were collecting many of these serials, but they had no long-term means of archiving them. CICNet decided to go beyond the original charge of archiving electronic serials available at CIC member institutions. Instead, CICNet swept the Internet with an automated FTP process to collect all electronic serials available via FTP. The CICNet E-Serials Archive represented an early effort to provide the CIC library community with collaborative access to electronic serials. Establishment of the CICNet E-Serials Archive also coincided with the spread of Gopher, which CICNet used to provide access to the archive. The archive, which was housed on a CICNet server, was an undifferentiated collection of some 800 titles in varying degrees of retrospective coverage and completeness. At the peak of its usage, it was accessed 35,000 times a day by Internet users.

+ Page 7 +

The CICNet E-Serials Archive was valuable because it illustrated the wide range of available electronic serials; however, it soon became clear that no entirely automated collection process could produce an archive that would satisfy the needs of most scholars. The process of automatically sweeping the Net could only gather those electronic serials that were available via FTP. Increasingly, new electronic serials were being distributed via Gopher and the Web. It was not possible to build an academically useful collection of electronic serials without librarians and computer specialists managing the collection. An uncataloged, unsearchable collection whose contents were not examined regularly by collection staff could not be of widespread, long-term, or consistent value to scholars because it offered no assurance that the collection was complete, current, and worthy of preservation. The CICNet E-Serials Archive is best thought of as a snapshot of electronic serials that were available at a particular time in the history of the Internet, rather than as a comprehensive resource. However, the frequency of its use clearly indicated the need for a reliable, managed collection of electronic serials. Although it has been preserved on tape for researchers interested in the development of Internet resources, the CICNet E-Serials Archive is no longer available to the public.

3.0 The CIC-EJC: A Prototype Electronic Journal Collection

In 1991, the Task Force on the CIC Electronic Collection was charged by the CIC library directors to explore the management and use of shared electronic resources and to consider relevant issues for the CIC libraries including specific recommendations on collection policy, organization, bibliographic control, and access policies for electronic journals and full-text electronic collections. [3] The Task Force responded with a complete plan for building a managed electronic journal collection (CIC-EJC) based on the work CICNet had done with the CICNet E-Serials Archive. The Task Force, which included representation both from CICNet and the CIC libraries, planned all aspects of the CIC-EJC, from electronic journal selection to ongoing maintenance of the collection. CICNet staff then developed a prototype system based on the initial recommendations of and ongoing input from the Task Force. The prototype system is available on the Web as an illustration of the collection the CIC university librarians and the CICNet staff ultimately plan to build.

+ Page 8 +

In addition to content management issues, the Task Force encountered technical development problems in the transition from the CICNet E-Serials Archive to the CIC-EJC. As publication of electronic serials shifted from FTP to Gopher to the Web, a more sophisticated and responsive collection strategy

was required. Archiving electronic journals distributed on the Web required more intelligent tools than the FTP mirroring jobs CICNet previously ran. The prototype includes the following important features--all of which will be expanded as the prototype moves into production.

3.1 Publisher Approval Access to all electronic journals in the collection is provided by pointing directly to the publisher's site. CICNet staff contact each publisher for approval before any journal is added to the collection. This initial contact is important in building publisher/library relationships; in building confidence in the site; and in ensuring that access to the site is authorized.

3.2 Archiving Pointing directly to the publisher's site ensures that users see the electronic journals exactly as intended, but it does not ensure a permanent record of the publications. The CIC is committed to the long-term preservation of these journals. Therefore, CICNet is also building a full archive of all the titles in the collection. The titles are presently stored on disk and backed up to tape several times per week. This archival process will be reviewed by the CIC Task Force on Preservation and Digital Technology, in concert with CICNet computer specialists, in order to identify an appropriate long-term solution. The archive is intended to serve as a permanent record that can be used in the event the original site is destroyed or discontinued, and, therefore, it is not available as a "public site." This model is consistent with traditional archival efforts, in which, for instance, original microform copies are stored, with public access provided through copies.

3.3 World-Wide Web Home Page The CIC-EJC has a descriptive Web home page that provides: (1) subject, title, and keyword searching; (2) the ability to view titles in the collection listed either alphabetically or by subject; (3) and bibliographic records for all titles in the collection, including links to the originating journal servers. [4] From these links, the user can move directly to the electronic journal. The CIC-EJC's links and holdings records are updated weekly.

+ Page 9 +

3.4 Cataloging

Six CIC universities participate in the collaborative cataloging of the journals held in the CIC-EJC. [5] All titles are cataloged in the MARC format. Each electronic journal's URL is recorded in an 856 field. Records are then contributed to OCLC (the CIC symbol is YNT) and to the CIC OPACs. CIC universities with local systems capable of using the 856 field can link directly to the journals through their OPACs.

3.5 Staffing The CIC has been able to draw on the rich resources of its member libraries and CICNet to make the CIC-EJC prototype a reality. The Task Force on the CIC Electronic Collection was appointed by the CIC library directors in 1993, and it subsequently assumed oversight of the CIC-EJC project. This small group (usually 7-9 members) includes collection development, technical services, public services, and information technology specialists. The 13 collection development officers work with their selectors and bibliographers to provide guidance on the content of the collection and to ensure that the CIC-EJC will represent the collection development policies of the participating institutions. Project staff at CICNet handle relations with the publishers of all free journals, maintain the CIC-EJC server, and provide other technical support for building and maintaining the archive. Six libraries provide cataloging using existing staff resources. Finally, the Task Force on Preservation and Digital Technology, again made up of specialists from the participating institutions, provides input and guidance regarding the preservation of CIC-EJC resources. CIC hopes that its work will serve as a model for individuals and organizations wanting to create similar repositories of electronic information on the Internet. Both computer specialists and librarians will be engaged in building and professionally managing this collection. Librarians will identify and document those areas where they can contribute to the increasingly difficult task of managing Internet resources, and computer specialists will design sophisticated access, retrieval, and archival tools

and processes. To this end, we will fully document the development process and make this documentation available via the Web. [6] We invite comments, questions and criticism from any interested parties, including electronic publishers, librarians, patrons, and authors.

+ Page 10 +

4.0 Future Plans

Our long-term goal is to create a significant collection of electronic journals on the Internet, which scholars, libraries, and individuals around the world can access via the Web. Today, all of the electronic journals in the collection are free; however, in the future, we plan to work with publishers and authors in the important areas of distribution, use, copyright, and security for titles distributed by paid subscription. CIC and CICNet are currently seeking funding to support and expand all aspects of the project. We have six immediate objectives: 1. Maintain and improve both the content of and access to the collection. 2. Maintain the bibliographic database: update holdings records, maintain URLs, and add MARC records as they are created by participating CIC institutions. 3. Identify optimum procedures for permanently archiving materials found in the collection: keep archival copies of all journal issues on disk, back up archives to tape, and refresh and reformat the archive as necessary and appropriate. All archival work will be preceded by discussion and agreement with journal publishers. 4. Build a model for sustaining and encouraging the appropriate use of the preserved materials. The archives will be available for downloading by CIC users. 5. Evaluate the holdings of the collection and plan to build in areas of strength and of mutual benefit to the CIC libraries. Some titles now in the collection may be deselected and new titles may be added. 6. Build a test Persistent URL (PURL) server into the EJC server. [7]

+ Page 11 +

CIC has also begun to address security and authorization issues related to commercially available journals. The CIC library directors and chief information officers met in March to begin exploring and resolving issues related to these journals and to the digitization of print materials. The meeting explored the experience individual CIC institutions have had with digitization, text encoding, OCR, and licensing. This initial meeting marked the beginning of the planning process to add commercially available journals to the CIC-EJC. Exploring the addition of multimedia publications is another project for the future.

4.0 Shared Responsibility for Electronic Materials Management

The CIC-EJC has provided the opportunity for the CIC libraries to define their role in electronic scholarship both independent of and in relation to publishers and computer specialists. The CIC Center for Library Initiatives has provided coordination and leadership for the CIC-EJC as it has for other CIC-wide library projects. CICNet has provided technical support, guidance, and implementation. It has conducted all development and maintenance of the technical aspects of the system, including acquisition and archiving of electronic journals, publisher relationships and permissions, organization and display of bibliographic data, development of indexing and search utilities, and hardware and software support. The CIC member librarians share responsibility for evaluation of available information resources including selection, deselection, cataloging, and quality control. Other projects within the CIC provide an opportunity for collaboration in the development of related electronic information resources and access. The CIC libraries, with shared licenses negotiated by the CIC Center for Library Initiatives,

have purchased commercial databases and are sharing them across the CIC institutions' regional network. This activity has served as a model of how to work together and reach mutually beneficial collective decisions. These efforts have put CIC in the forefront in collective licensing negotiations with publishers.

+ Page 12 +

The Virtual Electronic Library (VEL), funded through a U.S. Department of Education grant, will develop the technical infrastructure required to provide seamless access to the CIC libraries' OPACs. [8] The utility of this infrastructure will be demonstrated through user-initiated interlibrary loans and document delivery throughout the CIC. The VEL will enable the more than one-half million faculty, staff, and students to explore and take advantage of vast resources within the CIC. Inherent to the VEL project is the addition of an expanded set of electronic resources to the VEL pool of information resources. Ultimately, the CIC-EJC will be an integral part of the VEL. The VEL has provided the impetus for the CIC libraries to sponsor numerous working groups and projects. The Task Force on the CIC Electronic Collection, which oversees the CIC-EJC, is one of these groups. Each CIC library has appointed an Electronic Resources Officer to coordinate local participation in the various projects related to building the VEL. The Task Force on Preservation and Digital Technology is exploring both digitization of materials held by the libraries and preservation of original electronic materials using digital technology. The CIC Electronic Text Group is developing a core collection of encoded humanities texts and planning for networked access among the CIC libraries. Sharing expertise among CIC library computer specialists is a central component of the E-Text project, with group members specializing in applying text encoding standards, building search engines, developing collections, and training colleagues at other CIC institutions. Groups have just been appointed to address issues around geographic information systems and government document electronic resources. All these separate and overlapping projects provide a strong environment for collaborative research and work.

5.0 Conclusion

The CIC is governed by three founding principles:

- o No single institution can or should attempt to be all things to all people.
- o Inter-institutional cooperation permits educational experimentation and progress on a scale beyond the capability of any single institution acting alone.
- o Voluntary cooperation fosters effective, concerted action while preserving institutional autonomy and diversity.

+ Page 13 +

Successful inter-institutional collaboration can transform higher education. The network is one of the keys to such transformations, as is access to high-quality information resources. The Electronic Journals Collection has benefited from cooperation among the various constituent groups of the member institutions and from cooperation between the CICNet technical staff and the CIC librarians. Cooperation between the CICNet staff and the CIC librarians has led to a broader understanding of technical issues and issues around the collection and organization of electronic materials. The two groups have challenged each other and broadened the perspective each brought to the project. These discussions and explorations should lead to and contribute to the body of research on publisher and user behavior in this new environment. At the same time, a significant body of electronic literature will be made available to nearly one-half million students and scholars.

Notes

1. The CIC Center for Library Initiatives (CLI) was established in September 1994 to support collaborative efforts specifically among the CIC libraries. See <URL:<http://cedar.cic.net/cic/cli.html>>.
2. CICNet, the regional TCP/IP network founded by the CIC in 1988, serves the internetworking needs of the CIC universities, other academic institutions, not-for-profit organizations, and businesses. CICNet has had a strong interest in the design and deployment of networked information services. See <URL:<http://www.cic.net/>>.
3. Members of the Task Force on the CIC Electronic Collection are: Gay Dannelly (chair), Ohio State University; Mira Geffner, CICNet; Bill Gosling, University of Michigan; Sharon Hogan, University of Illinois, Chicago; Wendy Lougee, University of Michigan; Bonnie MacEwan, Pennsylvania State University; and Charlene Mason, University of Minnesota.
4. See <URL:<http://ejournals.cic.net/>>.

+ Page 14 +

5. The cataloging institutions are: Indiana University, the University of Michigan, the University of Wisconsin-Madison, the Ohio State University, the University of Illinois at Chicago, and the University of Minnesota.
6. See <URL:<http://ejournals.cic.net/ej.doc.html>>.
7. Persistent Uniform Resource Locators (PURLs) were developed by OCLC in response to the Internet Engineering Task Force discussion of Uniform Resource Names. For more information, see <URL:<http://purl.oclc.org>>.
8. See <URL:<http://cedar.cic.net/cic/vel.html>>.

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+ Page 15 +

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