17.   Automated Network Catalog Products and Services*

by Maurice J. Freedman

This paper will concern itself with the kinds of catalog products and services a library can receive or share by participation in a computer through cooperation in the development of automated systems. Unless otherwise mentioned, all systems discussed are American and MARC monograph-based. The approach taken will be to deal with the products and services by categories of form. The assumption is that the networking which concern based, so the actual products and services described will all be directly or indirectly generated from machine-readable data.

The four categories or formats which will be examined are (1) the on-line cathode-ray-tube (CRT) display, (2) the line-printer produced card, (3) the photocomposed book catalog or catalog card, and (4) microforms produced on computer-output-microfilm (COM) or digital-based graphics display microfilm. These categories each have differing technological attributes, costs, and advantages and disadvantages. Although monographic catalog products and services are the concern of this paper, these formats can be used for serials, any other category of library material, or for that matter a list of automotive parts.

The CRT Display or On-Line Access to the Computer

CRT terminals have been primarily used for input and maintenance of cataloging data. The Ohio College Library Center, the premier automated library network, consists of individual terminals located in institutions all over Ohio as well as most other areas of the country, all connected to a computer in Columbus, Ohio. The OCLC system allows participating libraries to first search via the CRT terminal the entire OCLC data base of over two million catalog entries.[1] Within seconds, the entry desired can be displayed on the screen, and the user can accept it or add, delete, or change it to render it consistent with the library's local cataloging requirements. If the library can find no entry already in the data base for the title searched, it calls for a work-sheet display on the screen and locally enters the cataloging as a new record in the data base.

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Finally, the union catalog function is available, and is particularly valuable to the original network participants, the academic libraries of Ohio, as well as other networks whose libraries are members of OCLC. Each time an entry is used or a new one added, a notation is affixed to the OCLC record indicating that the user library holds the item represented by that record. It is then possible using a simple search key to find out which libraries have a given piece of material. This information is of tremendous value both for collection development and inter-library loan. Expensive and unnecessary duplication of collections can be reduced and cooperative acquisition is facilitated through the use of an on-line union data base. These are especially important cost considerations which superficial analyses focusing on card costs and line charges tend to overlook.

In addition to OCLC, Stanford University's BALLOTS (Bibliographic Automation of Large Library Operations Using a Time Sharing System) project allows on-line access to the MARC data base for the purpose of creating catalog cards for the Stanford University Libraries.[2] It has some similarities to OCLC, but it also has a particularly unique and distinguishing feature. It has a powerful search system: BALLOTS provides searches of its data base by virtually any combination of terms within the catalog record. It allows on-line subject querying of the entire machine-readable catalog file. On a daily basis, reference questions utilizing this capability are telephoned in from many libraries and individuals; these queries are manipulated through the search software in an on-line mode and appropriate citations are given. In addition, Stanford uses BALLOTS for ordering purposes. BALLOTS is developing the capability to include participation and use by other libraries and library networks.[3]

Although no large library currently uses a CRT terminal as a public on-line catalog, it is the Ohio State University (OSU) libraries' plan to do so in the not-too-distant future. The estimated date for this implementation is July 1976. At that time, the card catalog will be closed and no additional cards will be filed into it. Banks of CRTs will complement the card catalog, and the OSU users will have on-line access to the library's holdings.

A chief disadvantage of an on-line catalog is cost. One of the most important functions of a network is to spread the cost of maintaining a huge data base among a large number of libraries. It is most interesting that computer costs, particularly the cost of being on-line, have been going down, and there are indications that they will continue to decrease as methods and tools of storage and access become simpler.

There are also serious technical problems involved in the use of telephone lines and electronic transmissions. In addition, "Ma Bell" seems much less cooperative than she might be, as will be attested to by most anyone who has tried to schedule speedy installation of appropriate line facilities.

A disadvantage which pertains to the present on-line systems, but is not intrinsic to the on-line process, is the absence of automatic authority control. At present, the only way to change or control authority terms on the OCLC data base is to individually maintain (or change) each occurrence of the term, and to keep a manual authority file against which new authority terms can be checked and established.

The advantages of an on-line system are most attractive. Any library which has had to use a batch process for creating a catalog file will immediately appreciate its value. The batch process usually involves several trips back and forth to the computer. For example, a record is keyed and converted into machine-readable form; a printout or listing is then produced which is used for comparison with the source document. If a correction is necessary, the correction must be keyed and the whole process is then repeated. In addition, with the exception of the University of California's "FIX" program, usually the whole subfield or field must be rekeyed to make the correction.[4] This cycle continues until the proofreader sends an explicit approval to the machine or a sufficient time has elapsed for the computer to assume that the record has become cleansed of both typographical errors and tagging or coding errors. The on-line system allows immediate correction of any error, be it a single character or a whole record, thus obviating the tremendous loss of time and editorial expense involved in repetitive proofreading.

However, the on-line display is not as useful as a displayed page for the browser who does not have a specific title in mind or a precise knowledge of the author's last name. At most, a few entries can be viewed at once, while a printed catalog page allows one to browse large numbers of titles at a glance. The kinds of reduction and clarity true of the printed page are currently superior to the display of the CRT terminal. Yet, one should bear in mind that the computer printed catalog is out of date before the user sees it, as opposed to the immediacy and currency of the here-and-now online data base. The Ohio State University experience will be of great interest because it will involve the full use by the public of an on-line catalog in a large general research library collection.

Before going on to the next section, reference should be made to Information Dynamics Corporation's (IDC) BIBNET system. There are three separate components of BIBNET; two will be described in this section, and the third will be discussed below. In 1974, BIBNET, a commercial network service, consisted of a minicomputer terminal on-line via a dial-up telephone to the IDC computer. The primary use of the service was the on-line querying of a central bibliographic file for the dual purpose of creating and collecting cataloging records and holdings data, and printing card sets off-line. A recent enhancement of BIBNET was the loading of the entire MARC file and the additional non-MARC indexes created by IDC into a national data base service time-share network operated by the System Development Corporation.

This recent development allows for the widest range of reference and subject queries, as well as the more "traditional" catalog use and addition of holdings for ILL purposes associated with the 1974 version of BIBNET. The New Mexico State Library, as of January 1975, was using the new BIBNET data base service for location searching and interlibrary loan.

Line-Printer Produced Catalog Card and/or Printout

These are the most common network products and the use of the service by which these cards or listings are produced is the most widespread of the four categories of products. The line-printer is the device on the computer from which printouts are produced. Large book vendors such as Blackwell North America, Bro-Dart, and Josten's all provide line-printed catalog cards to their customers, as do such institutions as OCLC and the University of Massachusetts.[5] These applications might all be viewed as network examples insofar as the central computer cost is defrayed by the libraries participating in the card service, and the cost of maintaining the data base is shared by the many purchasers of the service.

In addition, the MARC-0 project in Oklahoma has been providing a printout service wherein Oklahoma libraries (and more recently other libraries) could request listings of MARC records. The printout service is valuable for the cataloging data and also for the SDI data provided to those wishing to know what is in MARC in a given area of the LC or Dewey classification.

Overall, the chief advantage of line-printed output is that it is inexpensive (or economical) to produce. One can purchase a set of cards from Josten's Catalog Card Corporation for less than thirty cents. All the commercial vendors mentioned provide card sets or kits at rates which cannot be refused unless one is already receiving free Title 11 depository cards (with their attendant obligations) from LC, or has a book catalog. Of course the vendors do not allow any significant options with respect to modifying those cataloging data. (Blackwell North America seems to offer the most flexibility.) It is difficult to compare the OCLC produced card set with that of the commercial vendors because OCLC's card set is an intrinsic part of a union catalog and national network and is not just a stand-alone card service. On the other hand, the total cost to a library for an OCLC card set is far greater than a commercial set because it includes such costs as line charges, maintenance costs, and terminal costs in addition to the price of the cards. One of the real cost savings OCLC provides libraries is that it delivers all of the cards to an individual library in ready-to-file main entry or title arrangement. It should also be noted that OCLC offers tremendous flexibility to its members in relation to the format of the card. OCLC was the first network to allow its users to alter any element of data in the catalog record. None of the commercial firms routinely offer this degree of flexibility.

A chief disadvantage of all of the extant card services, except Blackwell North America's, is the absence of an internal authority control; none of them provide name or subject cross-references with their card sets, thus leaving a large part of the cataloging job undone or still to be done by those libraries still concerned with bibliographic control.

Perhaps the greatest disadvantage of network card services is independent of the network or the computer. As the size of the library increases, the cost of maintaining its card catalog grows. In OCLC's case, the libraries must pay both for the maintenance of the machine-readable data base and the maintenance of their own card catalog. Despite this, Dartmouth University, for example, estimates "(a) ... net annual savings of $25, 000 to $30, 000.[6] OSU may be the first to close its catalog and go on-line, but the overwhelming costs of maintaining large card catalogs will force other libraries to do the same.[7]

In balance we must note that although line-printed cards as commercial or institutional network products are economical, the data base from whence they came and the card catalogs into which they are going are costly to maintain.

The Computer-Produced Photocomposed Book Catalog

Next in line as a major product of networks is the computer produced and photocomposed hard-copy book catalog. There have basically been three major book catalog products: (1) all of the commercially supplied catalogs which almost wholly have been sold to public and school libraries, as well as the in-house catalogs produced at places as disparate as Harvard (the Widener Library Shelflist), the University of California at Santa Cruz, and the State of Washington Library Network, etc.; (2) the phenomenon of the University of California Union Catalog Supplement for its many campuses; and (3) the development of The New York Public Library bibliographical control and book catalog system. The book catalogs produced in each of these situations represent significantly different approaches to bibliographical access and control.

The commercial book catalog producers have been in the game a long time. The reason public libraries have converted to book catalogs in large numbers is that generally they have many branches in addition to a central library or headquarters, and it is cheaper and easier to have a single book catalog in which an entry appears once rather than multiplied in the several branch card catalogs. It is clear that any system of library branches, be it public or academic, would find most valuable a single compilation of all the materials in the entire system. This in effect is the Sears Roebuck concept: the smallest branch library provides direct bibliographic access through the book catalog to the total resources of the system insofar as the central data base contains everyone's holdings, and all of the members, large or small, have access to the materials. Depending on local arrangements, they will also share through interlibrary loan the materials described in that data base.

The University of California Union Catalog Supplement (UCUCS) represents the single largest library conversion project.[8] Keeping the cost down and accepting a relatively high error rate were two components of the project. In addition, the first effort at automatic field recognition (AFR) was made with UCUCS. All input was keyed directly from the catalog card rather than from some form of worksheet which included explicit tags and codes, the traditional method. The scope of the project was tremendous: 1.2 million cards were handled, or approximately 750, 000 unique titles.

The Now York Public Library attempted to create an automated bibliographical control system; in effect, this was an effort to have a computer system which would allow for the control functions associated traditionally with the official catalog. The net result is of great significance. For example, NYPL demonstrated and proved that sophisticated library filing rules can be observed by the computer in the creation of a catalog. (There apparently are those, and they are seemingly having their way, who advocate a wholesale departure from traditional filing rules to rules similar to those which IBM's machines observe.)[9] Of even greater importance is NYPL's solution to the age-old problem of authority control. Two of the salient features of the NYPL authority control system are: (1) any new term entering the file which does not match an existing term or cross-reference is automatically sent back to the cataloger for approval, thus eliminating the traditional search for establishing or verifying authority terms-all one deals with are the terms which do not match. The computer automatically takes care of the vast majority which matched existing terms or cross-references, while in a manual system a human being would have had to search each one individually; and (2) by the use of a single transaction, one can take all instances of a single term and transfer them to another term.[10] This technique solves the problem of manually having to change the term in every record in which it appears. It should be noted that Blackwell North America has developed a subject authority control system.

Several library agencies are served by each of the three kinds of catalog producers. (The New York Public Library consists of an eighty-three-branch system in addition to its several research libraries. In all probability there are many networks or consortia with fewer members.) The union catalog is the real foundation for networking, whether the catalog is used for cooperative acquisitions, shared cataloging, information retrieval, interlibrary loan, or other purposes. The book catalog in terms of economics is the most practical to produce and use. No terminals or special viewers are required, little special staff training is required, no telephone lines are needed, and most importantly no huge data base need be kept on-line at great expense. (The diminishing costs of on-line data storage are beginning to weaken this latter point.)

On the other hand, the book catalog is obsolete the moment the cutoff for a given edition is established, and the printing and binding time can be extensive, as well as having become increasingly more expensive. Because of the cumulation process and the intrinsic obsolescence of the data, the reader is always forced to look in several places to complete now a definitive search; and bad entries, entries representing withdrawn materials, and typographical errors must sometimes remain for as long as an entire year (or even longer) because of the reaccumulation process.

In addition, all of the book catalog systems discussed use the batch input process, which is much more time consuming and troublesome than on-line input and/or maintenance. Keeping track of the printouts and source documents is difficult under the best circumstances, and all too frequently the best circumstances do not prevail. †

Photocomposition or electronic composition has revolutionized book catalog printing. It is important to note that this process wherein the digital information is converted to graphic arts or letterpress quality images, via the computer and the cathode ray tube, allows much greater flexibility than the line printer. The research libraries particularly can go beyond the Roman language alphabets and the single font to which the ALA print chain, despite all of its flexibility, perforce limits them. †† The Library of Congress (LC) and Xerox Bibliographies have used the photocomposition process to produce catalog cards.

In the near future, particularly as long as on-line storage and transmission costs are still significant, it seems that the book catalog will be a valuable complement to the on-line data base.

Special note should be taken, before closing this section, of the experience of Hennepin County Library (Minnesota) and Denver Public Library. The "how to automate without doing it yourself" theme pertains to the efforts of both of these libraries to transfer The New York Public Library's system to their respective computers.

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* The New York Public Library has been fortunate because its printer, Multiprint, Inc., New York City, has been able to keep costs relatively constant and may even lower them because of the introduction of special printing equipment and processes which were not previously used in catalog production.
† The Hennepin County Library for its shelflist conversion project was particularly vexed in trying to keep up with the flow of printouts and corrections for 100, 000 entries. Special stack space had been set aside and a whole system of batch control had to be developed.
†† The Research Libraries of The New York Public Library have recently published a book catalog containing vernacular Hebrew characters. All of these characters were computer generated and created on the Videocomp, a state-of-the-art photocomposition device. This illustrates the difference between the line-printer with its single alphabet limitation, and the photocomposition device which in principle can handle a multiplicity of alphabets and type fonts.

The research and development were done by NYPL and the software was freely given to these respective libraries. Libraries might well note that each network need not do an unique and massive research and development effort. Software sharing and transfer should have a special role in networking. The Hennepin County Library converted its 80, 000-title shelflist to the MARC format by use of the University of California's MARC format recognition and MARC maintenance programs. It then had these records processed through NYPL's authority control and book catalog production programs to produce Hennepin's book catalog. Although Hennepin has successfully completed the software transfer, the Denver Public Library discontinued the project.

Software sharing and transfer is not only possible, but it is a practical approach to automated networking on a modest basis; the book catalog, because of its ease of dissemination (one can print many copies and distribute them anywhere), offers great opportunities for cooperation in acquisitions and collection development, cataloging, and interlibrary loan.

Note should also be taken of the University of Chicago's total data management system currently in the research and development stage. Its basic design criteria should be mentioned: the system will be both upward and downward transferable on IBM equipment; it is predicated on be-ing usable by any kind of library, and, in principle, any number of libraries.

Computer-Based Microforms

During the 1970s, microforms have come into their own in library service. With the advent of computer-output-microfilm (COM), microfilm is playing a new and most vital role in library service and library automation. COM is available as an invaluable tool for networks.

Although COM either in microfiche or microfilm reel format was available well before 1970, it has become more heavily used in libraries, first in the area of acquisitions (e.g., the in-process file approach at Yale and Michigan Universities, and the on-order history files at Hennepin County and Los Angeles Public libraries) and ever more in the area of cataloging. The aforementioned Information Dynamics Corporation's Micrographic Catalog Retrieval Systems (MCRS) uses COM-generated indices and COM-generated card images for Cataloging-In-Publication data all on microfiche.

Information Design Incorporated's (IDI) CARDSET system is a wholly MARC-based system which uses indices to MARC, CIP, and full LC cataloging records which are displayed in full cardsets, ready for photocopying. Unlike other systems which photographed the LC card, an expensive and time-consuming process, the whole process is controlled by the computer.

Actually IDI's reel microfilm is produced by a more sophisticated photocomposition device rather than the typical device used by the various COM service bureaus whose machines have limited character sets and lower-quality displays. Many libraries around the country are using COM catalogs for their patrons. Tulsa City-County Public Library (Oklahoma), El Centro Junior College (Dallas, Texas), Federal City College (Washington, D.C.), Tulsa Junior College (Oklahoma), the Georgia Institute of Technology, the University of Texas at Permian Basin are all examples of libraries using COM catalogs either in total or in part.

COM is important because it is the quickest and most economical means of disseminating multiple copies of reports, be they acquisitions, cataloging, or any other. it is not unusual for a COM service bureau to turn around an extensive report with multiple copies in appreciably less than one eight-hour shift. For example, a typical COM device (they are usually called cameras) will take the computer-generated reel of magnetic tape with its digital information and "set type" at the rate of 300-500 pages of printout per minute. One service bureau charges $1. 80 per 207-page (or frame) four-by-six-inch microfiche master and $. 09 per duplicate fiche. Reel microfilm, although more expensive per frame, is also quite economical.

One of the most simple yet valuable applications of COM is the Louisiana Numerical Register.[11] The Register is in effect a union catalog of library holdings symbols affixed to the LC card number for a given title. It avoids a number of bibliographical problems by simply relying on the LC card number. Of course, if one does not know the LC card number, the Register is useless.

A last advantage is that the film itself is virtually indestructible, and can be cheaply and quickly replaced.

The disadvantages of COM center around the microfilm medium itself. The display image tends to discourage use by individuals for extensive periods of time. It would be wonderful if the microfilm industry could in some way improve the traditional quality of display. The typical COM reduction is 42X, and experimentation is underway at reductions of 8OX and greater. Three particular COM readers are library oriented.

IDI has developed the ROM III reader which is especially valuable for library use. A single reel of COM microfilm locks inside the reader, and all of the adjustment and controls are on the outside of the reader, thus enabling the library patron to access the data contained on the film without having to handle the film, as required with traditional readers. Because of the low cost of producing COM microfilm from a machine - readable data base, the availability of a relatively low-cost high-speed reader, and the ease of preparing fully cumulative and frequent updates on a single reel, we may see some major changes in public and technical service orientation. Science Press is now marketing microfilm book catalogs with the ROM III reader.

Autographics Corporation has recently announced the Library Catalog Reader (LCR) 500, a reader similar to the ROM III. It is noteworthy that Science Press and Autographics, two major commercial book catalog houses, have both committed themselves to microform catalogs. As printing and paper costs continue to increase, the shift to microform products from paper will also increase. These two suppliers are a further manifestation of a trend already established.

Northwest Microfilm, Minneapolis, Minnesota, has a microfiche reader which incorporates the best features of several microfiche readers presently on the market. Because of the many microfiche standards ranging in reduction from 16X to 48X, it is comforting to know that there is finally available a low-cost microfiche reader which permits the simple interchangeability of lenses. This solves the problem of needing several readers, one for each significantly different reduction.

Networks, the various micropublishers and those national distributors of data which have not availed themselves of COM's potential can all use COM in a variety of ways, many of which are just beginning to be explored.

In the balance, it would seem that the ROM III and the LCR 500 type of readers have more potential for use by the public at this time. Rather than having to deal with quantities of microfiche, the user can just push a button to scan an entire file on a single COM reel locked inside the machine. However, the ability of these machines to stand up to the daily wear and tear of public use must still be demonstrated. In the balance, though, it is a bright spot in what has become an increasingly dismal cost picture in the hard-copy book catalog world. Unfortunately, the initial capitalization of microform equipment is a problem. It is especially difficult because the equipment is not much beyond the prototype stage.

Conclusion

To close, a bright picture is before us. Shortcomings notwithstanding, there is a full range of products which networks can use to deliver needed services. From on-line CRTs to Catalog Cards to book catalogs to COM catalogs, there are enough tools available for networks to utilize in meeting the catalog and cataloging needs of participating libraries. The larger issue is: what is needed by libraries to get them to recognize that through networking, interlibrary cooperation and the sharing of resources, they will be able to serve their various publics better and cure themselves of some of the age old problems that they in principle cannot solve by themselves? The economic picture of today underscores the urgency of this question.

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1,046 automated network products are offered for sale by suppliers on Alibaba.com, of which other communication & networking modules accounts for 8%, fiber optic equipment accounts for 1%, and network switches accounts for 1%. A wide variety of automated network options are available to you, such as other. You can also choose from other, din, and curtain poles, tracks & accessories automated network. There are 679 suppliers who sells automated network on Alibaba.com, mainly located in Asia. The top countries of supplier is China, from which the percentage of automated network supply is