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# DEVELOPMENT EFFORTS BETWEEN HIGH TECH FIRMS AND ACADEMIC LIBRARIES: A CASE STUDY OF ONE LIBRARY'S EXPERIENCE

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*Higher education will benefit from the adoption and implementation of affordable academic technologies. This benefit, however, will be realized only if academics are placed at the forefront of technology development, ensuring that emerging technologies meet the specific needs of higher education.*

John Oberlin<sup>1</sup>

This article examines the University of Toledo Carlson Library's cooperative effort with IBM personnel in attempting to design a new and cost-effective method for networking CD-ROM databases. It outlines how the development effort was conceived and executed, and presents recommendations on how such ventures can be effectively carried out in the future.

This article examines the University of Toledo Carlson Library's cooperative effort with IBM personnel in attempting to design a new and cost-effective method for networking CD-ROM databases. It will outline how the development effort was conceived and executed, and will conclude with recommendations on how such ventures could be effectively carried out in the future.

## Background

In the spring of 1990, Carlson Library submitted a grant proposal for an Ohio Board of Regents (OBOR) Instructional Equipment Allocation. The library proposed a CD-ROM local area network, using SilverPlatter's MultiPlatter network system. This network would be composed of 12 public workstations, each with simultaneous access to any of 14 CD-ROM drives. MultiPlatter was selected, in part, because it was a preconfigured system that could be expanded beyond CD-ROM, so, for example, Carlson Library could add a word processing or a database management

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## SIDEBAR 1: PROPOSAL FOR A CD-ROM LOCAL AREA NETWORK IN CARLSON LIBRARY (JUNE 1990)

The University of Toledo's Carlson Library proposes to install a CD-ROM (compact disk - read only memory) local area network (LAN). CD-ROM is a new technology used to store large databases in a form readily accessible by microcomputer. A CD-ROM LAN links several microcomputers to one or more CD-ROM players, enabling more than one researcher to access the databases at a given time. The technology has all the advantages of online database searching without the high variable costs, and CD-ROM databases are designed for direct access by the researcher. Carlson Library already offers two CD-ROM databases which receive nearly constant use.

Carlson Library will install a public-access CD-ROM local area network supporting 12 new workstations and 14 CD-ROM drives. Additionally, the library will add up to 8 existing CD-ROM workstations on the network. The total project cost is \$109,156.

This network will give UT scholars unprecedented, timely, and efficient access to information through state-of-the-art technology, and will provide extensive research support for students and faculty in virtually all disciplines at the University of Toledo.

### Project Criteria:

- is a Local Area Network (LAN) in Carlson Library which will provide simultaneous access to all networked CD-ROM databases;
- is a network which is supported by UT Computer Services;
- should be a turnkey network which supports CD-ROM products from multiple vendors in order to reduce the strain on staff hours for installation and maintenance;
- should be an expandable network, capable of supporting at least 10 workstations and up to 14 CD-ROM software packages;

Carlson Library proposes the purchase of SilverPlatter's MultiPlatter Network. MultiPlatter is a stand-alone CD-ROM network capable of supporting 10 or more workstations and up to 21 CD-ROM drives.

### Configuration

This network will include 12 CD-ROM workstations (including one workstation for system administration), two 8-port Token Ring multistation access units, 15 CD-ROM drives, and on-site installation by SilverPlatter Information, Inc.

• Basic MultiPlatter System	\$25,580
• MultiPlatter Expansion Unit with 7 CD-ROM drives (drives 8-14)	9,980
• Additional CD-ROM drive	700
• 8 additional network interface cards with MS-DOS CD-ROM Extensions	9,400
• Network Communications Software	4,800
• MultiPlatter Application Manager Software (drives 8-14)	2,000
• 8-port Token ring multi-station access unit	700
• 12 CD-ROM workstations (\$3586 per workstation)	43,032
• Network wiring (shielded twisted pair)	5,200
• Warranty (15 percent of MultiPlatter configuration)	7,764
TOTAL:*	\$109,156

\*based on 1990 figures

package to the network that would be accessible from staff workstations. SilverPlatter personnel would install the CD-ROM network, reducing the amount of staff time required for initial set-up. Networking software was also included in the proposal (see sidebar 1).

In the summer of 1990, the library was awarded \$100,000 for the network, which was about \$9,000

short of the proposed amount. With the underfunding, the library considered three alternatives:

- 1) to reduce the number of public access workstations and/or the number of CD-ROM drives accessible on the network;

- 2) to select a less expensive network that would support CD-ROM, but that would not provide the functionality to adequately support staff network applications such as word processing and database management; and
- 3) to select a CD-ROM network that would allow for the later inclusion of staff applications, but which would require in-house setup.

The library opted for the third alternative—that is, to use in-house staff to install a network that would accommodate CD-ROM for public use and other software applications for staff use. Specifically, the library decided to install the CBIS CD Server system—the same system used for SilverPlatter's Multi-Platter system, but without the added support and some enhancements offered by SilverPlatter. Novell NetWare was chosen as the network operating system under which CBIS would be installed. NetWare was chosen for its expandibility and widespread use in universities, including the University of Toledo.

### IBM Contact

In the course of ordering network equipment, a local IBM marketing representative became interested in the library's project, and spoke with an IBM engineer responsible for networking. This engineer and the marketing representative contacted the coordinator of library automation to discuss the possibility of installing an IBM LAN Server Network to support the CD-ROM applications in the library. A meeting was set up between key library personnel and the IBM engineer and marketing representative, to discuss networking alternatives.

LAN Server (IBM) is an OS/2-based network operating system with the ability to access DOS-based programs. It seemed possible that LAN server could run DOS CD-ROM applications without third party software (e.g., Optinet, CBIS, or Meridian); thus, LAN Server could replace both Novell NetWare and the CBIS software, resulting in a savings of several thousand dollars. Prior to the IBM meeting, the coordinator of library automation established and articulated the library LAN requirements (see sidebar 2), providing a focus for the meeting. During this meeting, the library presented its budget, expressed the LAN requirements, described the CD-ROM databases to be networked, arranged what each party would contribute, and set a deadline for results. Also discussed was the requirement that Microsoft Extensions be run with most library CD-ROM applications; the library staff questioned the viability of OS/2 LAN Server, given this requirement.

The engineer indicated that IBM's LAN Server could handle DOS CD-ROM applications in a networked environment, and he did not feel that Microsoft Extensions would pose a problem. Before we took that leap of faith, we asked him to identify sites that were running multiple DOS CD-ROM databases under LAN Server. After some investigation, he and the marketing representative were unable to identify any sites, which led us to arrange a test environment using their software and hardware products. In relatively short order, both parties agreed to the following:

- Carlson Library would purchase an IBM file server, workstations, and token ring adapters (all of these components could be used with several CD-ROM network solutions, including Optinet, Meridian, or CBIS), and
- IBM would provide eight CD-ROM drives, LAN Server and OS/2 software, and technical support.

To facilitate this test, IBM provided equipment and software from the local office and from a regional IBM Demonstrator Program. The test set-up was to be in place for 30 days.

### Network Test

The delivery date on some IBM-supplied equipment was delayed, so IBM loaned the library a file server in addition to the other equipment previously negotiated. Carlson Library's involvement in the IBM Demonstrator Program had a disadvantage because all of the necessary equipment was not immediately available. The equipment arrived 7 January 1991, some weeks after our agreed-upon set-up date, which was to be during the university's winter holiday break. The IBM engineer delivered and set up the computer equipment and provided the IBM manuals for our use. At the end of the day, after minimal introduction, LAN Server was operating on the file server, and the required network software was operating on two connected workstations. The following day, we had one CD-ROM application (a product that did not require Microsoft Extensions) operating on the network and accessible from the DOS workstations.

During the next 30 days, we tried several solutions to make the CD-ROM portion of the LAN Server network operational with other applications. We read IBM's documentation on their CD-ROM drives. This documentation included information on OS/2 device drivers and DOS device drivers. OS/2 drivers were already installed on our network with the initial LAN Server software load. It appeared that the OS/2 drivers were required in order for the LAN Server file server

**SIDEBAR 2: CD-ROM LOCAL AREA NETWORK SPECIFICATIONS  
CARLSON LIBRARY  
THE UNIVERSITY OF TOLEDO**

Following are the specifications needed in a CD-ROM Local Area Network for Carlson Library:

1. A reliable and expandable network initially supporting 20 workstations, capable of expanding to at least 75 workstations.
2. Support for simultaneous access to 14 CD-ROM databases from any network workstation. All CD-ROM databases will be DOS applications, most operating under Microsoft CD-ROM Extensions.
3. Cache available for CD-ROM queries, and response time for a single user of a CD-ROM database should be equal to or less than the response time on a stand-alone CD-ROM workstation. Response time for up to three simultaneous users should be no less than double the response time on a stand-alone station.
4. Capable of limiting the number of users on a given CD-ROM drive, and when this limit is reached, capable of displaying an appropriate message to the user indicating that the database is unavailable.
5. Easy-to-use menus available for users.
6. Capable of adding applications software to the network, including WordPerfect and dBASE IV.
7. Capable of making a SNA connection to the campus mainframe.
8. Security support, eliminating access to staff applications (word processing, database management, etc.) from public CD-ROM databases.
9. Capable of operating on a 16Mb Token Ring network, over shielded twisted pair wire, with distances from file server to workstations up to 400 feet.
10. Capable of supporting a time-out function, where a workstation defaults back to the network menu after a pre-defined period of inactivity.
11. Capable of supporting a network printer remote from the file server, attached to a network workstation, with the ability to route printing from a group of printers to a designated printer attached to a workstation within that group.
12. Permitting local printers attached directly to parallel ports on CD-ROM workstations.
13. Providing remote terminal access, where system administration can take place at workstations other than the file server.
14. Software and hardware vendor telephone support during business hours.

to recognize the eight attached CD-ROM drives. DOS CD-ROM applications, however, required Microsoft Extensions, which were provided with the IBM DOS drivers but not with the OS/2 drivers. This was a major obstacle. We attempted to load both OS/2 drivers and DOS drivers (with Extensions). Not surprisingly, this strategy failed.

Having failed to run Microsoft Extensions on the OS/2 file server, we attempted to install Extensions on DOS workstations. We were unable to load IBM DOS CD-ROM drivers because the driver was looking for

a SCSI adapter on the DOS workstation, not on the fileserver. We attempted several solutions. We attached a CD-ROM drive to a DOS workstation, so when the machine booted the CONFIG.SYS it found a local CD-ROM drive and loaded the Extensions. We then attached a LAN analyzing device to track network traffic. This device displayed traffic on the network, and confirmed that the Extensions loaded on the DOS workstation and that the workstation attempted to access the drives on the file server. However, accessing the file server drives was not successful, and we deter-

mined that there likely was a conflict between the DOS CD-ROM Extensions and the OS/2 CD-ROM device drivers.

### Caught in the Big Blue Maze

After attempting the above solutions to our driver problem, we turned to IBM's technical support personnel. Unfortunately, the local IBM office could not identify the personnel capable of modifying the CD-ROM drivers. The local engineer sent the problem out over the IBM network, only to discover that other sites were trying to set up DOS CD-ROM applications on LAN Server networks but were having the same difficulties between Microsoft Extensions and the OS/2 drivers.

Meanwhile, the coordinator of library automation contacted Microsoft to discuss the Extensions software. Microsoft informed him that their Extensions are an Original Equipment Manufacturer (OEM) item and are therefore supported by IBM. SilverPlatter, CBIS, and Online were contacted also, but those companies had either not considered OS/2 drivers a priority in research and development, or had not yet developed those drivers.

### Observations

Our experience demonstrated the advantages and disadvantages of working with a large corporation in a development effort. As a result, we can suggest a few steps that will aid libraries in future research and development endeavors.

- 1) Get everything, especially the time-frame and the library's expectations, in writing. At least an informal written "contract" is necessary for future reference and for clearly delineating the participants' roles.
- 2) Arrange for the provision of adequate technical documentation for your development effort. For example, as a minimum, our project required the full developers' documentation on the Microsoft CD-ROM Extensions in addition to standard LAN Server documentation. Documentation provided with IBM's OS/2 and DOS CD-ROM drivers was very inadequate.
- 3) Before starting the project, quantify the estimated time to be spent in support, and determine who

will provide it. It became apparent in our project that we required expertise beyond the local IBM office and the technical support available on campus. Involvement of the persons at IBM who wrote the OS/2 and DOS CD-ROM drivers would have been of great benefit.

- 4) Involve higher levels of management in the vendor's organization to ensure adequate interest and support. In our case, the development was a "pet project" for the local office, but had no priority within the larger IBM organization.
- 5) Determine how much the library is willing to compromise in the final product. For example, after we abandoned the OS/2 LAN Server solution, IBM proposed that we set the network up under DOS PC-LAN. This setup would have afforded far less functionality than LAN Server or other CD-ROM networking solutions, and was thus unacceptable.
- 6) Be certain that the top-level administration in the library is aware of the project and the risks involved (time delays, staff time, and so on). Our library's administration knew of our efforts from the outset and there was no pressure when the development effort resulted in a delay in the final implementation.

### POSTSCRIPT

Following the test with IBM LAN Server, Carlson Library continued with its plan to install a Novell NetWare network and a CBIS CD-ROM server. Applications—word processing, a database management system, 3270 software for access to the campus mainframe, and a network laser printer—are installed and in use by library staff. The CBIS CD Server with 14 drives is installed and operational, and 45 public CD-ROM and staff workstations are now available.

### NOTE

1. Oberlin, John. "Corporation Support Secured from Novell, Inc.," *The Institute of Academic Technology Briefings* 1:2 (Spring 1991): 1.