Implementing a LANtastic CD-ROM Network

Martha Chantiny
Sinclair Undergraduate Library, University of Hawaii at Manoa

ABSTRACT

A LANtastic network to provide access to shared CD-ROM drives was installed at the University of Hawaii Sinclair Undergraduate Library in early 1990. In this chapter, background on related CD-ROM projects at the University of Hawaii Libraries is provided. Reasons for choosing LANtastic and an overview of the installation, upgrading and maintenance of the network are discussed. LANtastic network products, equipment and specific experiences related to the use of LANtastic for access to networked CD-ROM drives are described. Future plans for expanding the number of shared CD-ROM drives and evaluation of the system are presented.

Introduction

Sinclair Library is designated the Undergraduate Library and Learning Resources Center and has a collection geared to serving the needs of students in all basic baccalaureate programs. Sinclair Library serves as the principal library and research center for the nearly 13,000 undergraduates attending the University of Hawaii at Manoa. Sinclair Library also houses all library holdings for the music and architecture collections as well as the audio-visual center and a large microcomputer lab, the Computerized Learning and Information Center (CLIC), managed by the University Computing Center. One of the missions of CLIC in conjunction with Sinclair Library is to expand the availability and usage of Computer-Aided Instruction. Installation of the LANtastic network to provide access to multiple CD-ROM databases in the Reference Room of Sinclair Library supported this mission by making another technology-based information access system available to library patrons.

LANtastic is designed to be inexpensive, easy to install and maintain. It is a peer-to-peer system which does not require the use of a dedicated file server. The workstation which acts as a file or network resource server may also be used as a fully functioning network workstation, or node. LANtastic is one of the few network software package which offers built-in and virtually transparent support for CD-ROM drives.

The Sinclair Library LANtastic network currently consists of three workstations and five chained CD-ROM drives and provides access to CD-ROM databases for general undergraduate research as well as specialized information to support students
in the Music Department. The network workstations are located near the Reference Desk and are available all hours the library is open.

**Background Information and Related Automation Projects**

The University of Hawaii Libraries at the main campus in Manoa Valley in Honolulu serve a diverse clientele. In addition to the over 20,000 undergraduate and graduate students and the faculty, staff, and researchers associated with the University, the libraries are heavily used by members of the general community as well as the students from the four Community College campuses on the island of Oahu and students from several private colleges.

The Library Systems Office is located in Hamilton Library and is responsible for all automation-related support for both libraries. This includes support for terminals, minicomputers, microcomputers, and any related networks.

During the summer of 1989, material containing asbestos was scheduled to be removed from water-damaged ceiling areas in Hamilton Library. The building was to be off-limits to the public and most staff during this process. In preparation for this project, the University of Hawaii Libraries began planning in August 1988 to move over 100 staff and most services and operations from Hamilton Library to Sinclair Library for the duration.

It was immediately apparent that the miles of printed reference and index materials located in Hamilton Library could not possibly be accommodated in Sinclair along with the additional staff. Therefore, a subcommittee of the Library Microcomputer Council began to investigate CD-ROM indexes as an alternative means of providing access to reference materials which would be unavailable in their printed format.

Until this time the libraries had not been utilizing much microcomputer-based information technology, nor were there many CD-ROM products available for patron use. Hamilton Library had been leasing a four-workstation InfoTrac system (the 12-inch optical disk, daisy-chained version) for several years. Information Access announced in early 1989 that the 12-inch optical disk version of the product would be phased out and replaced by a CD-ROM version before the end of the year. The original version of the CD-ROM replacement was not networked, but would require separate CD drives and disks in each workstation. Because the InfoTrac database would not be an adequate replacement for the many types of indexes that would be unreachable over the summer as well as for a number of other reasons related to collection development and budget, it was decided that the InfoTrac subscription would be cancelled on June 30, 1989 at the end of the fiscal year contract period.

The summer of 1989 marked a major turning point for the Libraries with regard to the use of new information technologies and CD-ROM. The MultiPlatter network system sold by SilverPlatter was installed temporarily in Sinclair Library in June. For five weeks prior to the MultiPlatter installation, the Library was fortunate to be able to borrow three single-user, XT-type workstations, each with an internal CD-ROM
drive, from the University's School of Library and Information Studies. The Reference librarians were then faced with the logistics of handling five databases spanning eight CD-ROM disks and three workstations while they learned the search software and attempted to adjust to the new technology.

Naturally, everything that could go wrong with a single-user workstation did go wrong. A CD-ROM disc was inserted into the floppy drive, a CD disk was inserted into the CD-ROM drive but without a protective disk caddy, and a disc was stolen. Innumerable swaps were made as patrons used one disk after another. The network system was greeted with great relief and appreciation when it was finally installed.

At the end of the asbestos-removal project, the staff and the MultiPlatter network moved back to Hamilton Library. All that remained in the Sinclair Library Reference department was a single-user workstation with one external CD-ROM drive. The discs once again were swapped in and out of the drive by the Reference and Circulation staff. The wear and tear on the disks was extensive. It was often the case that within six weeks of receipt of a new disk deep scratches would develop causing retrieval errors. Discs updated quarterly often had to be replaced before the next update arrived. The wear and tear on the staff was also tremendous. Almost immediately they began to ask when Sinclair was going to get their own CD-ROM LAN. Many patrons use both the Hamilton and Sinclair Libraries and were very fond of the MultiPlatter LAN and also waited impatiently for a similar system to be installed in Sinclair.

**Network Goals and Objectives**

The MultiPlatter network system had been chosen to satisfy two primary objectives—to provide a replacement for as many types of printed indexes as possible and be a system which would be up and running without any false starts or a lot of time spent installing programs and/or configuring menus, software, access levels, and so forth. Cost was not a major consideration because of the need for timeliness and maximum functionality. Our goal was to provide as much shared access to as many CD-ROM databases as quickly as possible.

Unfortunately, there was no special project (or large amounts of special funding) to provide a similar justification and motivation for acquiring a LAN for Sinclair Library. However, the University of Hawaii Libraries had recently been permitted by the State Legislature to retain monies collected for fines and fees in a Library Revolving Fund. Before 1989 these monies were to be returned to the State General Fund. The Legislature specified that the retained fines and fees should be used to enhance public services. In January 1990, the University Librarian asked the Coordinator of Public Services and the Library Systems Office to develop a proposal to expand the number of library CD-ROM workstations using this money. The goal of the proposal was to provide a range of equipment to several library departments for under $18,000. In order to meet the proposal requirements and also fully fund a
microcomputer-based LAN to share CD-ROM drives in Sinclair Library, a low-cost CD LAN product must be identified.

The Library Systems Office had gained more experience supporting CD-ROM applications and the MultiPlatter CD-ROM LAN, therefore it was relatively easy to formulate the basic criteria for the proposed Sinclair CD-ROM LAN. The system must use low-cost, highly-rated network software which would allow shared access to CD-ROM hardware. With no deadlines governing installation and functioning, and a limited budget, a complete support and maintenance package was not required or practical. However, because support and maintenance would not be purchased from the vendor, a system which was easy to install and use was highly desirable. Ideally, to simplify support of another LAN, the system should also match the MultiPlatter configuration with regard to the same types of workstation hardware, network protocol, and interface cards. LANtastic fit the bill perfectly.

**Selection and Acquisition**

Prior to the installation of the MultiPlatter system, the Library Systems Office Microcomputer Support Librarian attended a week-long workshop "Networking Personal Computers: Selection and Management of PC Based Networks" presented by the Personal Computer Group, a division of the American Institute. The workshop covered the theory and implementation of microcomputer-based local area networks. This overview of the available types of network configurations served as invaluable background for decision making prior to the selection of LANtastic.

Citations to reviews of LAN software were obtained by searching Computer Library, one of the CD-ROM databases available at Hamilton Library. LANtastic received excellent ratings from several PC journals and has continued to do so (see Bibliography). In addition, contributors to the BITNET discussion group PACS-L (Public Access Catalogs in Libraries) were reporting good experiences and low cost implementation with LANtastic.

Preliminary calls to the vendor, Artisoft, and the local dealer in Honolulu proved that the costs for the actual network hardware and software would be less than the price of one workstation. LANtastic was chosen primarily because it was low-cost yet promised to be an effective means to provide shared access to databases located on CD-ROM discs.

The Library Systems Office Microcomputer Support Librarian prepared a proposal and budget for the Coordinator of Public Services and the University Librarian. The proposal was accepted and Requests for Written Quotations were sent to the three nearest vendors.

**Hardware Configuration**

The LANtastic network was originally configured with two microcomputer workstations each with a printer, Ethernet interface cards, and thin coaxial cabling. A daisy-chained stack of four CD-ROM drives was installed on one workstation.
The Library Systems Office wished to avoid adding any unnecessary unknown elements to the new network in order to simplify support as much as possible. Therefore, the same type of microcomputers that had been installed for the MultiPlatter system were purchased for the LANtastic network. IBM PS/2 model 50z workstations with 12-inch VGA color monitors were chosen because they had adequately fast processors and color screens to display the software to best advantage and were easily purchased because they were listed on an official State Price List.

Technical specifications for the IBM PS/2 model 50z microcomputers include: a 10MHz Intel 80286 microprocessor with zero wait-states, 1MB of memory on the system board, a 30MB hard drive with a disk access speed of 39ms, a VGA port, 3 expansion slots, a 1.44MB 3.5 inch diskette drive, and a standard IBM enhanced keyboard.

Again, to simplify support and troubleshooting, the same type of CD-ROM drives already in use in several other library departments on single-user workstations were chosen. By early 1990, Hitachi 1503S drives were no longer state of the art but they were proven workhorses with still-acceptable access speeds. Since CD-ROM drives for library applications are not available locally in Hawaii, the library had already developed a satisfactory mail-order relationship with the Missouri Library Network Corporation and again ordered the drives from them.

The same Hewlett-Packard ThinkJet printers used on all of the terminals which access the main Library Online Catalog were chosen for the network workstations because they could be easily added to an existing maintenance contract. Parallel models were selected so that printer redirection wouldn't be needed and possible incompatibilities with CD-ROM search software could be avoided.

The IBM PS/2 model 50z workstations purchased for the network required the use of MicroChannel Architecture (MCA) interface cards. At the time of purchase, Artisoft did not offer their lower-priced starter kit for equipment with MCA expansion slots.

Starter kits are now available for both standard and MCA microcomputers and consist of: two LANtastic 2Mbps adapters with cable and terminators, the LANtastic Network Operating System (NOS) software and documentation. The starter kits use proprietary LANtastic-brand network interface cards and must be used with the LANtastic-specific network software. Ethernet starter kits are now offered as well, using LANtastic-brand Ethernet interface cards.

LANtastic also sells a version of their NOS which is adapter independent (LANtastic/AI) and may be used with a wide range of Ethernet interface cards which are NetBIOS (a widely used LAN operating system interface standard) compatible. The LANtastic/AI NOS currently costs twice as much as the Starter Kit NOS per node. This was the only type of Ethernet product sold by LANtastic in early 1990 and was called NOS 2.57g (generic).

Purchase of the higher-priced generic Ethernet product was acceptable because this product used the same protocol and type of interface as that installed in the Hamilton Library MultiPlatter network. The major drawback of using MCA-based
equipment is that add-ons, including Ethernet interface cards, cost at least $100.00 more than the standard type. The library purchased the LANtastic Network OS version 2.57g and Western Digital Ethercard Plus (MCA) interface cards.

**Network Software Installation**

Installation and configuration of the LANtastic NOS is performed using a series of menus invoked by the NET_MGR (Network Manager) program. Initial installation of the server and workstation software is accomplished easily, in a step-by-step process begun by selecting the menu option "Install Software." The entire installation procedure is explained clearly in the LANtastic Network Operating System User's Manual.

The NET_MGR program maintains a special directory on the server where network information is stored. This directory is created when the server software is installed and it is updated whenever network resources are modified, added, or deleted.

When setting up the network, users and shared resources are described and defined. A user may correspond to a particular workstation or individual user accounts may be created if a number of different people with varying access privileges use the same workstation. Users may have different access privileges which control what type of functions the user can perform and network resources have associated access levels which control what any user may do with a given resource.

Before a user can access a network resource it must also be defined. This is accomplished by selecting "Network Access Information" from the installation menu. Resources must be named, have a link path or location identified, be described and have a level of access specified. Access types include (R)ead, (W)rite, (C)reate directory, (M)ake directories, (L)ookup directories, (D)elete files, (K)ill directories, re(N)ame files, (E)xecute programs, (A)lter attributes, and (P)hysical access to resources. This information is input via a screen which contains the following prompts:

<table>
<thead>
<tr>
<th>Description</th>
<th>Link path</th>
<th>CD-ROM Drive</th>
<th>Access Control</th>
</tr>
</thead>
</table>

For example, the network access information for the root directory of the server might be:

<table>
<thead>
<tr>
<th>Description :</th>
<th>Main Root path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link path :</td>
<td>C:</td>
</tr>
<tr>
<td>CD-ROM Drive :</td>
<td>No</td>
</tr>
</tbody>
</table>
| Access Control : | MANAGER
|                | NUMBER1
|                | NUMBER2
|                | RWWMLDKNEAP

<table>
<thead>
<tr>
<th>Description :</th>
<th>Link path :</th>
<th>CD-ROM Drive :</th>
<th>Access Control :</th>
</tr>
</thead>
</table>
| Main Root path: | C: | No | MANAGER
|                | NUMBER1 | NUMBER2 | RWWMLDKNEAP

- - - - L -- E --
To insure that a CD-ROM drive is treated appropriately by the network, all that must be done when defining the CD-ROM drive as a network resource is enter "YES" at the "CD-ROM Drive" prompt on the menu and insure that the link path defined for the CD-ROM drive corresponds to the drive letter defined by the /L: switch of the Microsoft Extensions for CD-ROM (MSCDEX) setting in the CONFIG.SYS file of the CD-ROM server.

**Implementation**

The hardware and network software were installed in mid-April 1990. The local Artisoft dealer who submitted the lowest bid for the network software and Ethernet interface cards was intrigued by the fact that we planned to install a LANtastic system in a library and use it for multiple access to CD-ROM drives as network resources. We were apparently the first local LANtastic installation purchased for use specifically with CD-ROM drives. The vendor provided free on-site installation because he wanted to see how the CD-ROM aspect of the network software worked.

Prior to the installation of the LANtastic software, Ethernet interface cards and thin coaxial cables were installed. The Ethernet version of LANtastic uses a bus topology; workstations were linked to T-connectors on each interface card. The workstation software setup was updated to account for the new hardware. IBM PS/2's were configured by using a setup disk. After any new components are added, setup must be rerun, with any necessary device drivers copied to the setup disk, in order for the machine to recognize the existence of the new component. The process to this point was virtually trouble-free.

The Library Systems Office Microcomputer Support Librarian also installed the specific CD-ROM drive device driver for MCA interface cards and Hitachi model drivers (HITACHIB.SYS) and the Microsoft CD-ROM Extensions (MSCDEX.EXE) on the workstation which would function as the server for the CD-ROM drives. This process was the same as for a single-user workstation, and also went smoothly.

The LANtastic vendor installed the network software and explained the configuration process as he performed it. The LANtastic network software for both the non-dedicated server and the additional node was installed and functioning perfectly in less than two hours. The four daisy-chained CD-ROM drives were defined as network resources available for read/execute procedures only. The network configuration was tested by listing the directory of each CD-ROM disk from the DOS prompt of each workstation.

The CONFIG.SYS and AUTOEXEC.BAT files, after installation, contained a number of network settings as follows:
Server CONFIG.SYS

```
files=50
buffers=30
lastdrive=z
device=\drivers\HITACHIB.SYS /D:CD_0 /N:4 /P:300
```

Node CONFIG.SYS

```
files=50
buffers=30
lastdrive=z
```

No device driver was needed for the workstation which did not have the CD-ROM drives physically attached to it.

Server AUTOEXEC.BAT

```
cls
echo off
prompt $p$g
path c:\c:drivers;c:\lantasti;c:\util;
wdb003
ailanbios
redir server1 buffers=1 size=1024 logins=2
mscdex.exe /D:CD_0 /M:8 /L:L
server
cls
menu
```

Node: AUTOEXEC.BAT

```
echo off
cls
prompt $p$g
path c:\c:drivers;c:\lantasti;c:\util;
wdb003
ailanbios
redir numb2
net login \server1 numb2
net use L: \server1\cd1
net use M: \server1\cd2
net use N: \server1\cd3
net use O: \server1\cd4
net use D: \server1\drive_c
et use B: \server1\floppy_B
menu
```

The WD8003 statement invokes the Ethernet interface card device driver. The AILANBIOS statement starts the LANtastic operating system software. The REDIR statement invokes the program REDIR.EXE and allows network resources to be used by any workstation as if they were physically attached to the workstation. The REDIR setting must be present in every workstation AUTOEXEC.BAT.
however, the SERVER setting is only required in the boot file of the workstation which acts as the network resource server. The NET USE settings define the path to resources on the server, for example, from the workstation node identified as "numbr2" one would type "L:" to access the CD-ROM drive defined as "cd1".

After defining the network resources and testing access to the contents of each CD-ROM disk the installation was declared a success. The LANtastic vendor left—he now knew that adding CD-ROM drives to the network was not much more complicated than defining a system printer. However, one more step was required before the network would be useful to the library. The search software for each CD-ROM database still had to be installed and configured to function on each workstation. True success from the patron or librarian's point of view had not yet been attained.

The CD-ROM drives on the server are accessed via the use of an interface card device driver and the Microsoft CD-ROM Extensions (MSCDEX.EXE) software. The MSCDEX program allows DOS on the microcomputer to act as if a CD-ROM drive is a type of large, read-only hard disk drive. The MSCDEX program communicates with CD-ROM applications and with device driver software. The device driver software in turn communicates with the physical interface card which controls signals sent to and from the CD-ROM drive. When the microcomputer is booted, the MSCDEX /D: switch in the AUTOEXEC.BAT file identifies and points to the device driver. Therefore, the HITACHIB.SYS device driver and the MSCDEX software were installed only on the server because the interface card and CD-ROM drives were physically installed only on that microcomputer.

The network was intended to be a CD-ROM disk-sharing system, rather than an application server in part because CD-ROM search software is not written in network versions which easily allow multiple use of one copy of the program. Therefore, the search software for each product was loaded on each workstation. All the search software functioned correctly from the workstation with the device driver and MSCDEX software and the actual interface card, but wouldn't work from the other workstation node.

The MSCDEX were not loaded on the other workstation because there was no physical connection to the CD-ROM drives. Unfortunately, the database search applications were configured to expect to find the MSCDEX and driver software loaded on each workstation. When attempting to search a Wilson Company product from the workstation which was not the CD-ROM drive server, the Wilson search software would return either the standard Wilson error "Serious Error 901" or a mysterious message which said "Error with Disk (A) Hit any key to continue." However, the software worked perfectly from the server workstation.

An online plea for help sent out to Artisoft and CD-ROM network users identified among the PACS-L contributors yielded the solution within a week. The Library Systems Programmer at Virginia Polytechnic Institute and State University revealed that the Wilson software should be configured for a DOS drive not any particular model of CD-ROM drive. The server had already loaded the MSCDEX
IMPLEMENTING A LANTASTIC CD-ROM NETWORK

settings and LANTastic NOS had defined the CD-ROM drives as DOS-type network resources. Therefore, the application software for the other workstation should not be configured for CD-ROM drives.

The Wilson application software is installed or modified via a menu-driven Install program. The Install program prompts for information on the hard drive and boot drive, the location of the Wilson software and the CD-ROM model and number of drives. In order for the Wilson search software to function, the workstation(s) which did not have a physical connection to the CD-ROM drives were configured for a CD-ROM model of "Magnetic drive" rather than "High Sierra Drive/Microsoft Extentions" [sic]. Success at last! Patrons could then search any of the four Wilson CD-ROM disks from either of the workstations.

A similar problem was encountered when a fifth chained drive containing the OCLC Music Library database was added. When trying to search the Music Library CD from any workstation other than the server, the error message "Problem 1720, Software was unable to access Compact Disc Drive—Program requires MS-DOS CD-ROM Extensions" would display. The installation program for this product did not include an option to define a CD-ROM drive type. After several calls to OCLC the solution was obtained. The configuration file updated by the software installation process (MUSICALDB) had to be edited at the DOS level so the software would work correctly on the workstation(s) which did not have a physical connection to the CD-ROM drives. The parameter in the MUSICALDB file which contained the default information "location: cd_rom" had to be changed to "location: local".

Costs

The proposed budget for the original configuration of the LANTastic network made use of the existing equipment: one PS/2 model 50z and ThinkJet printer with a single Hitachi 1503S drive and interface card. The proposal called for obtaining an additional microcomputer and printer, three more CD-ROM drives, two Ethernet interface cards and the LANTastic software for $6,081. Actual costs were within $50.00 of the proposed budget.

Ongoing costs for the original installation are negligible. However, it seems that no matter what size the network is it is never big enough. Fortunately, the University of Hawaii Computing Center (UHCC), whose mission is to support student/faculty access to computing resources, has become a strong supporter of public-access microcomputers in the library.

The Reference department wanted to make more databases available on the LAN, therefore the original four Hitachi 1503S CD-ROM drives were replaced in mid-June 1990 by five faster Hitachi TCDR 6000 drives. The 1503S's were recycled and chained to existing installed drives on single-user workstations in other library departments. In addition to expanding the number of drives, another network workstation was added. The purchase of the new CD-ROM drives and the workstation and printer were made by the UHCC on behalf of the library.
Each of the workstations has its own printer. The patrons love the print capability but many seem to use it to excess. The problem of coping with the increasing cost of providing print capability is the only major ongoing cost. The library uses the Hewlett-Packard plain paper ink cartridge so that the lowest price continuous feed paper may be used in the printers, but each ink cartridge costs nearly $12.00 and each printer uses two or more cartridges per month.

**Network Use**

Both of the library CD-ROM networks are used extensively by students. The Hamilton Library MultiPlatter LAN is used by researchers and faculty to a greater extent than the LANtastic network in Sinclair because of the types of databases available. The databases currently available on the LANtastic network are: Readers' Guide Abstracts, Art Index, Biography Index, and Book Review Index, all produced by the H.W. Wilson Company, and Music Library, produced by OCLC. Users generally print out their search results, but may also download to diskettes.

Patrons unfamiliar with the downloading function seem to be confused about what is happening when they choose that option and therefore a dozen or so files per week are saved on the hard disk of each workstation.

Regular preventative maintenance on these machines includes the deletion of extraneous files, searches for lost clusters, and optimization of the hard disk. This is done by the Library Systems Office using Norton Utilities such as Disk Doctor and Speed Disk.

Another aspect of usage is one common to nearly all public-use microcomputer and CD-ROM situations. Patrons tend to reboot or turn the micros off whenever they have problems or are finished with the machine. These abrupt terminations cause the hard disk to clutter up with potentially damaging lost clusters and can cause damage to the equipment over time. To circumvent this the Library installed locks over the power switches. A key is now necessary to turn the workstations off and on.

**RAM-Cram**

LANtastic has been touted as requiring the lowest RAM to run a network. However, a number of library CD-ROM products are notorious for requiring rather large amounts of RAM. Wilson CD-ROM search software, at least through version 2.21, are among the most RAM-intensive programs. In addition to the RAM requirements for the network software, the MSCDEX require 8k of RAM for each CD-ROM drive. When the number of CD-ROM drives were increased, these competing RAM requirements clashed.

Eight Hitachi TCDR 6000 drives may be chained on a standard interface card, however, an MCA interface card for this model drive was only capable of supporting four chained units. When the library wished to expand the number of CD-ROM drives from four to six, two interface cards were required and the dreaded "RAM
cram" problem arose. The amount of RAM needed did not leave enough for all of
the search software to function.

After some study of the LANTastic manual, the network parameters were
reduced from the standard defaults to the absolute bare minimum and all other
system configuration files were reduced to the minimum. Even with the pare-down
parameters, five drives was the maximum number which could be used and still leave
enough RAM for the Wilson CD search software to run from all workstations.

With only five drives rather than six, further balancing of RAM requirements was
still needed. Music Library had files and buffers requirements that were too high in
combination with the server software requirements to leave enough RAM for the
Wilson search software to run on the server workstation. If the files and buffers were
reduced to free enough RAM for the Wilson software, the Music Library software
would not function. The server workstation could only be used to search four of the
five databases; Music Library was available only at the other workstations. Therefore,
the boot files of the server were modified to the following settings:

```
files=20
buffers=20
lastdrive=0
device=\drivers\HITACHI_BSYS /D:CD_0 /N:4 /P:300
device=\drivers\HITACHI_BSYS /D:CD_1 /N:1 /P:360
```

The files and buffers statement were set to the minimum that would allow the
software to function. The lastdrive was set to only one drive beyond the letter of the
last defined CD-ROM drive (P). An additional device driver statement was required
for the second interface card for the fifth CD-ROM drive and the addresses of the
controller cards were supplied via the /P switch.

```
Server AUTOEXEC.BAT
cls
echo off
prompt $p$g
path c:\c:\drivers;c:\lantast;c:\util;
wd8003
aioanzs
redir server1 buffers=1 size=512 logins=1
mscdex.exe /D:CD_0 /D:CD_1 /M:8 /L:L
server
cls
menu
```

As shown in the above example, the REDIR settings for the server were set to the
minimum values of 1 buffer with a size of 512 and 1 login.

The RAM cram issue is one that would probably not become a problem when
using LANTastic for standard PC application programs. However, the addition of
multiple CD-ROM drives with the associated MSCDEX driver makes memory
management issues a serious concern. The Library plans to deal with this problem but it will involve some additional costs. Most probably a dedicated, AT-type server will be used to off-load the network and CD-ROM control programs to a workstation that is not used for database searching. Perhaps in conjunction with a memory management program, this should allow the expansion of the daisy-chained CD-ROM drives to a maximum of eight. This expansion will cost approximately $3,000. The UHCC or a special grant may be used to acquire this additional functionality within the next six months.

Evaluation of the System

The LANtastic system has lived up to its high ratings and to the library's original goals and expectations for it. Because LANtastic was installed to provide access to shared CD-ROM resources, integrating the CD-ROM equipment into the configuration has been the only factor which has required extra thought and effort. The LANtastic manual is quite good and specifically addresses configuring CD-ROM drives as part of the network setup. The glaring lack of an index is the only major fault of the documentation.

The functionality expected has been fully delivered, and the RAM limitation is a relatively easily solved problem which cannot be directly attributed to the LANtastic system but to our particular use of the network.

The MultiPlatter system in Hamilton Library is fully supported by SilverPlatter, and maintenance fees commensurate with such full support are paid. On the other hand, the LANtastic network in Sinclair Library is supported only by the Library Systems Office and any hardware warranties that may be in effect. Initial installation and configuration of the menu system and search software required quite a bit of time and effort on the part of the Microcomputer Support Librarian, and upgrades of CD-ROM search software often require further file tweaking and phone calls to the various database vendors. This type of work has a hidden cost which is difficult to quantify. However, evaluation on the basis of the initial purchase price and upgrades has proved LANtastic's claim to deliver an inexpensive high-value network system. From the Libraries' point of view it has indeed been cost-effective and there is nothing that would have been done differently.

Implementation and support of the LANtastic network for the purpose of sharing CD-ROM drives has been fairly simple and straightforward partly due to prior experience with the MultiPlatter system. However, even if a library is going to install a first network, LANtastic may be one of the easiest to work with. To install any microcomputer based network, any library will need at least one support staff person on hand with experience with DOS, microcomputers, and CD-ROM installation issues. If a minimum level of expertise is available, LANtastic represents an excellent network system suitable for many types of libraries.
List of Vendors and Products

Artisoft
Artisoft Plaza
575 E. River Road
Tucson, AZ 85704
(602) 293-6363
(602) 293-8065 (fax)

Missouri Library Network Corporation
10332 Old Olive Street Road
St. Louis, MO 63141
(800) 444-8096
(314) 567-3799
(314) 567-3798 (fax)

American Institute
55 Main Street
Madison, NJ 07940

Bibliography
About the Author

Martha Chantiny is the Small/Microcomputer Systems Support Librarian for the Sinclair Undergraduate Library at the University of Hawaii at Manoa and is responsible for all aspects of microcomputer support in the Library and serves as the automation liaison with the six Community College libraries in the University of Hawaii System.

She received her B.A. in Anthropology from the University of Hawaii at Hilo and her M.L.S. from University of Hawaii at Manoa. In her varied and itinerant professional library career over the last ten years she has been at different times cataloger, bibliographer, Science Reference Librarian, and Systems Librarian at the Manoa Graduate Library.
Library LANs

Case Studies in Practice and Application

EDITED BY MARSHALL BREEDING

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