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## Networking Your CD-ROMs: A Texas Tale

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## MARGARET SYLVIA

Installation of a CD-ROM network at St. Mary's University Academic Library has created a revolution in the way students and faculty do research.

*Margaret Sylvia is local area network systems administrator at St. Mary's University Academic Library in San Antonio, Texas.*

**T**he network gets over 1,000 uses per week during the regular semester, even in spite of the small size of the university (about 4,000 students overall, 800 graduate students, and 650 law students).

This usage only counts log-ons to a particular database; the number of searches done once a database is in use cannot be counted. The print indexes go relatively untouched, except for subjects that do not have good coverage on the network; and librarian-mediated online searching has dropped off to a trickle.

It all started when individual CD-ROM workstations were purchased several years ago to aid students in their research. The workstations immediately became popular. Indeed, during peak research times, students would often wait in line for a CD-ROM workstation rather than use the print index. We realized immediately that there were too few workstations to handle the volume of research. The institution of a doctoral program in counseling provided one of the driving forces behind the push for a CD-ROM network.

## ALTERNATIVES TO A CD-ROM LAN

Many possibilities for bringing journal indexing to students over a network were considered, such as loading journal index tapes onto computer. Unfortunately, the equipment we owned was not sufficiently powerful to handle the task.

We also considered loading the tapes on the campus mainframe, a VAX 6000 series. But purchasing a search engine to run them was out of our price range.

## DIALING-UP OFF CAMPUS

Our principal goal was to allow students at off-campus sites to dial-up the network to search the CD-ROMs. Another, to keep control of the network within the library.

There were other requirements. We needed a reliable and affordable system. It had to be easy for students to use and also offer the ability to limit the number of simultaneous users for different databases.

- We determined to find a reputable, financially sound vendor who had a good track record of installation and support.
- We needed our network to support a variety of calls to the CD.
- We wanted the network to be easy to administer.
- The most desirable network would support any sort of hardware dialing-up and not require any sort of special software loaded on the remote machine.
- Finally, we wanted to ensure that all the CD-ROM software we used would run on the network and be accessible through the gateway.

## AFFORDABILITY: THE BOTTOM LINE

The titles we had already chosen for our stand-alone workstations basically governed the choice of CDs we placed on the network. With only one exception, we retained all our subscriptions

and simply upgraded to a network version.

All monies saved were redirected to finance network subscriptions to remaining CDs and to purchase a network subscription to another, and less expensive, index. This strategy enabled us to stay within our CD-ROM budget and even to purchase needed items.

Vendor contract and pricing agreements are well established. We had to decide what we could afford. For example, The National Trade Database, from the U.S. government, has no restrictions on networking. On the other hand, PsycLIT from SilverPlatter, has tight controls and many non-negotiable options.

Another big expense involved in building a network covers the outlay for hardware. We were lucky to receive a grant for \$50,000 funded by the George W. Brackenridge Foundation in San Antonio. Additionally, we requested free maintenance from our vendors for the remainder of our fiscal year. Computer maintenance budgets are being increased for the future.

## NETWORKING HARDWARE AND SOFTWARE: THE CHOICES

Since our primary goal aimed for dial-up access to the network, we looked first for hardware and software to support this service.

Secondly, we wanted searchers to be able to use the network in pretty much the same way an in-house user would. Search software reload or keyboard remap was to be avoided.

We scrutinized Virtual Microsystems' V-server gateway that works with

the DEC Infoserver and Gandalf, which offers the Starport server running Meridian software.

Both seemed to fit well with our goals and needs, especially the goal of making the network available to off-campus users.

To help make the choice, we already dialed up systems to test functionality and installed response times. The DEC Infoserver system responded significantly faster in this test. Because their bid also came in somewhat lower in total cost, we chose Virtual Microsystems.

## TWISTED PAIRS: STAR CONFIGURATION

Since Virtual Microsystems installs only the DEC Infoserver and the V-server gateway, we used a local vendor to set up our Novell network. 10baseT unshielded twisted pair cabling and a star configuration for the network reduced both the cabling cost and the difficulty of locating and repairing network wiring problems.

Cable is very inexpensive, so even though a star configuration requires more wire, we saved money over using Ethernet cable in a bus configuration.

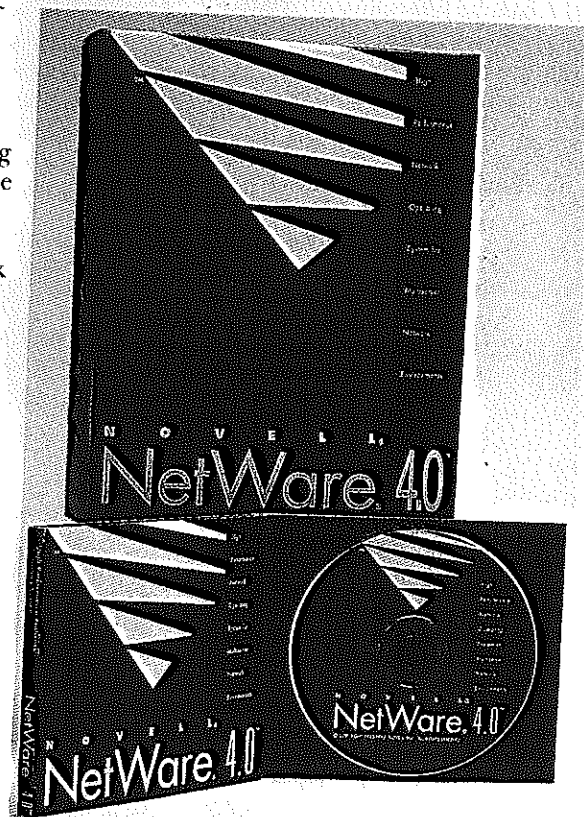
The remaining hardware included: 8-bit DEC DE101-AA network cards, monochrome monitors, and 286 clones with 20MB hard drives for the workstations. A 386 with a 105MB hard drive for the Novell file server was also purchased, although a 486 with a larger hard drive, possibly even dual hard drives to allow mirroring would have been preferred.

However, price considerations entered into the picture.

We have since upgraded the 286s to 386SXs in order to take advantage of the 386's improved memory capabilities.

## WIRING, OUTLETS, NETWORK CARDS

We installed the network between the fall and spring semesters to allow for the least disruption of student and faculty research activities. And after deciding on the placement, the type, and number of terminals and printers we could afford, we used our on-campus physical plant electricians to rewire the area and install enough outlets for all the equipment.



Novell NetWare 4.0 — Networking Software

- ABC Systems & Development, Inc.  
20 Gregg Street  
Newbury, MA 01961  
(508) 463-8002
- American Power Conversion  
170 Fairgrounds Road  
West Kingston, RI 02892  
(609) 800-3APC
- Artisoft  
801 E. River Road  
Tucson, AZ 85704  
(602) 293-4000
- Atlanta Computer  
11211 NE 36th Street  
Atlanta, GA 30306  
(404) 634-3100
- Bay & Windows Software Ltd.  
P.O. Box 4130  
Girdwood, AK 99587, Canada  
(416) 763-0822
- Bay Brothers  
360 Lake Washington Blvd. N.  
Bellevue, WA 98005  
(206) 271-9507
- Calsoft, Inc.  
1771 W. Hillstone Blvd.  
Berkeley, CA 94702-1520  
(415) 494-2334
- Cardell  
3255 State Blvd.  
Santa Clara, CA 95051  
(408) 490-0474
- EDS, Inc.  
5000 Redwood Industrial Blvd.  
Santa Ana, CA 92704  
San Jose, CA 95062  
(415) 486-1332
- Empac, Inc.  
2800 Campus Drive  
Plymouth, MA 01961  
(617) 531-0100

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# WHY NOT A CLONE CD SERVER ?

The question is an old one. Can we get the same performance and reliability from a computer system made from third party manufacturers ? YES. The answer to this question came to us in the late eighties when the PC computer business exploded with clones of the IBM PC. Since then it has become common place to purchase clone PC computer systems. Almost everyone has been involved in the purchase of a clone PC computer system for home or at work. And why not. Clone PC computer systems are a great value.

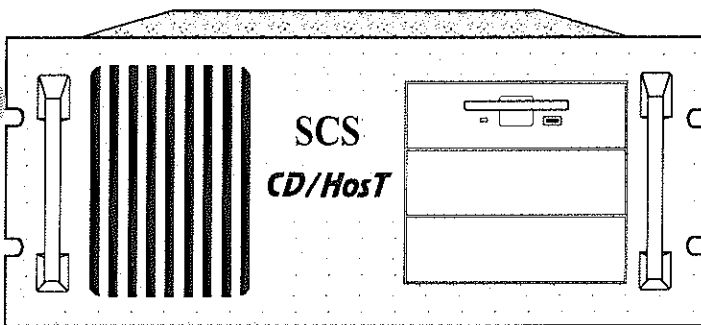
The advent of CD Servers is an excellent addition to the PC LAN. CD Servers are the easiest way to distribute the large volumes of information contained on thousands of CD ROMs. Of course, the best part is that CD Servers are based on what we are already familiar with, a standard clone of the IBM PC.

SCS has assembled a CD Server called CD/HosT™ using quality clone PC computer systems along with SCSI controllers

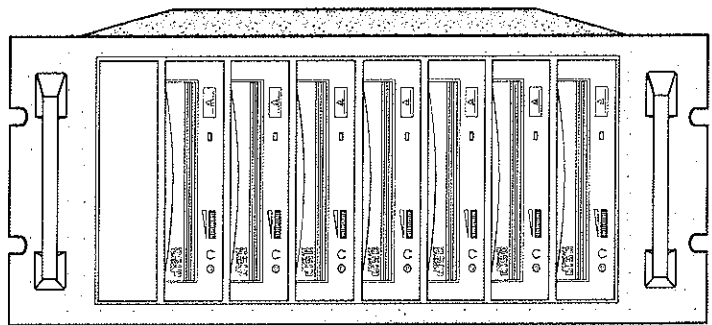
from Adaptec, the leading SCSI controller manufacturer in the industry. The CD/HosT™ CD Server is a perfect clone of the Meridian Data CD Net™ CD Server. The CD/HosT™ CD Server also employs the Meridian Data CD Net™ Software in order to get the best performance available. Our CD/HosT™ CD Server appears on your network exactly like the CD Net™ CD Server would and it is recognized by other CD Net™ CD Servers that may already be in use. There is absolutely no difference in performance or reliability between the CD/HosT™ CD Server and the Meridian Data CD Net™ CD Server.

The only difference between the CD/HosT™ CD Server and the Meridian Data CD Net™ CD Server is price. We ask you to compare our CD/HosT™ CD Server to the Meridian Data CD Net™ CD Server, or to any other CD Server that you may be considering, before you make your decision to purchase and see what an outstanding value the CD/HosT™ CD Server really is.

CD/HosT CD Server



CD/HosT CD Sub-System



## CD/HosT™ 333

Incl: 80386DX-33MHz ISA CD Server  
16 MB Ram  
16 Bit SCSI CD Controller & Cable  
CD Sub-System  
7 SCSI CD Drives  
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Logcraft LanCD™ Software  
IPX and NetBIOS Support  
Expandable to 14 SCSI CD Drives

**\$ 8,995.00**

## CD/HosT™ 466

Incl: 80486DX-66MHz EISA CD Server  
16 MB Ram  
32 Bit SCSI CD Controller & Cable  
CD Sub-System  
7 SCSI CD Drives  
Meridian CD Net™ Software *or*  
Logcraft LanCD™ Software  
IPX and NetBIOS Support  
Expandable to 28 SCSI CD Drives

**\$ 10,495.00**

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Fax 916-784-1538  
scs@netcom.com

Computer Software Systems, Inc.  
 1000 University Blvd.  
 Cambridge, MA 02142  
 (617) 452-2200

Compu-DEC  
 4056 Lakeville Drive, Suite 100  
 North Attle, MA 01907  
 (508) 851-7272

ComatLinc Management Corp.  
 370 N. Orchard Blvd., Ste. B-105  
 Toronto, CA 90303  
 (416) 212-5465

Curry Corp.  
 2400 Lockwood Way  
 Carson City, NV 89706  
 (702) 863-7011

Deeper Corp.  
 1347 Ridder Park Drive  
 San Diego, CA 92131  
 (619) 443-2527

DCA  
 1080 Alderman Drive  
 Atlanta, GA 30202  
 (404) 442-0000

Edmark Computer Co.  
 3550 S. 9th Blvd., Bldg. 2A  
 Santa Clara, CA 95054  
 (408) 486-1105

Emerson Computer Power  
 9630 Jeronimo Road  
 Irving, TX 75038  
 (714) 457-6600

FlexSys Corporation  
 24 Grid Road  
 Newryport, MA 01950  
 (603) 534-7750

Pallas Computer Corp.  
 1430 Lower Ferry Road  
 West Trenton, NJ 08618  
 (609) 874-1122

Five Computer Systems, Inc.  
 49 Temple Place  
 Boston, MA 02111  
 (617) 451-5400

Fuhr Software Inc.  
 222 Third Street  
 Cambridge, MA 02142  
 (617) 497-6339

Putnam Corp.  
 211 Pennington Center Hwy., Suite 910  
 Atlanta, GA 30346  
 (404) 392-7579

We hired an independent contractor to pull the 10baseT wiring for the network itself and set up the workstations with their network cards and used DEC Repeaters as hubs to bring all the 10baseT wiring together and into the file server.

A local vendor provided the Novell license and the file server. Finally, the day came when Virtual Microsystems arrived to install the DEC Infoservert with its CD-ROM drives and the V-server gateway.

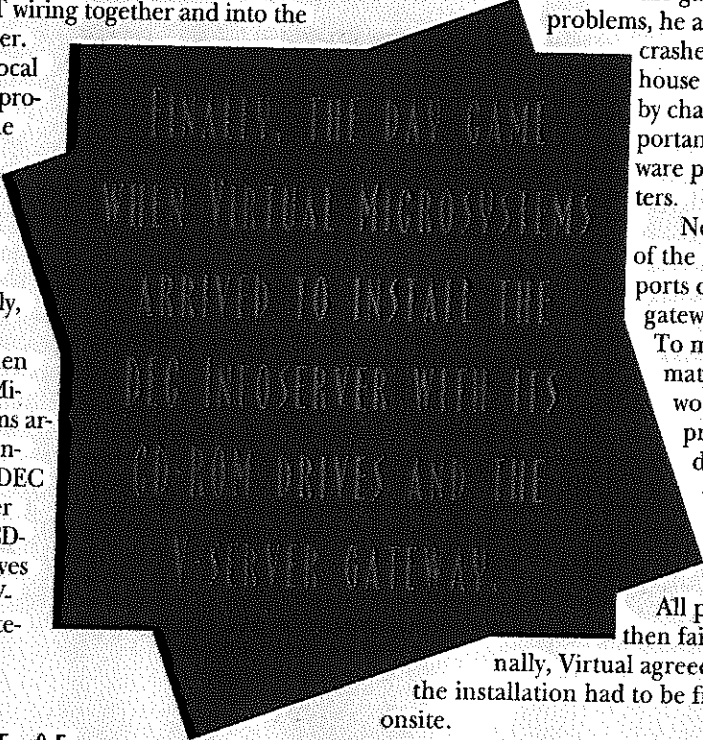
stallation be finished via a dial-up session.

This proved a real problem. The first technician to dial up didn't just fail to fix the gateway problems, he also

crashed the in-house network by changing important software parameters.

Next, one of the dial-up ports on the gateway failed. To make matters worse, the problem developed on the first in-line.

All ports then failed. Finally, Virtual agreed that the installation had to be finished onsite.



## A CASE OF MURPHY'S LAW

The installation had its ups and downs. The original wiring contractor did not get all the 10baseT wiring installed in time and never got the Ethernet cable pulled to the computer center which was to serve the gateway. We discovered that we did not have the right network card for the Novell file server.

When the Ethernet line run had been run to connect the gateway to the campus network, the next step was the gateway itself. It was the most harrowing experience of all.

Even though a technician from Virtual Microsystems returned to the campus, he could not get all our databases to work through the gateway. He proposed that the remainder of the in-

## DISKQUOTA EXCEEDED

The next trip to the campus by a Virtual technician had favorable results. There was still a problem with the SilverPlatter software writing temporary files to the virtual disk as searching progressed.

This caused the user to get a "diskquota exceeded" message and to get kicked off the system. Even giving users a fairly large diskquota did not solve the problem.

Apparently, our Virtual disks were not expanding properly. A Virtual technician solved the problem by enlarging our Virtual disks manually. This incompatibility problem has been resolved with the latest release of Pro-Quest 4.0.

## KERMIT TO THE RESCUE

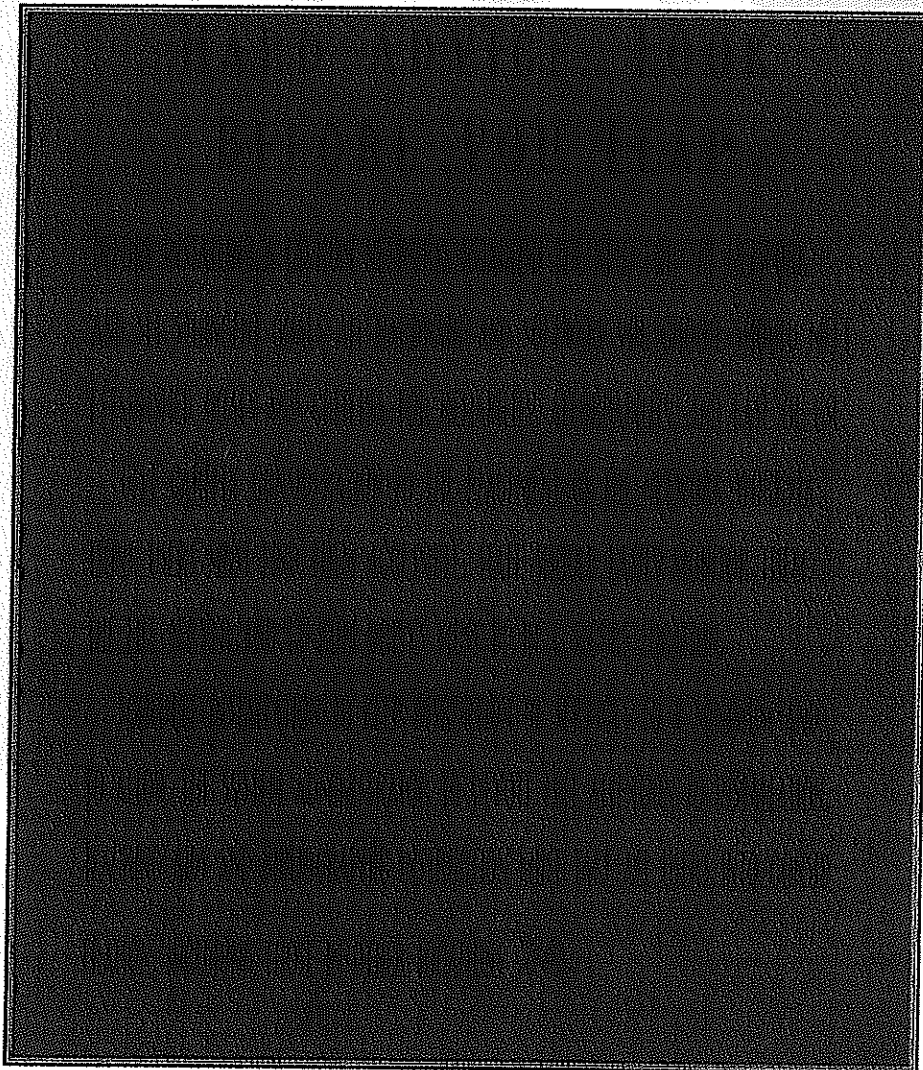
Finally, since Procomm — the campus standard telecommunications software — does not have a true VT terminal emulation, function keys fail to perform correctly on the gateway.

We solved this problem with a specially tailored Kermit program. Since it is in the public domain, we can distribute it to users for gateway access.

## GUIDING THE USER THROUGH THE NETWORK

Because we were concerned that off-campus users on the network would have no training to begin searching, we arranged to make as much of our training material available online.

A number of existing short guides to our databases only needed minor updating to handle variations. We produced others that had never been available before.



- Bay Networks, Inc.  
10000 Wilshire Blvd.  
Suite 1000  
Beverly Hills, CA 90212  
(310) 276-1000
- Bay Systems, Inc.  
2941 Balboa Road  
San Diego, CA 92123  
(619) 294-1000
- InterPower, Inc.  
10 A Thomas Street  
Irvine, CA 92714-2702  
(714) 537-0155
- Invisible Software, Inc.  
1215 N. Hwy. 427, Suite 105  
Lanham, PA 22066  
(800) 822-9962
- Kronos Systems, Inc.  
375 E. Elliot Road, Suite 10  
Chandler, AZ 85225-1120  
(602) 501-8000
- Longfin Microsystems, Inc.  
10000 Chamber Blvd.  
San Jose, CA 95129  
(415) 803-8888
- Maxpeed Corp.  
1420 Chess Drive  
Foster City, CA 94024  
(415) 345-8247
- Microsoft, Inc.  
3511 E. Shea Blvd.  
Phoenix, AZ 85029  
(602) 871-4104
- Worton Management, Inc.  
12074 Teck Road  
Silver Spring, MD 20904  
(301) 627-5600
- Network Interface Corp.  
15019 W. Park Street  
Leuca, CA 92274  
(619) 894-0277
- Network Security Systems, Inc.  
2101 Wexler Street  
San Diego, CA 92121  
(619) 587-9550
- Novell, Inc.  
122 E. 1700 Street  
Provo, UT 84606  
(800) 453-1917

For in-house use, we placed copies of all guides in clear plastic pocket pages and made duplicate notebooks of these for placement next to each workstation inside the library. In addition, we made all guides available on-line on the network for use by those patrons who would dial up from remote locations.

The Direct Access Network menuing software also has an option for on-line help for each menu item. We also devised context-sensitive help screens for each database.

Finally, we received interactive tutorials from UMI and SilverPlatter, which we loaded on the network. Some of these training aids and guides have received fairly heavy use. In the future, we plan to take a look at some of the more effective and useful ways of training users to search on the network.

## DIALING IN FROM AFAR

Our campus-wide network makes remote use of the network possible. As we had planned, Procomm users must obtain a customized copy of Kermit from the library in order to use the network properly on a PC from a remote location. They dial up the campus network, log on normally, activate the customized Kermit program, and proceed to a menu that lists the CD-ROM network as one of the options.

From this point, remote network use becomes identical to network use in the library, except that downloaded

searches go in the user's VAX account instead of on their local hard disk. Users can log sessions to their local hard disks with Kermit or print searches if they have a printer attached to their workstation.

## USAGE AND IMPACT

Usage patterns for the network reflects similar usage on the stand-alone workstations. Our general database (Periodical Abstracts) is by far the most heavily used, followed by PsycLIT and ABI/Inform and then the National Trade Databank, ERIC, Marcive Government Documents Catalog, and BIP+.

Mediated online searching has fallen off dramatically since installation of the network; paper indexes related to these items get much less use now.

Interlibrary loan use has risen somewhat. But we attribute part of this to a large influx of Ph.D. students rather than simply to the installation of the CD-ROM network. Reference work is changing, and now consists largely of teaching users about the contents and use of databases on the network.

The gateway has had a greater impact on the computer center than we anticipated. Before it was installed, fewer students showed interest in having a computer account and in dialing up the campus network. The computer center plans to expand the main campus VAX and to generate student computer accounts automatically upon registration.