

## **SOME THOUGHTS ON SELECTING LAN BASED CD-ROM SHARING DEVICES**

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**ABSTRACT:** More and more information is available only on CD-ROM, and this has been a mixed blessing. While the CD-ROMs take less space than the books and journals they displace, we are left the question of how to make the disks available to library patrons. Some systems work better in some environments than others. Some systems will succumb to built-in obsolescence. How should you prepare for shared online CD-ROM access? What works, what will keep working, what will have the lowest implementation and maintenance costs? Should we purchase a system or build one ourselves?

### **Introduction**

Whether we like it or not, more and more of our information resources are being delivered on disks. Some material isn't available in any other form – large databases and multi-media learning tools come to mind. Even with materials that are available in print, CDs are sometimes cheaper.

When I worked for a medical research company, we found the PDR was cheaper on-line than in print. That is, if we shared the PDR over a network. Really, the network approach has many advantages – clients can't lose what they can't touch. Clients can't deface – or steal - what they can't touch either. It's easy to make sure all your clients are looking at the latest version of important resources. Still, some materials are also available on the internet at competitive prices - and someone else has most of the hassles in maintaining the availability of the material.

However, moving to on-line CD-ROM sharing can be scary. Luckily, the hardware and software tools have been improving for a number of years. Even better, the prices have been dropping to the point that if you have the computers needed to access the on-line CD-ROMs, the cost of sharing them may not be prohibitive.

### **Some considerations....**

Before we start looking at possible solutions, we need to look at our environment, our needs, our hopes, and our expectations. If we don't have a handle on where we are and where we are going, we're primed to spend a lot of money and wind up disappointed.

The first consideration is the operating system environment – what client operating systems and network operating systems you are using. Some of the more common client operating system environments include Apple Macintosh, IBM OS/2, Microsoft DOS, Microsoft Windows 95/98/NT, and various Unix flavors. Network operating system environments include Apple networking, IBM OS/2 networking, Microsoft Windows Networking, Novell NetWare networking, and various flavors of Unix. Some of these platforms are more widely supported than others.

Each of these platforms has its own needs and requirements. Check vendor literature to see what products are compatible with your environment, and then look for on-line and professional organization feedback on your products. The easiest way to be compatible with the operating systems is to use them to share CD-ROMs. Both Apple and Windows 95/95/NT clients have provisions to share CD-ROMs among one themselves, but this usually means much management hassles if you distribute the CDs too far and wide. Worse, you've made the disks physically accessible to the clients.

Most of the network operating systems can share CD-ROMs with any of their clients. However, again, once you get past seven or so CD-ROMs on-line, management and performance issues can cause problems.

The next big consideration is the number of users you'll need to support. That's simultaneous users, not total users. The number of users and their usage patterns can give you an idea of how much performance you'll need to make everyone happy.

Closely related to this is the network topology you'll be using. If most of your users are connecting via modem, pretty much anything will do – their bottleneck is their modem, not your server. However, for local users regular Ethernet may be inadequate. I've seen several multi-media applications that let a single PC saturate a regular Ethernet-based network. Fast Ethernet is a reasonably priced upgrade for many systems, although in most cases it's only around 3x faster than a well-tuned Ethernet network. Further performance improvements can be obtained by using switches to provide virtual private connections between the clients and the servers. Again, caution is suggested – in single server applications, switches don't help much, and some switches are lots better than others. Token Ring networks can also benefit from switches. I suggest against FDDI or ATM to the desktop due to the per-node costs, but Gigabit Ethernet is coming and could help move the bottlenecks further from the users.

The number of disks you want to have on-line is another major consideration. Using your existing server is fine for up to around 7 disks, small dedicated servers can get up to 50 or so, and then you will need more sophisticated products.

As the number of disks on-line goes up, it's good to remember what a businessman friend calls the 80/20 rule – about 80% of a companies business comes from about 20% of its customers. Sometimes it's the 90/10 rule. In libraries, some books get checked out more often than others. And that brings us to changers. Some people hate CD changers.

They're slow. They're mechanical and failure prone. They're expensive. However, if you know which disks are infrequently accessed you can migrate them to changers, so the speed issue isn't that important. Moreover, many commercial servers will cache the disks, so the speed can be better than that of an actual CD-ROM drive. While they are more likely to break than any individual CD-ROM drive, they're not as likely to break as a farm of drives. Further, most jukeboxes have multiple drives inside them and can work around dead drives. In the end, jukeboxes and changers aren't as expensive as a similar number of dedicated CD-ROM drives. So, if you have many CDs to share, take a good look at changers. If you are considering changers, look at the management software offered by the vendor. Good management software will let you observe CD usage patterns, which will give you the information you need to migrate CDs to and from changers.

The changer discussion usually ignores the observation that the speed of the drive is usually not a real bottleneck. Many multi-media applications ran quite nicely with a dedicated 4x CD-ROM drive. However, the same multi-media applications don't always run well using a networked 24 or 32x drive. It's hard to believe that the drive is the bottleneck when the slower drive was adequate and the faster one was not. Put another way, don't spend too much time or money worrying about the speed of networked drives.

Another item is the types of CDs you need to make available. There are a number of different CD-ROM formats in use. Check the format of the CDs you are using – the vendor can help you if the product documentation doesn't have this information - and then check with your CD-ROM server vendor. Also, DVD is coming. That's great as it offers much greater storage, and a number of CD vendors want to switch as soon as possible. When the full DVD implementation is in place, they will hold as much as 15 times as much as today's CD-ROMs. However, not all CD-ROM server products are created equal here. You might save a lot of money today only to find that you can't upgrade your CD-ROM server to handle DVD CD-ROMs, forcing you into an expensive equipment replacement. Ask before you buy.

When you can grant access to software or data from a network, more items are raised. Was that disk supposed to be networked? And if so, how can you guarantee that you don't have more users than you are licensed for? This is the start of management software. Another key issue for management software is checking how often each disk is used, so infrequently accessed disks can be moved to changers.

How many disks are you going to share? All servers are limited as to how many disks they can share. If the number is large, then the importance of management software increases.

As the number of disks increases, changers look more and more attractive. A changer can make 5 or 6 disks available in the same amount of server drive bay space as a single disk. A changer is cheaper than the equivalent number of single disk players. In the case of

larger libraries, changers or jukeboxes with 100, 200, or more disks are available, along with the software needed to manage them.

### **Some Mundane Concerns....**

Everything that is made will become unmade. However you obtain services, your server will break and need to be repaired. Maintenance should be a major consideration in your purchase decision.

Who will maintain the equipment? In-house might make sense if the servers were built in house. But that puts you at the mercy of turnover and other sad problems. And in any case, what else could your staff be doing for you? Is building and repairing servers the best use for their skills?

If you can out-source maintenance, make sure your vendor is trustworthy. Is the vendor close enough to be able to help you? Are the staff trained and certified?

The final question is budget – what can you afford?

### **Product specific considerations...**

Do it yourself, version one - just copy the CDs to a server and run them from the image on the server. This is cheap, if you have the disk space. However, this may violate your license agreement with some vendors. Another caveat - some CDs won't share well this way, although flagging files as read-only and creating mappings, or shares, to the root of the CD-ROM image, can often help.

Do it yourself, version 2 - buy a tower full of drives and a SCSI card and add it to your existing network server. This is still pretty cheap, and has the advantage that you aren't leaving your network operating system. However, this can cause performance problems as the load increases.

Do it yourself, version 3 - buy a tower full of drives and add an AXIS controller. Good performance, cheap, not a bad solution for smaller shops.

Cheap servers – these tend to be based on the Axis controller, and are largely a way to avoid assembling them in-house. For what they are, they are fine. They offer good performance, they support NT, NetWare, NFS, and web access. However, they have no real management software and the last time I checked, they were limited to 10baseT Ethernet.

Low-end servers – the answer to the Axis server from a number of companies – Meridian, Ornetix, ProCom, MicroTest, SCSI-Express, and SCI-Net all have low end products that are quite good and quite affordable. Often the management software is limited, but for a smaller number of disks, that's OK.

High-end solutions. The sky's the limit! Meridian, ProCom, MicroTest, SCSI-Express, and SCI-Net all have large systems that can support hundreds or even thousands of CD-ROMs, offering broad platform support, high speed, and excellent management tools. Bring lots of money!

**Some resources.**

- A. Mailing list – CDROMLAN – dedicated to sharing CD-ROMs on LANs. Good information, and an excellent FAQ. Send a message to [listserv@listserv.idbsu.edu](mailto:listserv@listserv.idbsu.edu) With the command “subscribe cdromlan” in the body of the message.
- B. FAQs and other WEB documents. The CDROMLAN has a somewhat dated FAQ that is still good.  
<http://local.uaa.alaska.edu/~angjg/faq/faq00.html>
- C. InfoWorld magazine's home page offers all my reviews of competing products – look at <http://www.infoworld.com> Select “search” and then look for “cdrom server”.
- D. “Sharing from scratch: How to network CD-ROMs” by David Doering, in “The Magazine for Electronic Media Productions and Users”, volume 11, Issue 8, pages 32-41. An excellent article that covers much of the territory we covered here.

### **A side note – Clients and Y2K**

In the discussion in Reykjavik, I mentioned that there would be problems with some clients. I commented that DOS and Windows 3.X machines would be going away in the year 2000. This was received with some surprise, and I was asked about this several times in the next few days.

Of course, if your software does not use date information, Y2K won't be a problem. However, date information pops up in some unlikely places – such as contract expiration information for software. If you have software that is timed, it could stop working if the operating system feeds it the wrong date. You'll need to make your own determination as to the seriousness of Y2K problems in your environment.

Most vendors have their own Y2K information centers on the Internet. Check with them for information.

DOS is a rather vague term, as there have been many versions from a number of vendors, including Microsoft, IBM, Digital Research, Novell, and Caldera. A check at the Microsoft Y2K home page reveals that versions 5.0a through 6.22 are listed as being “compliant with minor issues”. IBM's home page is touting a Y2K compliant DOS. Digital Research's DOS was sold to Novell, and then to Caldera. Caldera is also touting a Y2K compliant DOS on their home page.

Several industry reports indicate that Windows 3.X has Y2K problems, and that Microsoft has indicated they will not undertake to provide solutions to these problems. A check of the Microsoft home page indicates that Windows is “Compliant with minor issues”.

With any operating system, there are concerns that the BIOS and/or real time clock of the systems in question might not be able to handle dates past the year 2000. They could pass bad date information to the operating system, causing problems for an otherwise Y2K compliant system. Older systems are the ones most likely to be affected by BIOS and real time clock problems.

There are a number of good resources on the Internet covering this issue. The Ziff-Davis page is an excellent starting point, one that has many pointers to other resources. It also has free diagnostic software that can help you get a handle on your Y2K situation.

#### **Home page addresses:**

Microsoft - <http://www.microsoft.com/technet/topics/year2k/default.htm>

IBM - <http://www.software.ibm.com/os/dos/>

Caldera - <http://www.caldera.com/products/drDOS/index.html>

PC-Magazine's Y2K resource page - <http://www.zdnet.com/zdy2k/>