Pioneer

DRM-6NX

Piecing together
the network puzzle

Caching In On Network Attached Storage

Market Situation

In today's dynamic marketplace, it is almost impossible for companies to predict or plan further than the current year when it comes to technological infrastructure. The rate at which products, services and trends change can make it confusing for IT managers and companies when selecting the appropriate equipment at the heart of their existence. Just as the computer age has directly affected the way and rate at which we do business, it also has contributed to the drastic amount of data produced. Thus, the industry now finds itself at another vital crossroad. How can we best manage all of the data and company resources to meet our specific needs?

According to Strategic Research Corporation, storage needs are doubling each year and spending for storage systems continues to rise.[1] One of the greater concerns among companies is how to share the pool of resources both effectively and efficiently, without sacrificing performance. Today, more data is scattered among desktops, on department servers, or in notebooks out-in-the-field. It is estimated that for every gigabyte at corporate, another two gigabytes is scattered elsewhere.[2]

This demand for greater use of shared resources creates an increased need for network trafficking. This has placed system reliability in question at many companies, and has sent IT support costs spiraling. The challenge also includes adding capacity and system compatibility without having to reconfigure an entire system.

As a result, users are making more storage decisions independent of server decisions. Many are focusing more towards newer options such as Network Attached Storage (NAS). Storage networking is the architectural separation of the storage subsystem from the computer, placing storage on the network as a shared resource.

Dataquest Optical NAS Forecast

Worldwide Revenue, 1997-2003
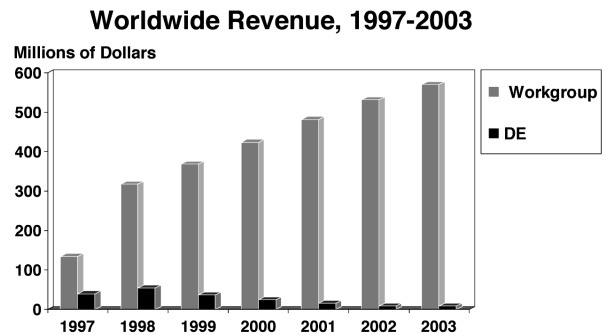
Source: GartnerGroup, 1999

Among several notable benefits, NAS can reduce overall management costs while continuing to meet needs for available data, maintaining interoperability of applications, and providing no downtime.

It is estimated that about 60 per cent of server capacity is applied towards storage versus application usage, such as tape back-up. NAS technology completely off-loads server storage altogether. In addition, a NAS solution can be added to a system and be up and running in a little as fifteen minutes, allowing users to benefit immediately.

Also, NAS technology now offers users the ability to easily localize applications, thereby customizing the use of company material for optimal use. Businesses can now easily segment or share data in smaller workgroup applications. For example, confidential or exclusive data can be segmented for Human Resource or accounting departments with protected use. Legal firms can segment use of specific case information or share legal resources across a network.

Whichever the case, network computing is forecast to rise from less than 10 million users in 1990 to over 100 million in 2000[3]. In direct response, it is no wonder NAS technology is becoming one of the fastest emerging storage opportunities in terms of market size and growth potential.

[1] Strategic Research Corporation, Comparing NAS & SAN Technology, February 1999
[2,3] International Data Corporation, March 1999 Special Report, Network Attached Storage Opportunity

A Driving Force Behind NAS

CD-ROM storage continues to be a popular storage medium due to its low cost per megabyte and its acceptance as a reliable distribution format. Until recently, most CD-ROM networks relied on centralized server architectures. Three essential ways include accessing CD-ROM drives from another workstation, connecting multiple CD-ROM drives to a file server, or designating a PC as the CD-ROM server. As networks and their number of users grow, these architectures become much more impractical. The cost of growing this "infrastructure" increases with the need for additional hardware and software. In addition to complex management, this type of growth also places unnecessary burden on the supporting system. There may also be incompatible platforms and operating systems, which can further limit data usage. (Diagram A)
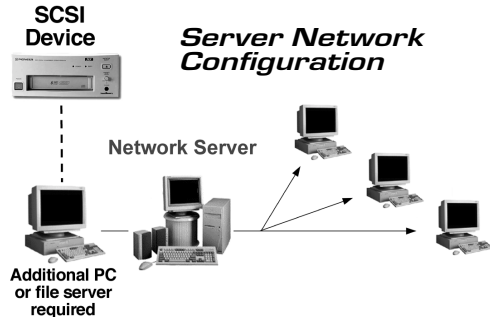

SCSI Device

Server Network Configuration

Network Server

Additional PC or file server required

Diagram A

Through NAS technology, data can be attached to a network in a less demanding, simple architecture. NAS devices are data-storage thin servers with their own processors and customized operating system that plug directly into a local area network. Their all-encompassing units simplify the addition of storage and offer optimized use of data across all platforms and operating systems. Since they are independent of core hardware, expanded CD-ROM storage can be made at a fraction of the cost of traditional systems, streamlining the shared use of data and eliminating down time. (Diagram B)
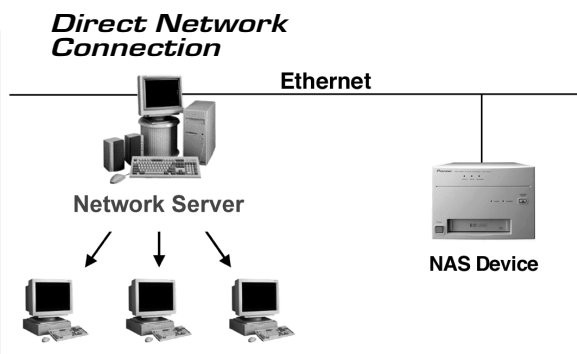

Direct Network Connection

Ethernet

Network Server

NAS Device

Diagram B

The Network Challenges

So how can CD-ROM and NAS technology jointly address the growing concerns of IT professionals and companies today? The answer lies in an understanding of the obstacles facing these professionals in the following key areas:

- **Cost**
How can I minimize costs as related to initial investment, expanding storage, manageability and time-savings?

- **Performance:**
How can I ensure that all of our users have the quickest access to the most important data needed? How can I minimize down time or other system failures and adverse effects to our users? Can it minimize conflict between platforms and operating systems?

- **Storage capacity:**
How can I increase storage capacity without having to reinvest in costly new hardware and software? How can we continue to add storage capacity at a minimal cost? Can we grow and expand the system easily, without time-consuming administration?

- **Space:**
How can I provide expanded storage and availability of data while keeping the need for equipment space flexible and at a minimum?

- **Efficiency:**
Is there a storage solution that can streamline the way we do business and contribute to increased profitability?

- **Manageability:**
Can network storage be user-friendly, improve application and server availability, and be less demanding on the current system?
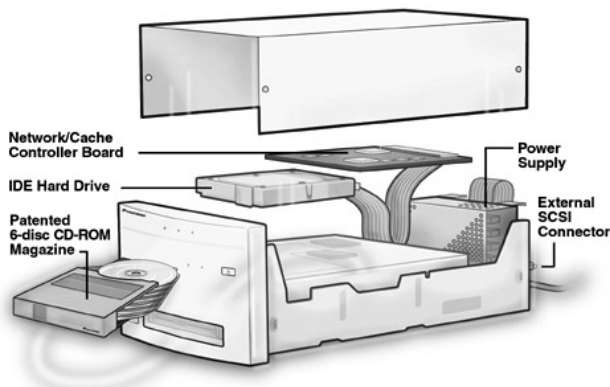
A Simple Answer
To The Complex Questions

Since 1989, Pioneer has manufactured an award-winning line of CD-ROM changer products with an installed base of over 150,000. Today, Pioneer is at the forefront of the NAS explosion with a new product that takes network caching to the next level. It is the DRM-6NX.

The Pioneer DRM-6NX addresses today's network demands through a variety of unique features designed to simplify the traditional use of networking CD-ROM technology.

The DRM-6NX is a network-ready, 24X CD-ROM cache changer that combines a network interface, a six-disc CD-ROM changer and hard disk drive in a single, compact device. In essence, the DRM-6NX functions as a storage server and provides the easiest and most cost-effective way for multiple users to share CD-ROM content. (Diagram C)

Diagram C

A detailed look at these features illustrates how this single product can provide simple answers to the complex questions.

• *Performance:*
The DRM-6NX offers end users four different caching options with a wide range of features which provide the most flexible and economical NAS solution. The features include directory, volume, archiving and dynamic caching.

Directory caching simply copies the table of contents, volume, directory and file information from each CD, creating a folder for each disc under the root directory. This enables users to easily scan and search data on a network instantaneously. Directory

caching on the DRM-6NX is automatic and is the first thing that occurs when a magazine is inserted into the changer. (Diagram D)
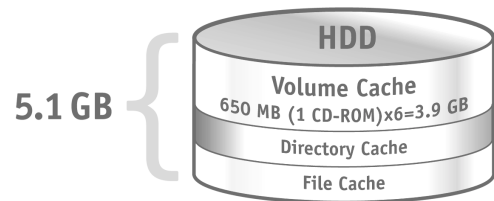

Diagram D

Volume caching involves copying the entire contents of each CD to the hard disk drive of the DRM-6NX, ensuring the fastest possible access and performance. There are two built-in features to the volume caching of the DRM-6NX which provide enhanced capacity and performance to the network. First, the volume feature allows only the amount of data stored on a disc to be cached onto the hard disk drive. This maximizes overall storage space, allowing a higher number of CDs to be stored. Secondly, all volume copying activity is transparent to the user, meaning access to the data is still instantaneous, even before it has found its way to the hard drive.

• *Storage Capacity:*
The DRM-6NX can provide simple, expanded capacity without the cost of expensive new hardware and software. The network controller card within the unit creates a "plug and play" feature that attaches directly to the network using a 10BASE-T/100BASE-TX connector (Diagram E). There is no demand on existing network servers. The DRM-6NX can also network software to more users without the need for additional licensing per disc, providing a significant cost savings.

Diagram E
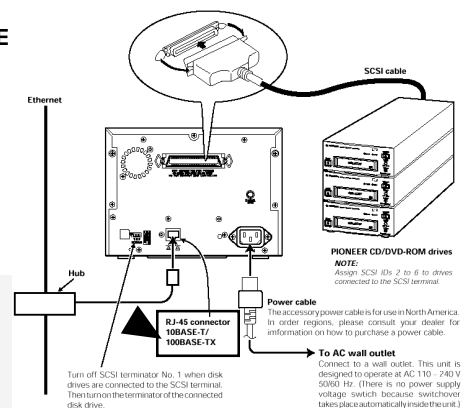
In a standard configuration, the DRM-6NX can network up to 14 CDs online; eight cached on the hard disk drive, and six near-line, using the six-disc magazine. In addition, a special archiving cache feature allows the DRM-6NX to eject magazines and continue to archive, or copy volumes, until the hard disk drive is completely full. Once the hard drive is full, additional magazines can be inserted, which then become near-line access to data via the directory cache feature.

A network can have access to as many as 30 CDs depending on the size of the hard disk drive within the DRM-6NX. However, by simply adding an external hard drive, the unit can potentially store over 100 CDs. For users of Pioneer's previous changer products, the DRM-6NX can be easily daisy-chained providing network connectivity and enhanced performance within minutes.

Another important feature of the DRM-6NX is the SCSI port. Using the SCSI port, any combination of up to five CD- or DVD-ROM drives can easily be added for increased capacity at a fraction of the cost of adding more file servers. (Diagram F).

Diagram F
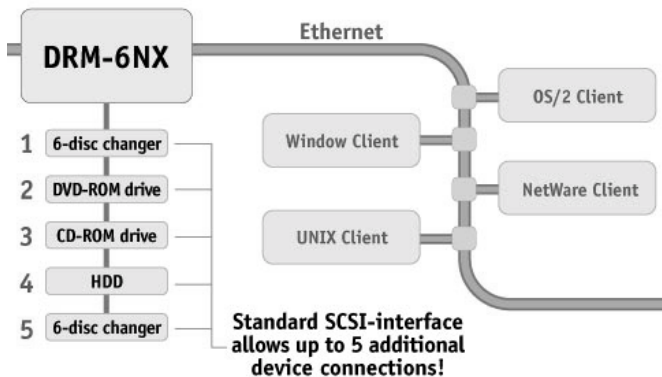
• *Efficiency:*

Combining NAS with CD-ROM caching can significantly streamline business operations and in turn increase profitability. The ability to localize data for specific uses via the network is an attractive feature to network managers. For a minimal cost, the DRM-6NX can be added to a network and be customized to provide improved workgroup applications or private access to data.

Although volume and archive caching are important features, they can actually become overkill on any

system when it comes to caching. It is not always necessary to have all data stored on the hard disk drive at all times. The dynamic caching feature of the DRM-6NX streamlines this process by freeing more hard disk space to store the most frequently used data. This feature provides more practical use of hard drive storage and makes more efficient use of data across a network.

Since there is no down time to add a DRM-6NX to a network, and because the DRM-6NX can perform all four of the caching capabilities without affects on the users, it further optimizes the use of company time and resources.

• *Space:*

The DRM-6NX is less than half the size of traditional CD-ROM towers. The smaller size is ideal when space is a premium and cost is a factor. The small footprint and "plug and play" feature allow it to be stored anywhere on the network, providing more flexibility. Users can also take advantage of the changer abilities and off-line storage via the six-disc magazine to catalog data. Storing data off-line can maximize use of storage space and minimize the cost of additional hardware.

• *Manageability:*

The DRM-6NX is a plug-and-play NAS device featuring a unique web-browser. This allows user-friendly monitoring and manageability of CD-ROM discs, CD-ROM or DVD-ROM drives, status, volume properties, server configuration, event log tracks and statistics. (Diagram G). By simplifying these tasks, the DRM-6NX can help save valuable time and money.

Diagram G
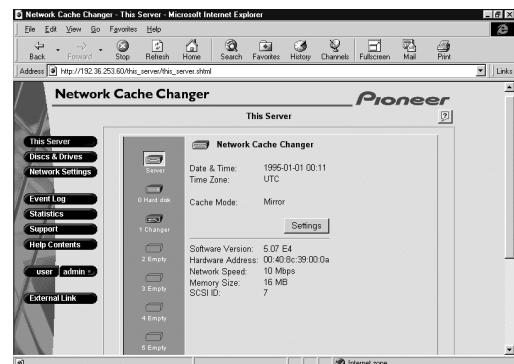
User friendly web browser simplifies manageability of the DRM-6NX on a network.

The DRM-6NX also provides multi-platform support, minimizing conflict between various operating systems and software. By choosing the Pioneer DRM-6NX, the administrator/manager is investing in a low-cost solution with one of the largest potential for growth, upgrading and flexibility. The DRM-6NX supports Novell NetWare 5.0 and earlier. In addition, the user will find the solution easy to manage, more reliable, and able to maximize performance.

Also, since the DRM-6NX is an all-encompassing, NAS unit that is as easy to manage as it is to install, it does not necessarily require the skills of an IT manager or network administrator to implement.

- *Cost Savings:*

Although the DRM-6NX and its benefits begin at the network administrator or IT manager level, there is also a direct benefit at the end-user or employee level by having instantaneous access to an expanded pool of shared resources. This affects the way a worker can complete his or her tasks, the speed at which they are accomplished, and increases overall efficiency. This can contribute to increased productivity and enhanced customer service abilities, depending on the application.

The smoother and more efficient a company or business operates, the better it increases its bottom line and profitability. The DRM-6NX offers companies the opportunity to invest in a sensible NAS solution without the added costs of traditional storage. It also streamlines time spent on management of the solution, as well as provides the path to increased company or business potential.

Target Markets & Opportunities

The NAS market offers a variety of ideal opportunities for network caching solutions such as the DRM-6NX. The range is virtually unlimited, spanning from Corporate to small business, based on individual needs.

On the small business front, the DRM-6NX may be ideal for professionals requiring constant access to vast reference materials, such as doctors, attorneys, architects and engineers. However, other startup companies, small government and home office

applications also show great potential. Network caching can provide a competitive advantage when it comes to overall efficiency and customer service.

For corporate applications, where security and data protection are particularly important, the DRM-6NX may be used as a cost-effective, simple system addition for quick and easy file or database services. Since there is no down time to add a DRM-6NX to a network, and because the DRM-6NX can perform the caching capabilities without affects on the users, it further optimizes the use of company time and resources.

These target users can span the major enterprise and mid-size companies as well as smaller, fast-track companies. Ideal markets include large government and medical applications where use of CD-ROM storage is increasing.

As the industry migrates towards the unique offerings of NAS, resellers are finding an unlimited market for network storage products such as the DRM-6NX. Whether its for a complex Fortune 500 application, or for a small work group application, being familiar with the unique benefits of NAS allows a reseller to offer a competitive solution with more flexibility and performance than ever before.

(For DRM-6NX Product Specifications see appendix.)

DRM-6NX Specifications and Standard Features

Supported Systems

Novell NetWare	NetWare 3.11, 3.12, 4.10, 4.11 and 5.0
Microsoft Windows	Windows for Workgroups, Windows95, 98, NT 3.X, 4.X
Microsoft LAN Manager	LAN Manager 1.3 and above
IBM LAN Server	LAN Server 1.3 and above
TCP/IP	Supports all UNIX dialects through NFS over UDP/IP on TCP/IP network
WWW	Internet/Internet over HTTP 1.0 and HTML 2.0 compatible browsers

Supported Protocols

Novell NetWare	NCP over IPX, RIP, SAP
Windows and OS/2	SMB over NetBIOS/NetBEUI and SMB over NetBIOS/TCP
UNIX	NFS over UDP/IP, TCP, ARP, RARP, BOOTP, DHCP, WINS/NBNS, SNMP, FTP
WWW	HTTP over TCP/IP

Network Management

SNMP MIB-II and private enterprise MIB.
Platform independent configuration and management from standard Web browser.

Supported Disc Format

Physical Format	Only 2048 Bytes/Block format is supported in this system. Physical formats to be supported are Mode 1, Mode 2 form 1, Multi-session and packet write (variable).
Logical Format	Logical format to be supported is basically ISO9660 (includes Rock ridge and Joliet extension).

Software Updates

Flash memory allows central and remote updating of the Network Cache Changer Software over the network using FTP over TCP/IP.

Performance

Data Throughput	<1,300 kbytes/s

Hardware

Internal IDE Hard Disk Drive	
Storage Capacity	5.1GB*
Average seek time	9.5 ms
Internal CD-ROM Drive	
Data transmission speed	1800-3600 kbytes/s
Average access time	75 ms

Interface

RJ-45	for 100BASE-TX and 10BASE-T
SCSI connector	for CD-ROM drives (up to 5 drives)
(SCSI-2 Support)	

Accessories

6-disc magazine (x2), Power cable (x1)
Operating Instructions (x1), Power button
cover (x1), SCSI connector cover (x1)

Other

Power Voltage	AC 110-240V, 50/60 Hz (auto select)
Power Consumption	AC 120V, 0.60A/AC 240V, 0.62A
Dimensions	212 (W) x 453.6 (D) x 153 (H)
Weight	6.3 kg (13 lb 14oz)
Operating Temperature	+5 to +35°C (+41 to +95°F)
Operating Humidity	10% - 80% (no condensation)
Storage Temperature	-20 to +60°C (-9 to +140°F)

*Hard disk drive specifications are subject to change without notice.

Pioneer