

HP Professional

JULY 1997

HP-UX

Windows NT

MPE/iX

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DATA WAREHOUSING

Full House, Data High

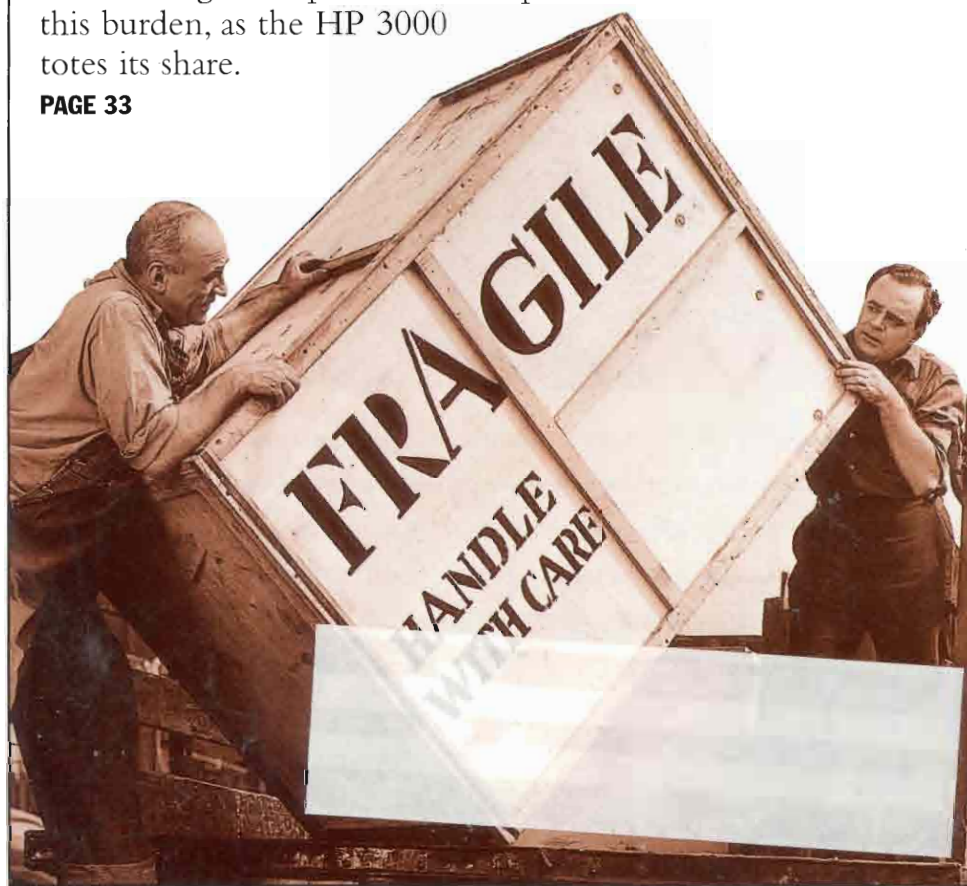
For most, "data warehousing" means back-breaking data management. Today, however, the process of storing and retrieving data has been heaved off of the mainframe and onto the desktop.

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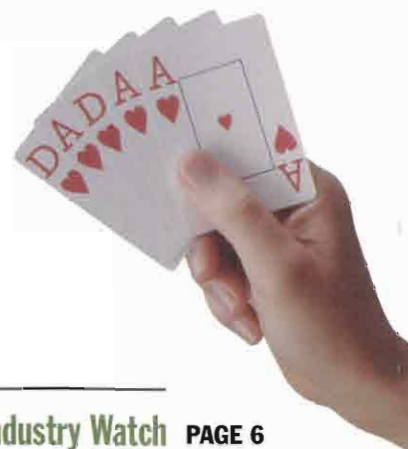
Get A Handle On Mass Storage & Memory

Gone are the days of cumbersome storage. It's "handle with care" and speedy delivery for today's information needs. Tape, data sharing and optical disks help lift this burden, as the HP 3000 totes its share.

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"IS is now in a 'win-lose' situation, and the IS manager needs help."



Martin Walsh
Executive Vice President
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HP Professional

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Cover photo: The Image Bank

FEAR OF FLYING?

Just read [Charlie Simpson's] "Eight Miles High" editorial [May 1997] in *HP Professional*.

My take on the situation is this:

If airplanes are so fragile that using a laptop or cell-phone has **any** chance of bringing a plane down or interfering with communications, something major is wrong with the airplanes! They need a re-design pronto.

If they are so fragile, maybe flying near power lines or radar beacons or lightning or microwave towers could do the same thing.

My guess is that airplanes really aren't that fragile; someone has just banned laptops and cell-phones on a whim.

Bill Dietrich
Sunnyvale, Calif.

I just finished reading [Charlie Simpson's May 1997 editorial], and thought it was great. I am a systems analyst and often bring my laptop with me when I travel. I sometimes use it to work on the plane, but mostly to pass the time and play games. But using the laptop is not worth distracting the pilot.

Robert Field
Systems Analyst
Circon Corp.

WE LAID AN EGG

In the June 1997 edition of *HP Professional*, Ivar Ruyter wrote: "By the way, what about Linux on HP PA-RISC? Do you know anything about porting efforts?"

Your response was most amusing: "From where we're sitting, Linux is not available for HP PA-RISC and is not

likely to be in our lifetime. —Editors"

I don't know where you are sitting, but your life seems to have come up very short.

www.osf.org/mall/os is the URL for the OSF's Open Group Research Institute. They have made microkernel Linux (or mkLinux) available for the HP PA-RISC. This is also available for the PowerPC and x86 architectures.

From www.osf.org/mall/os/pa-mklinux/index.html, you may download the software binaries and source code. Linux is available for PA-RISC. You also might want to reconsider wherever you are sitting.

Justin Leonard Tripp
Computer Systems Analyst
Brigham Young University

Lucky for us you're sitting on it, but that's why we publish letters. Isn't life great, readers helping readers. Thanks for the information. — Charlie Simpson, EIC

ONLINE QUERY

I read *HP Professional* and like the information on UNIX and so forth. However, my responsibility is MPE/iX. Any chance you plan to include articles on it?

Beth Harvey, Manager
Telecommunications Techniques Corp.

Although our primary coverage remains HP UNIX, PCs and their internetworkings, we certainly haven't forgotten about the HP 3000. In fact, beginning this August, we will be publishing a special HP 3000 demographic supplement, with HP 3000-specific articles and vendors. We believe you'll find it useful.—Editors

EDITOR-IN-CHIEF Charlie Simpson

simpsoncm@cardinal.com

SENIOR EDITOR George A. Thompson

thompsonga@cardinal.com

ASSOCIATE EDITOR Deborah Schwartz

schwartzdr@cardinal.com

INTERNATIONAL EDITIONS EDITOR Karine Simpson

COLUMNISTS

INTERNET Mark McFadden

NETWORK MANAGEMENT Greg Barnes

UNIX Fred Mallett

CONTRIBUTING AUTHORS Steve Berlin, Dick Davies,

Sam Diamond, James R. Dukart, William A. Dykas,

Kenneth S. Moser, Masayuki Onose

DESIGN & PRODUCTION

EXECUTIVE DESIGN DIRECTOR Leslie A. Caruso

ASSOCIATE ART DIRECTOR Kimberly Creaan

PRODUCTION MANAGER FOR HP PROFESSIONAL,
CARD DECKS, & ONLINE ADVERTISING Linda Hall

CIRCULATION

CIRCULATION DIRECTOR Carrie Eisenhandler

DIRECTOR OF FULFILLMENT Margie Pitrone

pitronemf@cardinal.com

CIRCULATION MANAGER Doreen Schrack

MARKETING

PROMOTIONS DIRECTOR Timothy M. Kraft

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SENIOR GRAPHIC DESIGNER Christine Patkowski

GRAPHIC DESIGNERS Candace Kent, Patty Wall

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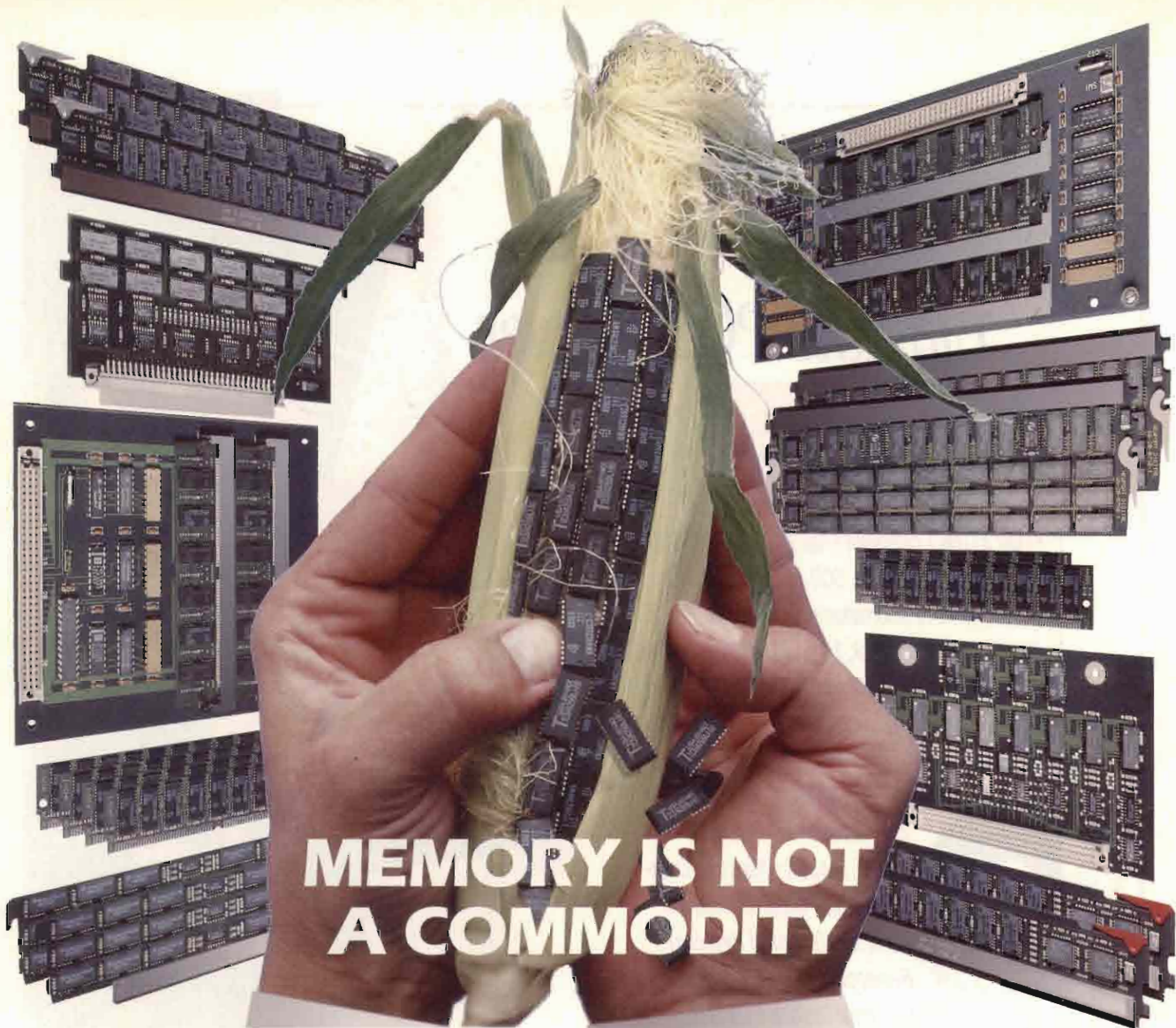
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CIRCLE 156 ON READER CARD



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CIRCLE 246 ON READER CARD

HP Way Found

In July 1993, I went in search of the elusive "HP Way" in ever-sunny Cupertino. Now, four exciting years later, I think I may have found it. Back then, I compared the computer industry to my rent-a-wreck. At that time, my car's tire was slashed because someone didn't like where I parked. The services and "outsourcings" I had to go through to get it fixed paralleled the computer industry. However, I forgot one key element — every party involved got paid in the end.

The HP Way is the way of all business — to make money. Lots of money if possible. It's just that some companies are better at it than others. Maybe that's the problem with Digital. Somewhere along the Digital Way, they forgot that in addition to having great technology, they had to make money. Microsoft, on the other hand, has never forgotten — not for a single software moment.

HP hasn't forgotten either. But HP goes about making money in a much kinder and gentler way than Microsoft. They do it by taking care of employees and by giving the customer what they want (or at least telling them what they want to hear) and by not getting emotionally attached to any technology.

I believe it was Will Rogers who said, "Even if you're on the right track, you'll get run over if you just sit there." And HP has no intention of sitting still, ergo MPE/iX, PA-RISC, HP-UX 11.0 and now Windows NT. Last time I questioned HP's Windows NT motives, we received several letters from HP-UX users saying they felt HP had sold out to Microsoft. I hit a nerve. So, we probed deeper.

In our June issue, we surveyed you to find out if you like the 1997 HP Way and it didn't take long for you to fax back your answers. Although we are still compiling, most of you are "Worried" about HP's recent NT maneuvers, viewing it as "Perplexing" at best, to "the death of UNIX" at worst. And there were still a few who weren't even aware HP had an NT strategy. For that last group, here's a quick recap: In March, HP unveiled its Colliance Program to bring a "definite, renewed emphasis on ensuring that the NT platform is adequately serviced within the client-server space."

That having been said, we also reported that Forrester Research found NT shipments were at one-third of UNIX shipments in 1996 (see "In This Corner," June 1997). But by 1998, NT should jump to half of UNIX, and by the year 2000 will double UNIX units shipped. And the Gartner Group estimated that while the NT server rate will grow 40 percent annually in the next three years, other operating systems, including UNIX, will remain flat. So somebody must be buying this NT stuff. Right?

Now think about the thousands of corporations that have invested billions over the past decade in developing "mission-critical applications" on the UNIX-based enterprise servers that currently run their businesses. Are they just going to trash everything? I doubt it.

Conventional wisdom has it that even if (or when) Windows NT rises to its height of conquest for the workgroup, UNIX will continue to dominate the high-end enterprisewide applications such as data warehousing. It would appear that *together* NT and UNIX will comprise the network OS of the not-so-distant future. Thus, the problem facing IT managers will not be deciding *which* to use, but rather how to integrate both within their enterprise.

What exactly does that mean? Where do you start? When and why should you integrate? And how do you do it? Fortunately, there is help. Today's third-party vendors offer a range of integration solutions. That's why this month in addition to our data warehousing feature and special mass storage section, we're featuring a supplement on UNIX-to-NT integration. From simple character-based access to graphical applications and code porting, the solutions are there. So, take a look and get started.



Charlie Simpson
simpsoncm@cardinal.com

INDUSTRY WATCH

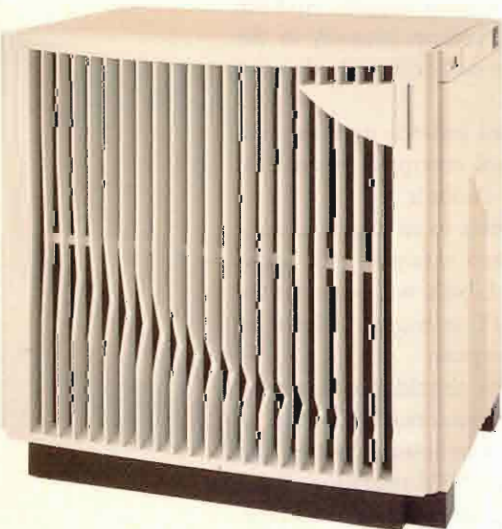
George A. Thompson

HP'S NEW CLASS ACTION

Lew Platt was there. Rick Belluzzo was there. So was Dick Watts. When the Chairman, President and CEO of HP, executive vice president and general manager of the HP's Computer Organization, and the vice president and general manager of HP's Computer Organization are all in one place answering questions from the computer press, you know something important is about to happen. So pay attention.

In New York City on May 22, with uncharacteristic panache, HP rolled out a bevy of new UNIX products. The most impressive was the HP 9000 V2200 Enterprise Server which provides up to 16-way symmetric multiprocessing (SMP), with 32-way capability planned for 1998. In addition, the V2200 Enterprise Server provides up to 24 PCI slots for broad I/O expansion. The slots are powered by up to eight 240MBps I/O buses.

Prices for the HP 9000 V2200 Enterprise Server (using one or more 200MHz HP PA-8200 CPUs) begin at \$170,000 (which includes one CPU,



V E R B E T A

“Sun Microsystems irresponsibly claims that HP is abandoning UNIX. But that’s a reflection of the small size of the company shouting [those claims] — and their myopic view of what the customer really wants. We’d be out of our ever-loving minds to walk away from UNIX.”

Lew Platt, HP chairman, president and CEO, during the V-class product announcement in NYC

256MB memory and an unlimited HP-UX license). Additional PA-8200 processors can be added for \$25,000 each.

The V-class servers can be ordered now, with early shipments expected in September and general availability expected by November 1997. You can expect board upgrades to HP's PA-8500 CPU in 1998.

According to the Aberdeen Group (Boston, Mass.), the V-class is based on supercomputing technologies that HP acquired in its purchase of Convex Computer. For example, the V-class achieves its power through HP's new HyperPlane crossbar technology — a backplane design already proven in the supercomputing circles. Operating at 120MHz over a 64-bit path yields a crossbar

port bandwidth of 960MBps in each direction.

At 15.36GBps, the V2200 Enterprise Server with HP HyperPlane provides more than seven times the speed of Digital's 8400 SMP server (rated at 2.1GBps) and 19 percent better than Sun's UE10000 (rated at 12.8GBps).

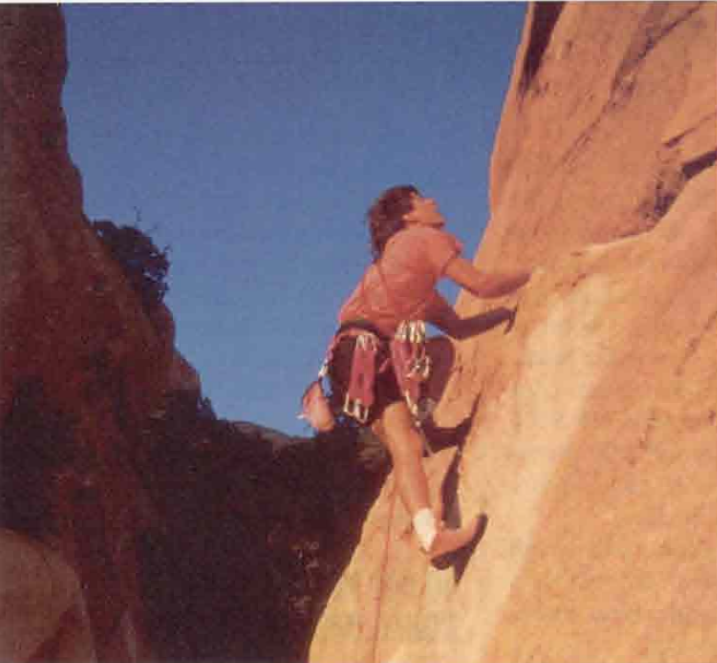
IT'S HP-UX 11.0. DO YOU KNOW WHERE YOUR APPS ARE?

Also introduced (but as yet unavailable) was HP-UX 11.00. A two-user license for the HP-UX operating environment will be bundled with HP 9000 workstations and servers, with additional license levels available. HP-UX 11.00 is expected to be available with the V2200 Enterprise Server in November.

K — ICKIN' IT UP A NOTCH

In a related announcement, HP also dropped the 200MHz PA-8200 CPUs into two new K-class systems. Models K370 and K570 use from one to six 200MHz PA-8200 CPUs. The K370 supports up to 4GB of physical memory, four HP-PB slots and three high-speed HP-HSC I/O slots. The K570 supports up to 8GB of physical memory, four HP-PB slots and nine HP-HSC slots. All systems run the HP-UX 10.20 enterprise-class operating system. All existing K-class server models are board upgradeable to the PA-8200 processor models.

The PA-8200-based K-class servers can be ordered now, with shipments expected this summer. Prices start at: \$66,900 for the Model K370 base system, which includes one 200MHz PA-8200 microprocessor, 128MB memory and a CD-ROM; and \$86,900 for the Model K570 base system, which includes one 200MHz PA-8200 microprocessor, 256MB memory and a CD-ROM.



Tough to scale

Protect your investment in tape backup equipment with the LibraryXpress system. Begin with a base module containing one or two DLT4000 or DLT7000 drives and 10 cartridges. This will provide you with a storage capacity of up to 700 gigabytes and a data rate of 72 gigabytes per hour.



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Wheatfield Way, Hinckley Fields,
Hinckley, Leicester LE10 1YG
Phone: +44 (0)1455 239000
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All others:
IEM International Sales
1629 Blue Spruce Drive
Fort Collins, CO 80524 USA
Phone: +[1] 970-221-3005
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NEW HP PARALLEL SERVERS

In addition, HP also expanded its HP 9000 Enterprise Parallel Server (EPS) with two new models — the EPS 23 and EPS 40. Based on the V2200 Enterprise Server, the EPS 23 and EPS 40 provide users with the scalability to run in massively parallel processing environments. The Model EPS 23 leverages the new K570 Enterprise Servers as SMP domains within the EPS architecture. The EPS architecture can support up to 16 SMP server nodes in a single system, allowing users to link hundreds of processors for a single enterprise application. The EPS 23 and EPS 40 servers support up to 84 and 512 CPUs, respectively.

Prices for the HP 9000 EPS 23 begin at \$124,000. Each additional six-way EPS 23 SMP node is priced at \$86,900. EPS 23 servers can be ordered starting this month, and are expected to ship in Q4. Prices for the HP 9000 EPS 40 begin at \$190,000. Each additional 16-way EPS 40 SMP node is priced at \$151,000. EPS 40 servers can be ordered starting November 1, 1997 and are expected to ship this December.

Additional PA-8200 processors can be added to any EPS 23 SMP or EPS 40 SMP node for \$25,000 each.

HOW HIGH IS UP

HP also announced the Mission-critical Server Suites for high-end computing environments, which offer a 99.95 percent annual uptime guarantee. Simply put, HP expects that customers will experience no more than 4.3 hours of downtime a year — a first in the industry. The three initial foundation configurations will encompass HP 9000 Enterprise Servers, the HP-UX operating system, inter-node connectivity and high-availability storage.

These pre-configured systems will be competitively priced and include a service and support agreement that is unmatched in the industry.

BRIDGING THE KNOWLEDGE GAP

If you happen to know 190,000 candidates with high-tech work skills, please tell the appropriate people in America's mid- and large-sized companies.

According to a report sponsored by the Information Technology Association of America (ITA) entitled *Help Wanted: The IT Workforce Gap at the Dawn of a New Century*, there is a labor shortage inside and outside of the information technology industry.

Other trends indicated by the report include:

- 82% of the respondents expect to increase the number of IT workers.
- 68% of respondents see the labor shortage as a barrier to growth.
- Universities are not doing an adequate job of graduating appropriately skilled students in sufficient numbers.

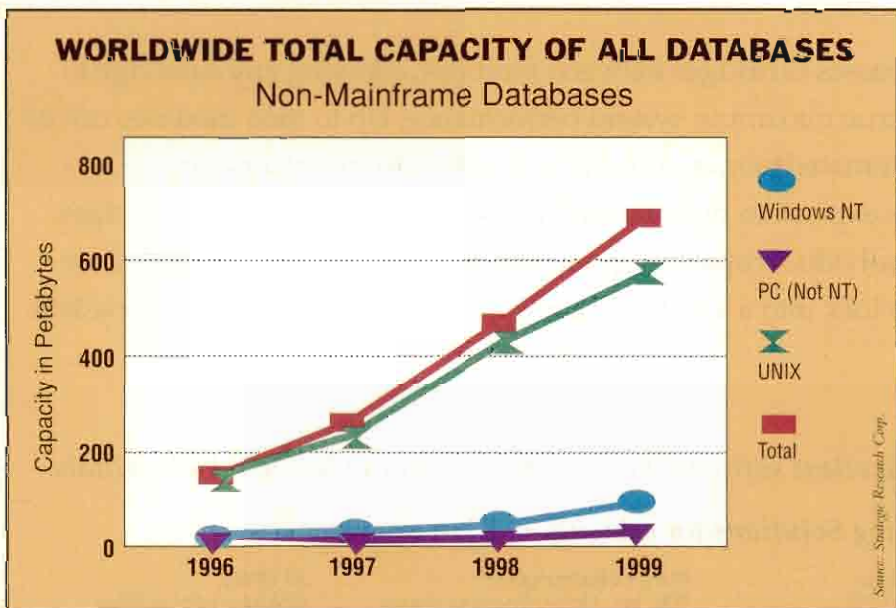
Although 190,000 jobs are estimated, it could be larger because the random survey of 20,000 respondents does not include small companies, non-profit and government agencies.

40,000 NEW WORKERS IN U.S. COULD CASH IN ON THEIR CHIPS

"All we need are people who are willing to get the training to work in our plants." With that understated hope, George Salise, president of the Semiconductor Industry Association (SIA) endorsed The National Workforce Development Campaign, to recruit and train 40,000 job applicants. He said the jobs campaign is aimed at students and workers who want a high-tech career but don't have four-year engineering degrees.

Also known by its hotline nickname, 1-888-4CHIPJOBS is spearheaded by SEMATECH and SEMI/SEMATECH (both of Austin, Texas). Under the program, SEMATECH and more than 30 community colleges are forming partnerships to develop and promote courses that lead to associates degrees in semiconductor manufacturing.

In addition, SEMATECH launched a Web site located at www.4chipjobs.com, to inform people of job opportunities and training options in the industry. Students with technical associates degrees can expect to earn \$25,000 to \$30,000 during their first year. In five years, technicians could earn \$40,000 to \$50,000 per year. SEMATECH is a nonprofit consortium of 10 chip manufacturers created by the SIA Board in 1986. SEMI/SEMATECH represents chip equipment, materials, software and service suppliers to the chip industry.

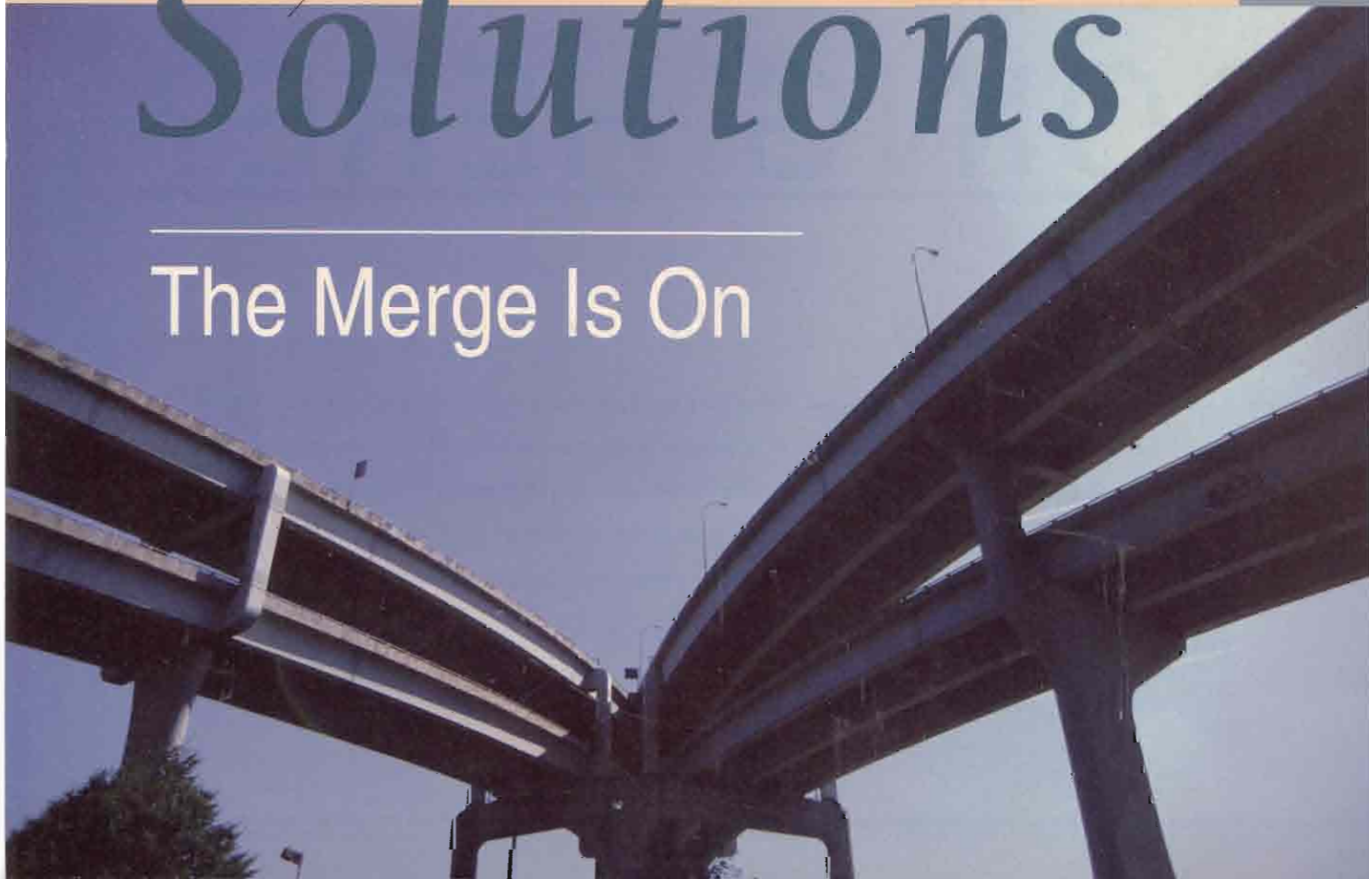


If you're starting a database on databases, UNIX appears to be out front and will remain so for a few years.

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The Merge Is On



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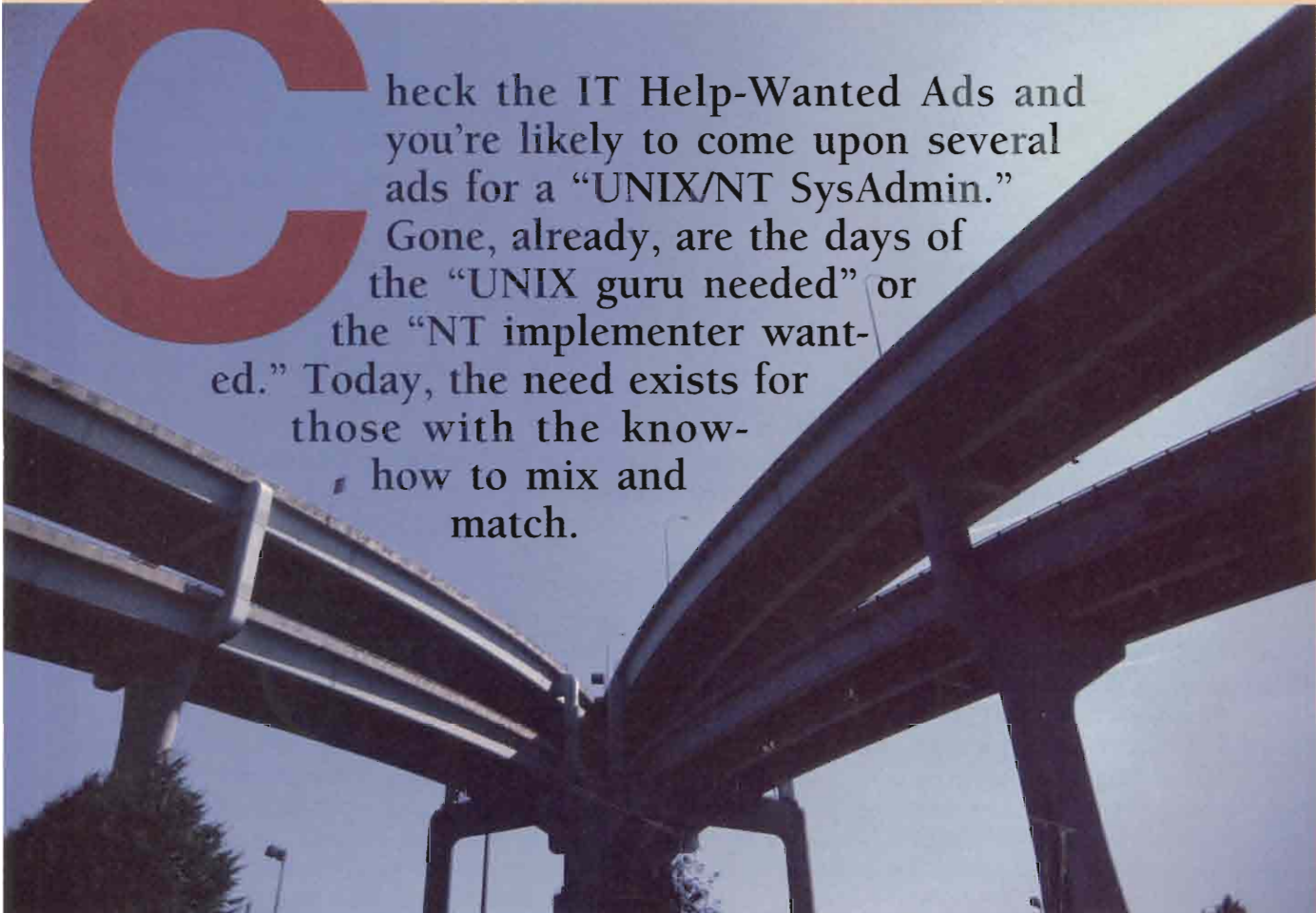
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From UNIX to NT and Back

By Charlie Simpson



Check the IT Help-Wanted Ads and you're likely to come upon several ads for a "UNIX/NT SysAdmin." Gone, already, are the days of the "UNIX guru needed" or the "NT implementer wanted." Today, the need exists for those with the know-how to mix and match.



What was a glutted market of network operating systems (NOS), including IBM's OS/2, Novell's NetWare, Banyan VINES and many smaller UNIX systems, will soon be reduced to a lean battle between the growing popularity of Windows NT as a file, print and application server and the continued strengths of high-profile UNIX, including clusters, powerful system management tools, scalability, a range of application support and its ability to handle large databases and data-intensive platforms.

Research and analysis indicates that "together" Windows NT and UNIX, such as HP-UX, IBM AIX, Sun Solaris and

year 2000, the growth rate for UNIX and other operating systems will be flat.

However, many corporations have invested millions over the past decade in developing mission-critical applications on the UNIX-based enterprise servers that now run their businesses and they are not ready to throw that all away. According to IDC, currently 80 percent of all enterprise servers are UNIX-based and the implementation of UNIX-based enterprise servers is expected to grow at a compound annual growth rate of 20 percent over the next several years. It seems that the immediate impact of Windows NT has been primarily on UNIX desktops and workgroup file, print and application servers, *not UNIX enterprise servers.*

So don't go burying UNIX yet. IDC's figures also show that end-user spending for UNIX systems will still outpace Windows NT end-user spending in the year 2000 by almost 2 to 1. This is because UNIX will continue to dominate the high-end, and higher cost, arena of enterprisewide or data-intensive applications such as data warehousing, while Windows NT will dominate the low-end file, print and application servers market.

Laurie McCabe, an analyst with Summit Strategies, believes that for workgroup, departmental and midrange computing as well as low-end, Windows NT is the solution. And in an enterprise application, like data warehousing, with huge amounts of data or of transactions, you need UNIX. "Most vendors are trying

to make sure UNIX and NT integrate, because most enterprises now and in the future need both low-end and higher-end functionality," says McCabe.

TOGETHER WE STAND

That's why today's major systems players, despite their initial resistance, are embracing a Windows NT-to-UNIX integration strategy. For example, Digital Equipment Corp., a long-time advocate of Windows NT in the enterprise, has joined forces with Microsoft to win more than 750,000 Microsoft Exchange seats. Digital also announced the beta of Windows NT 5.0 with 64-bit Very Large Memory (VLM) support on Digital Alpha. And, Microsoft will continue to work closely with Digital on Digital's Alpha processor, which is "the leading RISC platform for Microsoft Windows NT today," maintains Bill Gates.

Not surprisingly, HP is a prime example of a vendor offering the NT/UNIX integration strategy. In March, HP unveiled its Colliance Program, an initiative dedicated to the integra-



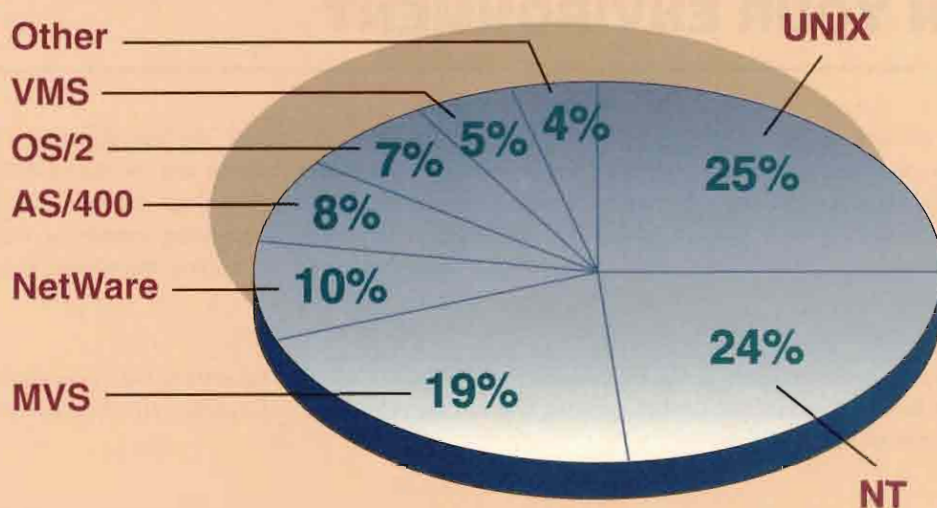
even Digital UNIX, will comprise the NOS of the not-so-distant future, with neither Windows NT nor UNIX dominating the other. The dilemma facing IT managers will not be deciding which to use, but rather how to integrate both UNIX and Windows NT within their enterprise.

NUMBERS, NUMBERS AND MORE NUMBERS

According to the article "In This Corner" in *HP Professional* (June 1997), Forrester Research found, in a survey of 50 IT managers at Fortune 1000 companies, Windows NT shipments were at one-third of UNIX shipments in 1996. By 1998, Windows NT will rise to more than half of UNIX and by the year 2000, will more than double UNIX units shipped. Forrester further predicts that revenue for Windows NT units shipped in the year 2000 will be at \$20.2 billion, eclipsing UNIX revenues of \$16 billion.

The Gartner Group corroborates that Windows NT growth rate, estimating that while Windows NT server growth will gallop at a healthy 40 percent annually between now and the

1996 ESTIMATED SERVER OPERATING SALES



tion of HP's flavor of UNIX (HP-UX) and Windows NT.

"UNIX and NT is what we can deliver to customers." In early March, with those words, HP introduced the Colliance Program to do just that. Colliance is HP's attempt to bring a "definite, renewed emphasis on ensuring that the NT platform is adequately serviced within the client-server space," says Russ McBrien, HP's worldwide program manager with the Wintel and UNIX Integration Program.

Microsoft has yet to include the networking applications that allow access to IBM AIX services like file and print sharing and terminal emulation in Windows NT. And although IBM has not announced any AIX-to-Windows NT integration products — due to the obvious implications to the RS/6000 family and to Windows NT's poor showing on the PowerPC — IBM users can still find connectivity through the third-party market. On the other hand, IBM's AS/400 division has embraced Windows NT, with almost 75 percent of MIDRANGE Systems' surveyed readers indicating that Windows NT is or will be part of their IT environment.

SECURITY

Two of the relevant issues managers of mixed UNIX/NT environments will have to address will be data integrity and security — in both the Internet and intranet environments. Microsoft is working together with vendors like HP and Digital to help user's computing environments become interoperable and secure. Secure communications are critical for effectively conducting business. Whether over the Internet, an intranet or between private intranets, confidentiality is a basic requirement for business communications; Without protection, it would be impossible to conduct negotiations, transfer sensitive financial data or develop plans for new products.

IT'S YOUR PARTY

It's clear. Most major IS departments are choosing integration over migration. But what exactly does that mean? Where do you start? How do you do it? When and why should you integrate? Fortunately, for as many questions about Windows NT-to-UNIX integration that exist, there are an equal number of solutions. In fact, there are any number of options of integration available.

Third-party solutions provide Windows NT with

full POSIX compliance, UNIX shells, UNIX-to-Windows NT application porting and development tools, TCP/IP application suites, DNS for Windows NT Workstation and Server, and even 3D-capable PC X servers. These third-party enabling technologies offer the UNIX/Windows NT shop:

- Foundation Communication and Integration Technologies
- Legacy Application and Database Access With Emulation
- Migration of UNIX Applications to Window NT
- File System Integration
- System Management

Today's third-party vendors run the gamut of solutions based on internetworking standards. Use this special section to find out how they can ease your UNIX-to-Windows NT integration. From simple character-based access to UNIX to graphical UNIX applications and code porting, the solutions are in Cardinal Business Media's first UNIX/Windows NT Solutions special section. For details about the vendors and their solutions mentioned in this special section, check out any or all of the following Cardinal Web sites:

www.hppro.com
www.midrangsystems.com
www.digital_age.com
www.ent.com

CHARLIE SIMPSON
 EDITOR-IN-CHIEF
 HP PROFESSIONAL
 AND DIGITAL AGE MAGAZINES

UNIX/NT Solutions

HP DELIVERS ENTERPRISE SOLUTIONS THAT FIT IN YOUR ENVIRONMENT

Let's face it: A growing number of Fortune 1000 companies are using both RISC/UNIX and Intel/Windows NT servers to meet their business computing needs. And new technologies like the Internet and the World Wide Web are proving indispensable when it comes to corporate connectivity as well as providing vital communication links that can open enormous new business opportunities. But with 25 years of experience of providing commercial computing solutions (beginning with the HP 3000 and MPE), HP has built a strong foundation for helping you address your enterprise challenges.

■ EXPERIENCE

In 1986, HP became the first computer company to market a commercial RISC/UNIX solution. Since then, eight generations of the HP 9000, with its PA-RISC architecture and HP-UX operating system, have established and launched HP into the number one position in the commercial RISC/UNIX market.

■ POWER

And now today, HP is once again building upon its historic computing foundation with a fundamental commitment to *both RISC/UNIX and Intel/Windows NT platforms*. While the HP 9000 ratings in industry benchmarks — superb Caffeine Marks for Java performance and TPC-D ratings for online transaction processing — HP's Intel-based NetServers also offer enterprise performance as confirmed by industry TPC-C, OLAP, SpecWeb and Lotus Notes benchmarks. "I know they have solutions for our needs, whether NT or UNIX. HP is on the leading edge and will work with partners to bring the next generation of servers," says John Kristie, director of Systems and Programming for Barnes and Noble, the world's largest bookseller.

Barnes and Noble's used seven HP NetServer LX Pro systems to enter electronic commerce with their online Web-based bookstore. "In an Internet environment," says Kristie, "you are judged by speed." In Kristie's configuration, the HP LX Pros run Windows NT and Microsoft's SQL Server database containing more than one million book titles with a search engine to enable online users to search for titles of specific books. The user load is balanced among these systems and performance thresholds are maintained to achieve under one second response times over the life of your server. Besides the NetServers, Kristie also uses two HP 9000 servers to handle order processing and e-mail applications.

■ PARTNERSHIPS

"They have the right strategic partnerships: Microsoft is working closely with us to integrate their Internet technology and with HP and Microsoft's joint working relationship, the technology allows us to provide superior solutions for our business and customers." HP NetServers include numerous availability features. For example, Automatic Server Restart, Error Checking and Correcting Memory with scrubbing, hot-swap RPS, UPS and high-availability disk arrays. And with plenty of I/O slots, mass storage capacity, and easily upgradeable memory, the NetServer product

HP Servers ... the Industry's Broadest and Most Powerful Offering

Servers from Desktop to Datacenter

File/Print	General Purpose OLTP and Compute	Very Large Scale DBS Server Configuration
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Back to the Future

When HP says "investment protection," they are not just referring to your past investments. They are talking as much about future protection — that is, a seamless growth path to the performance that you'll need for the next millennium. For the past two years, HP and Intel Corp. have been developing a next generation microprocessor architecture called IA-64 (better known as Merced) that will UNIFY the current PA-RISC and Intel architectures. By using state-of-the-art techniques such as optimized processor design, silicon processes and compilers, the new architecture will provide a quantum improvement in performance over current systems, while

reducing complexity, increasing flexibility lowering your overall cost of computing and enabling you to run more than 50,000 applications. HP and Intel are the *only vendors* involved in this development.

The IA-64 architecture promises to be a boon for HP customers. It's an opportunity to achieve the maximum efficiency by continuing to run HP-UX applications as well as the industry standard applications available on virtually every desktop. According to Microsoft Chairman Bill Gates, "We are excited to be working more closely with HP, a leader in integrating and supporting heterogeneous enterprise environments."

line provides a scaleable growth path. With HP's award-winning OpenView system and network management tools, you can control asset management costs and reduce setup times. And just recently introduced this past June, HP 9000 Servers guarantee 99.95 percent availability, and HP NetServers guarantee high availability implementation.

■ INTEGRATION / INTEROPERABILITY

Because many companies like Barnes and Noble are already benefiting from using both RISC/UNIX and Intel/Windows NT servers to meet their specific business requirements, HP has established the HP Colliance Program. The HP Colliance Program is a comprehensive set of technologies, services as well as partnerships in network and systems management, security, messaging, connectivity and



HEWLETT® PACKARD

application development. For example, under the auspices of the HP Colliance Program, First National Bank became one of the first financial institutions to offer banking services on the Internet.

HP's industry partnerships — Baan, Computer Associates, Cisco Systems, Intel, Lotus, Microsoft, Netscape, Novell, Oracle, PeopleSoft and SAP — can help you solve enterprise business requirements and implement mission-critical solutions. And HP's joint strategy with Microsoft will help lower the costs and simplify the management of large, enterprise computing environments through products and services for addressing total cost of ownership, Windows NT server-based solutions and heterogeneous environments.

■ SERVICES AND SUPPORT

You can work with systems integrators, HP-certified Channel Partners or HP's Professional Services Organization (PSO) to help you overcome IT obstacles and profit from business opportunities. These support services can help you to:

- * Develop a technology and product selection plan
- * Choose the best — HP NetServer solutions or HP 9000 solutions
- * Create an IT implementation plan
- * Migrate systems, data and applications
- * Analyze your need for corporate IT training and IT and end user educational services

As the next millennium approaches, whether you're evaluating RISC/UNIX or Intel/NT servers — or you already have both — you can bet on HP's commitment to compatibility across the entire product line to give you long-term investment protection for your company. With decades of experience in commercial and client-server computing, market-leading Windows NT and UNIX technologies and integration capabilities, partnerships with IT industry leading companies, and unrivaled service and support, you'll find HP to be a partner that you can trust to help fulfill your IT mission, even as it takes you beyond the walls of your enterprise. Says Barnes and Noble's Kriste, "They are the best at integrating a mixed computing environments. UNIX and high-end NT and the coming convergence of the PA-RISC and Intel chip technologies. We chose a vendor who understands investment protection and plans for the future." — *by George A. Thompson*

FOR ADDITIONAL INFORMATION

HP WWWeb server	http://www.hp.com/go/netserver
HP NetServer FTP server	ftp://ftp.netserver.hp.com
HP NetServer BBS	1-408-553-3500
HP FAX Response system	1-800-333-1917 (U.S.) 1-208-344-4809 (worldwide from fax only)
HP NetServer Literature	1-800-322-4772
HP Colliance Program	http://www.hp.com/go/colliance

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**Exceed:**

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Hummingbird is a leader in PC to enterprise connectivity—with a complete family of internetworking solutions that are innovative, robust and best-of-breed. Hummingbird—the growing choice for companies that aim for a higher level of business performance.



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UNIX/NT Solutions



INTEROPERABILITY

Key To Networking Windows NT Desktops



Peter J. Auditore
Director of Marketing

X and NFS are now mission-critical technologies that facilitate enterprise-wide connectivity

Networking the Windows NT desktop sounds easy, but the reality is that successful integration of NT into enterprise multi-vendor networks often requires support for legacy protocols and the interoperable technologies spawned by the open systems revolution. Although Windows NT Workstation provides a foundation for enterprise integration by embedding TCP/IP, NetBEUI, NetBIOS, and IPX/SPX protocols, integrating the enterprise desktop requires a comprehensive suite of TCP/IP protocols and applications that enable interoperability and enhance manageability in enterprise environments.

As a director of marketing I spend a great deal of time visiting customers who are implementing Windows NT as their enterprise desktop. During a recent visit, a UNIX server administrator cautiously mentioned that he was NT-illiterate and knew little about the networking capabilities of NT. This is a commonality shared by many enterprise customers implementing Windows NT; however, it's not an issue because many network managers and administrators are utilizing the familiar open systems standards of the UNIX world, such as the X Window System and the Network File system (NFS) to facilitate Windows NT desktop to enterprise integration. Along with the highly functional TCP/IP protocol suite, X Windows and NFS empower the Windows NT desktop by enabling seamless access to internetwork-based applications, information, file systems and resources. X and NFS are now mission-critical technologies that facilitate enterprise-wide connectivity in many large organizations worldwide.

As a leading developer of open systems-based software for Windows NT, Hummingbird pioneered the development of X, NFS and other 32-Bit TCP/IP applications on the Windows NT platform. Hummingbird's flagship product Exceed, developed more than three years ago, was the first native 32-Bit PC X server for Windows NT. Exceed's legendary stability, performance, robustness, and advanced administrative capabilities have made it the most successful Windows NT to UNIX integration product, and the industry's standard in PC X server software.

Hummingbird has also developed NFS Maestro, featuring the industry's fastest and most reliable NFS clients for Windows 32-Bit desktops, which include a full suite of high performance TCP/IP applications. Perhaps one of the most functional and often overlooked features of Exceed and NFS Maestro is Hummingbird's complete InternetNet service daemon (Inetd) implementation. The Inetd server suite provides the Windows NT platform with the full TCP/IP client/server functions of a UNIX workstation, enabling administrators to Telnet into a Windows NT workstation or server.

Two new and exciting products recently developed by Hummingbird for the 32 Bit Windows desktop include Exceed 3D and HostExplorer. Exceed 3D enables Windows NT desktops to access and view OpenGL-based 3D applications from network hosts, or run them locally on the local Windows NT desktop. HostExplorer is a high performance 32-Bit TN3270E emulator that provides the Windows NT desktop with easy access to mainframe data and information. HostExplorer's design features seamless integration within the NT environment, easy installation, low resource usage and support for legacy scripting.

For additional information on networking Windows NT please call and ask for a free white paper, Integrating Windows NT and Enterprise Computer Systems, or visit our web site at www.hummingbird.com/unixnt.

*Peter Auditore, Director of Marketing,
Hummingbird Communications Ltd.*

**Hummingbird
Communications Ltd.**
1 Sparks Avenue
North York, ON
M2H 2W1
Phone: (416) 496-2200
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UNIX/NT Solutions

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Extending the Life of Legacy Information Systems



Whether you are using mainframes or moving to an open systems client/server environment, you may be facing a dilemma regarding your company's proprietary applications and data. If your organization is like 80% of the corporate world, many of your applications are written in COBOL. Today's end users demand GUIs, client/server computing, cross-platform support, RDBMS access, Internet capability, and year 2000 compliance.

Acucobol is a leading supplier of portable, open systems COBOL, designed for developing, implementing, and rehosting applications across over 600 platforms—including UNIX and Windows NT.®

Graphical COBOL — Acucobol allows you to build graphical, portable programs supporting full-featured GUIs, including floating windows and graphical controls, directly in COBOL. Acucobol also offers a WYSIWYG screen painter.

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Year 2000 Compliance — Acucobol products are year 2000 compliant. We have many migration partners ready to make your conversion process a success.

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PROBLEM TRACKING & CONFIGURATION MANAGEMENT

(KISS - "Keep it simple") Cost effective and elegant solutions ARE available.



The evolution of software development is a lot like a waterfall; it is constantly changing, yet it remains unchanged. Languages come and go, methodologies become fashionable and fade away, hardware and operating systems mutate. And now the transition from UNIX to NT.

Yet across all that change, some themes remain constant; specifically the need to coordinate and manage the changes themselves. And in order to handle this properly, the Configuration Management and Problem Tracking system you use should not be vulnerable to the quickly changing currents of the industry.

There are two simple themes that will help insure your success in establishing an effective development process bridging the migration and coexistence between UNIX and NT. The first is to establish a level of stability in your approach. As much as possible, developers on both sides of the line should use the same set of rules, conventions, tools, and interfaces to handle the common need of tracking changes to their source code, and coordinating the tasks ahead of them. This statement of the obvious minimizes the confusion and overlap between the two environments. The second theme is to keep it simple. Avoid approaches that are unnecessarily complex. You need a solution that can be easily installed, configured, and learned. Complexity is not a requirement for success.

Razor provides these solutions. It has a consistent user interface across all environments, has a very straightforward installation, and is highly configurable. That's why NASA's using it to rewrite the shuttle launch software. It's why Lockheed Martin selected it as a standard. It's why you should consider it as well.

John E. Ivory

Director of Marketing, Tower Concepts, Inc.



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103 Sylvan Way
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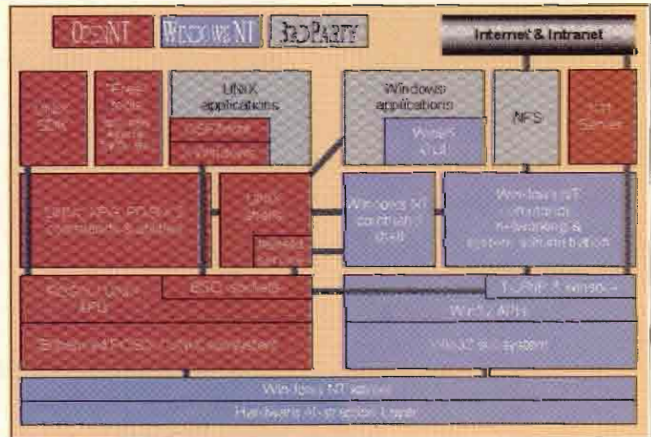
UNIX/NT Solutions

OPENNT™ for MICROSOFT WINDOWSNT™

OPENNT™ from Softway Systems is the only complete, native UNIX™ operating system environment for Microsoft® Windows NT™. OPENNT offers a user and developer product line for customers who need the power of UNIX systems on the world's fastest growing enterprise operating system — Windows NT. Whether you are a developer needing to port UNIX applications to Windows NT or a power user needing a full suite of UNIX utilities and internet tools, OPENNT is an indispensable addition. By using NT's subsystem architecture, OPENNT is able to provide a high performance, standards conforming platform that is tightly integrated with the existing tools and interfaces available on Windows NT. With OPENNT, users can run both Win32 and UNIX applications on the same desktop. Support is also provided for running your applications through multiuser shell access or network-based X Windows.

OPENNT FEATURES:

- Over 200 UNIX and X11R5 commands and utilities
- UNIX shells - KornShell, Bourne shell, C shell
- UNIX scripting languages - awk, perl, sed, Tcl/Tk
- ability to run Win32 applications from OPENNT
- file link support, true case sensitive file names
- full shell job control
- cron service, system service daemon support
- internet clients - ftp, telnet, ping, rsh
- integrated tape device support
- UNIX development tools - make, rcs, yacc, lex, cc, c89, nm, ar, strip
- full tty semantics mapped to console windows
- pseudo terminal support
- X11R5 Windowing System clients and libraries
- X11R6 Windowing System display server
- X11R6 fonts and font management
- telnet daemon service (multiuser login support)
- full integration with Windows NT security model
- full integration with Windows NT file systems
- OPENNTIF(tm) (OSF/Motif(r) 1.2.4 window manager, libraries, development kit)



- POSIX.1, POSIX.2 and ANSI C interfaces
- BSD sockets mapped to Winsock
- SVID IPC (message queues, semaphores)
- shared memory, memory mapped files
- color curses support

WHO NEEDS OPENNT?

- internet developers and ISPs who need UNIX tools and scripting (Apache, perl, UNIX shells and utilities)
- major corporate IT shops that want to maintain a "write once - deploy many" policy for applications across UNIX and NT
- corporate desktop sites that want to host both UNIX and Windows applications on a single platform
- system administrators who need remote login access using standard UNIX shells and utilities
- ISVs that want to use one workstation for developing both Windows and UNIX applications
- developers wanting to host multi-user character-based and graphical applications on Windows NT
- customers needing to port or develop UNIX-style background daemon applications
- all customers who want to capitalize on their UNIX investment as they move to Windows NT

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Essential UNIX utilities for NT applications

Our OEM program is designed to offer your organization maximum productivity and enhance your application development cycle.

“Reliability and performance are key benchmarks for us so MKS Toolkit allows our customers to quickly and easily configure and build our C++ and Java source code, offering superior quality and reliability.” — Dan Whitaker, Executive VP, Rogue Wave

Global 2000 companies have made a tremendous investment in UNIX-based software applications and expertise. As corporations make the transition from UNIX to NT, or blend the two within an organization, it is important that this transition be as cost effective as possible, with no sacrifice in performance. Whether you're a developer, QA engineer or system administrator, the more than 190 powerful UNIX utilities provided by MKS Toolkit will help preserve your skill set, reduce the learning curve, leverage your investment in hardware and automate time consuming tasks.

MKS Toolkit allows users — from traditional software developers to Webmasters working on NT servers — to leverage their existing investments in UNIX expertise and become instantly productive. Robust features include Perl — the popular web development language, and an easy-to-use graphical interface for PAX, a command line interface to Dynamic Data Exchange (DDE), the ability to create hard links to Windows NT, and tools that interact with web servers to retrieve, modify and update web pages.

Developers, testers and Webmasters will benefit from such productivity tools as AWK, Make, Visual KornShell, vi, Visual PAX, grep, Visual diff for Windows, and a Windows Scheduler. The high-performance text utilities are ideal for maintaining HTML and other web files. MKS Toolkit also includes graphical scripting for Win32 and customizable toolbars on KornShell Windows.

MKS Toolkit supports long filenames on NT, Windows 95 and OS/2, and integrated support for security permission features for NT. All utilities are optimized 32-bit on Win 95 and Windows NT.

As new technologies emerge, organizations must address the learning curve. Time spent learning new operating systems and porting scripts results in time lost in actual developer hours and other opportunity costs. Moving from UNIX to NT with MKS Toolkit saves your organization valuable time and money while increasing productivity.

Now you can bundle MKS Toolkit commands with your applications to help your UNIX programs run on NT. Our OEM program is designed to offer your organization maximum productivity and enhance your application development cycle by streamlining the migration process. Use familiar commands and utilities provided by MKS Toolkit to preserve your skill set, increase your performance and leverage your investment in hardware and software.

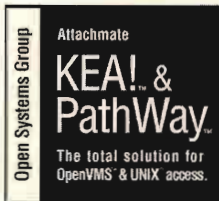
Award-winning MKS Toolkit provides a timeless solution that successfully addresses the complex trends emerging in software development today. By providing the same robust tools across multiple platforms, MKS Toolkit meets the needs of the system administrator, QA engineer and the sophisticated developer.

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UNIX/NT Solutions

OSG: THE ANSWER FOR NT/UNIX & NT/OPENVMS INTEGRATION

Attachmate's Open Systems Group (OSG) eases the integration of NT into your enterprise



The Open Systems Group was formed by Attachmate® to provide solutions based on standards-based connectivity for UNIX®, OpenVMS™, and HP® host environments.

"Attachmate has long been a leader in enterprise connectivity for all host environments," said Paulo Chow, VP Product Management/Marketing for Attachmate's Open Systems Group. "Now, with a single group devoted to the open systems market, we can provide solutions for UNIX/NT and OpenVMS/NT integration no other vendor can match."

Attachmate's OSG solution lets you build on your existing UNIX, VMS™, OpenVMS and MPE and MPE/iX environments with the leading products for client/server computing. That solution is more than connectivity — it's the right mix of products, technology, and expertise to assist IT managers deploying NT-based solutions into the enterprise.

For organizations considering Windows NT® as a desktop operating system, Attachmate products make host data accessible over a variety of methods, including Telnet, FTP, NFS™, and X Windows. For existing Attachmate users, the high degree of similarity of the user interface will minimize the cost of transition.

Attachmate solutions include the necessary server components to allow data from NT servers to be shared across the other platforms in your organization. The first of these products is a highly scalable NFS server. Critical to providing these products will be the requirement for compatibility and integrating high end desktop operating systems such as UNIX.

OSG products preserve access to existing systems while providing the advantage of the Windows NT environment. In UNIX and OpenVMS environments, that means you can enjoy enhanced productivity while protecting your investment in existing systems.

COMPLETE NT INTEGRATION SOLUTION PORTFOLIO



KEA! X is an easy-to-use, full-featured PC X Server. KEA! X links your Windows NT desktop to mission-critical X applications, enabling you to work in the world of X and Windows™ simultaneously.

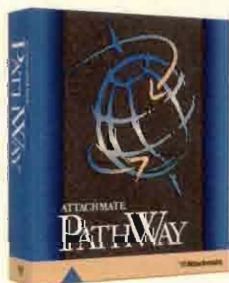
KEA! 420 and KEA! 340 provide intuitive, managed access to corporate information. Users have full access to the power of OpenVMS and UNIX computing environments and a true 32-bit product running under Windows NT.

PathWay for OpenVMS is a comprehensive collection of TCP/IP protocols and networking programs accessing mission critical applications. PathWay for OpenVMS enables users to access hosts and share data, messaging, printers, Web services, security features and computing resources on distributed systems across a TCP/IP network.

PathWay Server NFS for OpenVMS allows seamless and transparent access by NFS clients over TCP/IP networks to data and file systems residing on NFS servers. This powerful and easy-to-use Server NFS is tightly integrated with the OpenVMS operating system and offers load balancing between multiple NFS servers.

PathWay Client NFS for OpenVMS brings NFS-based file and printer sharing over TCP/IP networks. This powerful and easy-to-use Client NFS is tightly integrated with the OpenVMS operating system and can be configured to fail over transparently eliminating unnecessary network bottlenecks and backups.

Pathway NFS Server for NT equips Windows NT to act as a high capacity scalable NFS server. This product is designed as a true NFS server and is fully integrated with the administration utilities of NT making it easy to manage and configure.



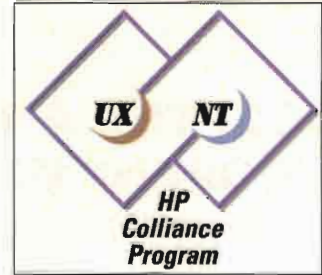
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Bellevue, WA
98006
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UNIX/NT Solutions

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Hewlett Packard has demonstrated a unique position in the integration of UNIX and NT: a fundamental commitment to both the UNIX and Windows NT operating environments and a clear understanding of customers' need for them to work together. The HP Colliance Program delivers UNIX/NT integration across your worldwide enterprise, from desktop to data center. The HP Colliance Program will help you to leverage the investment in your existing systems while reducing the cost and risk of implementing a mixed environment.

The HP Colliance Program provides integration capabilities in the areas of technologies, services, and partnerships. Technologies for integration include network and systems management; security; messaging; application environment; NOS connectivity; and Internet/intranet & Web middleware. Services include consultants who can work with you to assess, design and implement an integrated environment. HP's support organization can provide support services for UNIX, NT and many leading applications and networking products. And with HP's strong partnership with Microsoft, and other leading ISVs, you can confidently implement your solutions across mixed platforms.

For example, in the area of network and systems management, the HP OpenView family of network and systems management solutions answers needs for single point of management and common processes for mixed UNIX and NT environments. This has been implemented via native Windows NT implementations of products (for example Network Node Manager for network management) and agents on NT for all OpenView functionality areas.

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NobleNet's RPC for OpenNT Helps Intergraph Build Unix/NT Integration Business

Intergraph Corporation operates a business unit in Huntsville, Alabama devoted to the integration of Unix and NT. The group provides analysis, products, and porting services, including native code conversions, development of custom code and migrations to OpenNT, the X/Open and POSIX II compliant implementation of Unix on the NT kernel. "We provide services to support the full migration life cycle from Unix to NT," explained Kelly G. Berry, Chief Scientist of Intergraph Mapping and Information Systems. "Our study and analysis projects guide customers in the selection of off-the-shelf products in the two environments with comparable functionality, while our porting and development services focus on moving applications from Unix to NT."

Kelly explained the role of RPC for OpenNT. "With OpenNT, the port of a Unix application to NT is fairly reasonable and straightforward. RPC for OpenNT makes it just as easy to port existing Unix RPC code. In addition,

NobleNet, Inc.

NobleNet's advanced RPC code generator included in the SDK is the native middleware tool we need to develop new, industrial-strength client/server production systems on OpenNT."

RPC for OpenNT includes ONC/RPC libraries, rpcgen, and NobleNet RPC 3.0™ which features: threading, security, asynchronous operation, memory management, naming, load balancing, and extensive platform support. The functionality, quality and maintainability of the generated code makes other forms of network programming obsolete

Intergraph Mapping and Information Systems

Kelly G. Berry

205-730-4854

kgberry@ingr.com

<http://www.ingr.com>

NobleNet, Inc.

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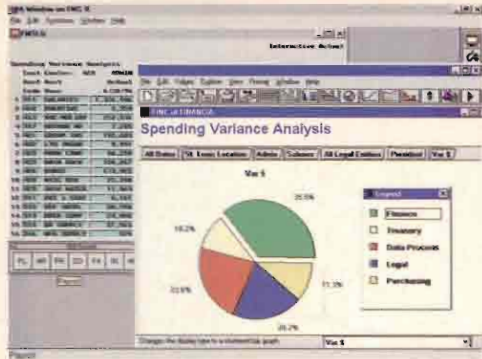


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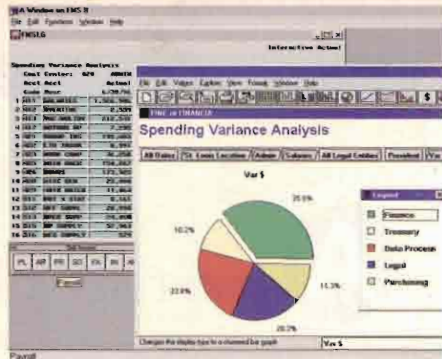




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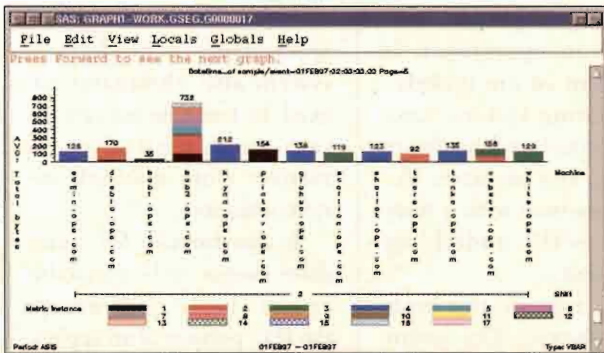
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Peeling Through The Data Layers



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- NDC provides filters, rules, thresholds, collection and storage of network data
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What if you were able to get intelligent network data, it was able to be easily analyzed and it was available in an understandable graphical form? You can now with the integration of SAS Institute Inc.'s (Cary, N.C.) IT Service Vision (ITSV) and Onion Peel Software's (Raleigh, N.C.) Network Data Collector (NDC). Combining the rule-based collection of NDC and statistical analysis and graphics of SAS ITSV provides a complete collection and presentation solution for any HP OpenView user.

NDC provides advanced filters, rules, thresholds, collection and storage of network data in an easy-to-configure application, while SAS ITSV provides analysis capability to generate complex graphs and charts represent-

ing network activity.

NDC gives network managers a tool for intelligent data collection based on selection rules and MIB expressions. NDC is linked to the graphical MIB-tree to provide efficient building of data collections and reduces the amount of manpower needed for data collections. Also, by reducing the amount of data collected, less disk space is used, network traffic is reduced and less processing time is spent, allowing reports to be generated more quickly.

NDC provides answers to complex OpenView questions in the form of statistics, hardcopy, graphs and Web-based publishing. It allows advanced data collection and reporting for OpenView. Designed for production and ad-hoc reporting, NDC provides management and technical reporting capabilities not previously available in OpenView. You only have to build the collection once, and new nodes are automatically included in reports.

Devices can be filtered using selection rules, object wildcards, IP address ranges and Boolean operators. Reports can be generated from any MIB variable using Onion Peel's graphical MIB Tree browser. Reports can

be run on periodic or repeating schedules. And, extracted data is stored in Comma Separated Variable format for import into SQL databases, or manipulation by spreadsheet and statistical packages. In addition, an "SQL-like" command language for creation of reports from scripts or programs is provided. Data collections and reports may be scheduled periodically or on a one-time basis.

NDC also automatically exports data collections into HTML format. Using the embedded Web Engine, Web NDC requires no scripting or programming to get up and running. Simply build a report collection and specify it as Web-enabled.

When a user connects to Web NDC, the list of Web-enabled reports is retrieved and displayed. Reports are refreshed on a periodic basis to show the most recent collection.

NDC is available for NNM 4.1 under HP-UX 9.x and 10.x, and Solaris 2.5. Price of the NDC/ITSV Integration Kit is \$15,995, which includes 40 hours of onsite installation, configuration, customization and travel expenses. Price for existing NDC customers is \$10,995.

—Deborah Schwartz,
Associate Editor

The Momentum Of Middleware



X*IPC

- Provides an API that will perform all interprocess communication operations
- Other functions are monitoring and debugging tools, and an interactive command language
- Price ranges from \$220 to \$65,900

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CIRCLE 353 ON READER CARD

These days, most computer applications are built up from multiple execution processes (or threads) working together to make the application work.

X*IPC, developed by Momentum Software (Hasbrouck Heights, N.J.), takes the standard Interprocess Communication (IPC) techniques (such as message queues, semaphores and shared memory), expands it to include guaranteed peer-to-peer messaging, and makes the new model system and network transparent.

Basically, X*IPC lies between an application and its underlying environment to provide an API that will

perform all interprocess communication operations; is independent of the underlying operating system, network protocol and hardware platform; and insulates the applications built with it from changes to the underlying environment.

X*IPC supports two kinds of semaphores. The event semaphores are general flags that can be set or cleared in response to application events in a distributed application. They can be used for affecting basic and short kinds of one-to-many interprocess communications.

Resource semaphores are counting mechanisms that control the access to limited-supply resources within an application.

It treats IPC programming as one problem, essentially letting the programmer treat the programming environment as a "virtual multitasking environment" where processes communicate and interact using a single high-level programming model.

X*IPC's peer-to-peer store-and-forward message delivery system is guaranteed between all kinds of user applications regardless of the operating system of platform volatility.

In doing so, it delivers a replacement for batch file

transfers between systems applications. The delivery system also eliminates the need to build recovery logic into each application to recover from network and system failures.

It also provides for immediate source code portability between unlike platforms, and the IPC portion of an application needs only to be written once. Applications written with X*IPC can be built on a single machine and then deployed over a changing network without changing the source code. Also included are monitoring and debugging tools, and an interactive command language.

X*IPC supports IBM AIX, HP-UX, Solaris, Sun OS, DG/UX/ Pyramid, SGI Irix, SVR4 (Intel), AT&T/NCR, UnixWare, SCO UNIX, MS-DOS, Windows 3.1, Windows NT and Windows 95, OS/400 and OS/2, Apple Macintosh, NeXTStep, Tandem Guardian, VAX VMS, Alpha OpenVMS, Alpha OSF/1, MVS CICS and DOS/VSE CICS. It also supports the TCP/IP, DECnet, APPC/LU6.2 and IPX/SPX protocols.

Price ranges from \$220 to \$65,900.

—Steve Berlin,
Contributing Author



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We hear the word "solutions" used a lot in this business, but what does it really mean?

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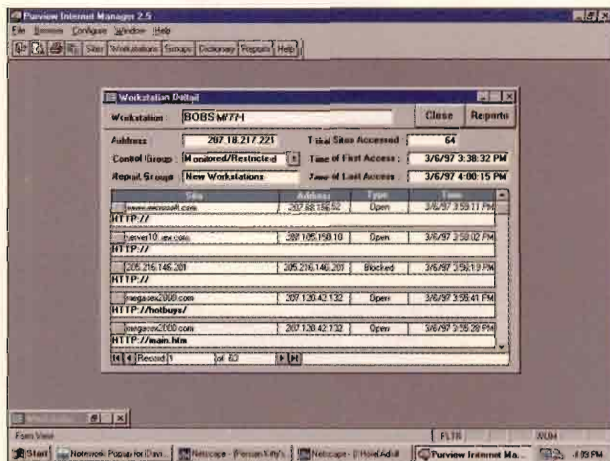
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CIRCLE 351 ON READER CARD

Who's spending time surfing the Web? Where are they going? When are they surfing? ON Technology Corp.'s (Cambridge, Mass.) ON Guard Internet Manager (OGIM) can answer those questions. OGIM Version 3.0, previously known as Purview Internet Manager, is a solution for managing and monitoring Internet usage in your organization. It provides detailed reports from an ODBC-compatible relational database that captures — in real-time — all IP traffic to WWW, ftp, telnet and Gopher sites.

Founded in 1914 as a preparatory school for the U.S. Naval Academy (Annapolis, Md.), the Severn

School (Severna Park, Md.) supports approximately 600 users. The network has two HP NetServer LMs running Windows NT 4.0 over TCP/IP using HP 10/100VG-AnyLAN hubs. They are using OGIM to grab IP addresses off a TCP/IP Cisco router. "We want to keep an eye on what sites our students are going to," says Todd Brekhus, technology coordinator and Webmaster at the Severn School. "We have a very well-defined 'acceptable use' policy and [OGIM] is an excellent tool for ensuring that acceptable usage is maintained."

OGIM can filter out unnecessary data by segmenting inbound and outbound traffic, and allows the administrator to disregard traffic to a particular internal or external site.

Traffic generated by external users visiting the company's public Web site also can be excluded from the usage database. OGIM supports monitoring and control of all IP clients including PCs, Macs and UNIX systems.

OGIM also can enforce corporate Internet usage policies and block access to sites considered inappropriate for business use. The information

can be used to gauge employee productivity, measure ROI, allocate costs related to network expenditures, and protect against legal liabilities or negative publicity.

Unlike proxy or network gateway-based approaches, OGIM is transparent to end users, does not require network re-configuration, and has virtually no impact on network performance.

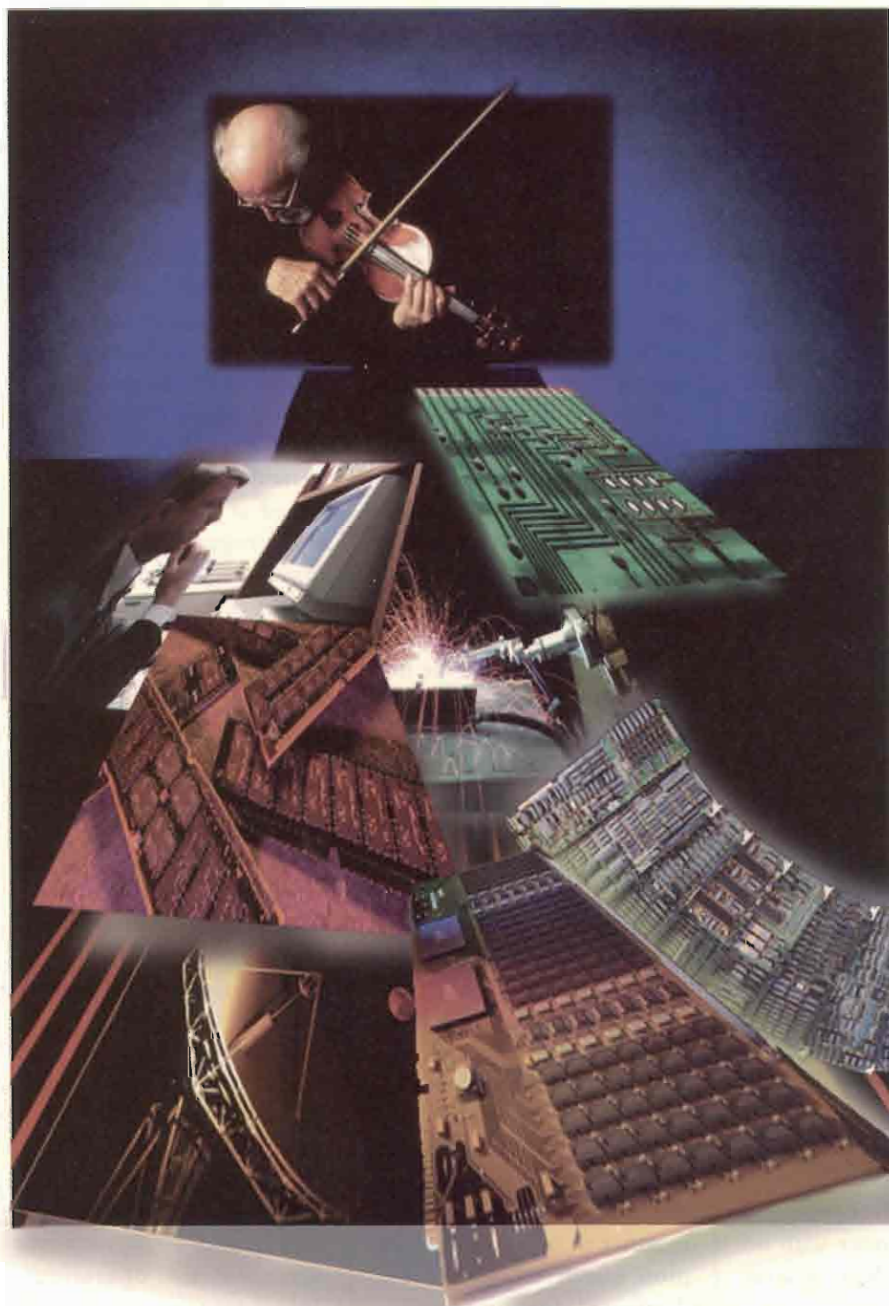
Unlike browser-based approaches, OGIM installs on a single centralized workstation and provides detailed reporting capabilities. The Internet Manager installs on a single Windows NT system (workstation or server version).

Pricing ranges from \$15 per seat for 1,000 users, to \$60 per seat for 50 users. Upgrades to OGIM Version 3.0 are free to users of any previous Purview Internet Manager version.

ON Guard Internet Manager is part of the ON Guard family of network security products, which includes the ON Guard Firewall, VirusTrack Anti-Virus Software and IP Address Funnel.

—Deborah Schwartz,
Associate Editor

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“There is a change in the psychology in the IS organization ... where others judge whether or not [IS does] a good job.”

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CIRCLE 354 ON READER CARD

If you think “disaster recovery” when you hear Comdisco, think again. If you think “asset management” when you hear Comdisco, think again. If you think “network management,” yeah, think again. If you think all three services linked together in one cohesive strategy — well, now you’re thinking. Oh yeah, Comdisco still does leasing better than ever. Today, the \$2.4 billion company, who got its start leasing IBM mainframes, lists services that include asset management, business continuity, network services, and equipment leasing and remarketing.

Comdisco wants you to think of three other terms as well when you hear its name: Independence, Flexibility and Experience. Good words, but Comdisco understands that, for the IS manager, words just aren’t enough. Therefore, Comdisco works as an unbiased partner with IS managers. A partner with no emotional bonds to anyone but its client.

When Comdisco says it is independent, you can believe it. The company has no ties to hardware platforms and no history with software developers, allowing it to provide true “open computing” solutions when clients call. From IBM mainframe leasing to the

recovery of networked HP 9000s, Comdisco addresses the needs of today’s multi-platform managers, based on the customers requirements and not the fulfillment of an obligation to a vendor.

“There is a change in the psychology in the IS organization,” says Martin Walsh, Comdisco executive vice president. “IS is now in a ‘win-lose’ situation, where others judge whether or not [IS does] a good job. The IS manager needs help.”

And that’s where the 30 years of Comdisco’s experience comes into play. According to Rosemary Geisler, president of Comdisco’s Distributed Systems Division, asset management, network management and business continuity (traditionally separate, but equally important, operations) can no longer be considered independent of one another. These three processes need to be executed together in order to gain the most effective and efficient distributed enterprise.

A pioneer in asset management, Comdisco’s strategy lets you manage, control and reduce the costs of your distributed networks.

To better reflect the services it provides, Comdisco Disaster Recovery Services changed its name to

Comdisco Continuity Services. With over 3,500 clients, Comdisco’s Continuity Services business grew 19 percent last year, with earnings rising 41 percent.

In late 1996, Comdisco introduced two programs aimed at enterprise continuity: program management services, including assessment, implementation and management of customers’ continuity programs; and coverage services and products which extend protection to the entire enterprise. Comdisco Continuity Services’ offerings also include traditional business continuity services and alternate facilities, network services, trading floor recovery and Millennium Testing Services.

“Disaster recovery is event-oriented and reactionary,” maintains Walsh who reiterates the importance of linking disaster recovery with asset management, and even network management operations. “Most managers go at their disaster recovery too quickly, without knowing what they have to begin with. Today’s IS shops are distributed out to end-users, so the disaster recovery plan is no longer in the glass house.”

—Charlie Simpson,
Editor-in-Chief

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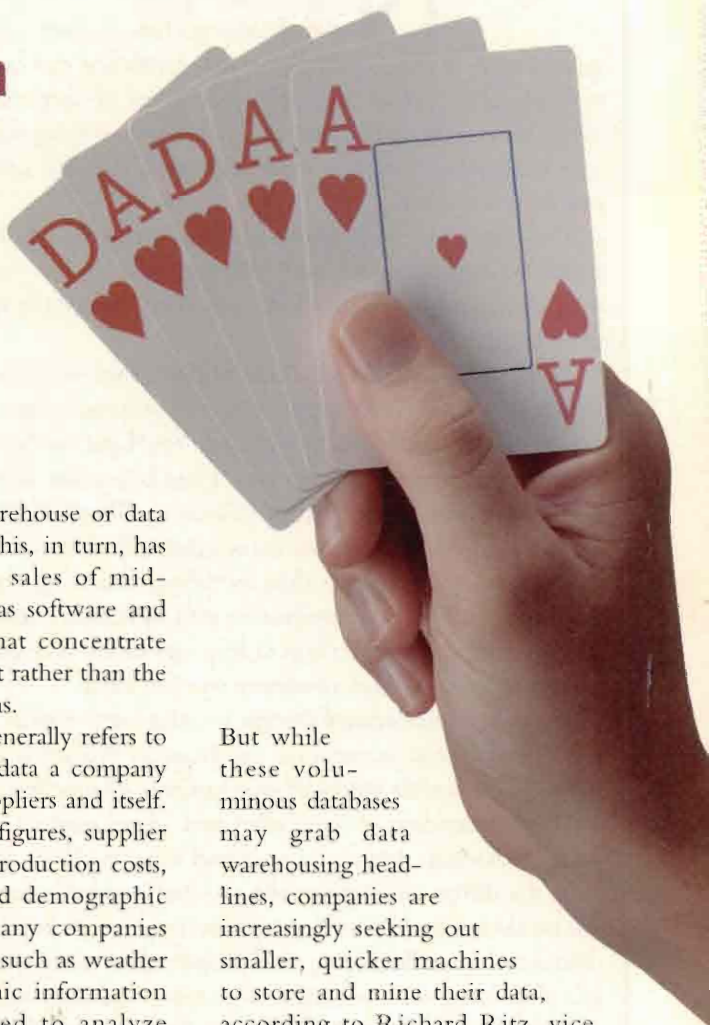
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mention "data warehousing" to most computer professionals and you will conjure up images of large mainframes holding terabytes of data, IT professionals composing complex queries, and project managers working with multimillion dollar budgets for projects that take anywhere from 24 to 72 months to develop and deploy.

While that may still be the case with many mainframe-based data warehouses, the process of storing, retrieving and analyzing company data is also proving fertile ground for vendors and users of midrange products and services. Many companies are moving aggressively to create mini data warehouses or so-called "data marts," and the acceleration of Web technology and corporate intranets has led to sharply increased numbers of knowledge workers with a need or interest in accessing data stored

in a warehouse or data mart. This, in turn, has pushed sales of midrange servers, as well as software and consulting solutions that concentrate on the midrange market rather than the multiterabyte behemoths.

A data warehouse generally refers to a repository of all the data a company stores about clients, suppliers and itself. This can include sales figures, supplier prices and inventory, production costs, and psychographic and demographic data on customers. Many companies even track information such as weather patterns and geographic information that can later be used to analyze whether, for instance, more of one product was sold when temperatures dropped or whether a certain type of offer was better received in Texas than in Oregon.

The sheer volume of this type of data can add up to the 1.2TB data warehouse of Bank of America or the 7TB colossus of Wal-Mart Stores Inc.

But while these voluminous databases may grab data warehousing headlines, companies are increasingly seeking out smaller, quicker machines to store and mine their data, according to Richard Ritz, vice president of the Data Warehousing Institute (Gaithersburg, Md.).

"These are happy times for the hardware and database vendors," says Ritz. "The midrange market absolutely provides a major opportunity. It's heading into a mass adoption phase. And it's not going to be just one server, it's gonna be multiple servers."

Ritz' comments are borne out by a 1996 study by the META Group (Stamford, Conn.), a technology and market research firm, which says that the data warehouse market, including hardware, software and services, will

grow at a 40 percent compound annual growth rate (CAGR), from \$2 billion in 1995 to more than \$8 billion by 1998.

Further bolstering confidence are findings like those of business intelligence software maker Cognos Inc.

(Burlington, Mass.), which says that roughly 80 percent of the world's 2,000 largest companies have some type of data warehousing initiative planned or in progress.

Judy Cushing, marketing manager at Cognos, says this is because companies



CAUTION!

DATA WAREHOUSE CONSTRUCTION SITE AHEAD

No doubt about it. There's a mad rush out there to get in on the data warehousing frenzy. And with good cause. A properly implemented warehouse can be a wellspring of insight into your mountains of corporate data. Do it right, and you're on your way to mining data and unearthing a mother lode of customer-focused competitive information.

However, like most major construction projects, the roads leading up to the work site are often bumpy. And the potholes are avoidable if you pay close attention to the caution signs.

Lack of an Experienced General Contractor — Proper construction of a data warehouse is a complex process. Definitely not a do-it-yourself project. You'll get far better results if you hire a company which has built other warehouses and has a good list of references. They'll understand all the arduous tasks associated with data warehouse technology, such as data modeling, cleansing, conditioning, architecture, integration and technology selection. Recruiting an expert firm to help you tackle your project is probably the best investment you can make.

Improper Architectural Design — Absolutely critical to a successful data warehouse construction project is an accurate yet flexible model of your business information. A clear understanding of how, what and where operational data is collected, stored and analyzed helps to clarify and drive the design of your warehouse. Architecture includes the hardware and network resources required to build a data warehouse. But today, most projects do a pretty good job of building that foundation. However, when key items are omitted from the overall vision — forgetting to add an extra aisle here, a storeroom there — you'll be left without a proper structure to store your data.

Poor Quality Construction Materials — Hand-in-hand with design, quality building materials determine the long-term value you get from the completed structure. In this case, we're talking about the quality of the data that is extracted from operational stores and used to populate the

data warehouse. Contents of operational data must be rigorously analyzed and cleaned up before bringing it into the warehouse.

Remember, you're building the warehouse to avoid making inaccurate assumptions about your business. Don't furnish your warehouse with inaccurate data.

An Overly Aggressive Construction Schedule — Properly building an enterprisewide data warehouse takes time. Lots of time. There is a great temptation to abandon the project entirely or to downsize it from an integrated data warehouse to a standalone data mart. Be aware that although the data mart route looks good in the short run, it fails to solve long-term issues. Data marts are essentially "mini warehouses," built as isolated solutions for specific departments. The problem is, without an enterprise data warehouse, there's no common source for the data. Before long, you'll have lots of little departmental data marts, each extracting data from different operational stores and each reaching different conclusions. You'll wind up right back where you started without an integrated data analysis capability.

Unrealistic Owner Expectations — You saw the slick ad for the warehouse down the street. You read the copy asserting how marvelous business has been since the owner moved in. It talked about the wonderful nuggets the data mining operation was producing. You want one just like it, so you tell your general contractor. Well, if you picked the right contracting firm, they'll likely shed some light on the claims being made. They'll point out that it might cost a bit more than you think it does. They'll say it will take longer than you expect to build it right. And the bit about data mining? Well, they'll mention that you need to be prepared to work at it. The mining tools are still a bit new and they don't always find things automatically. To reveal previously unrecognized patterns in your data, you'll still need some human ingenuity and insight to uncover the gems.

—*Michael Berry and Gordon Linoff are principal consultants at MRJ Technology Solutions (Philadelphia, Pa.), a specialty systems integrator focusing on data warehousing and data mining solutions. They also are co-authors of Data Mining Techniques for Marketing, Sales, and Customer Support (John Wiley & Sons).*

THE ALTERNATIVE IS TO HAVE ONE PERSON FROM SYSIX POLITELY KNOCKING AT YOUR DOOR.

If you've been designing your own data warehousing solutions, you've probably opened the door to a multitude of frustrations. You're juggling relational databases, front-end tools, consultants for this and vendors for that. You work with many software and hardware suppliers — but there's no single source responsible for your project's success. The problem is, you face hundreds of solutions and not enough answers.

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are responding to competitive pressure to have at least as much data and business intelligence at their fingertips as any supplier or competitor. This combined with Web technologies is moving data warehousing from mainframe-based systems to smaller machines and systems that can bring information to the desktop — and laptop — more rapidly. The creation of data marts is one outcome of this.

Though the definitions and parameters are changing rapidly, data marts are usually thought of as a data repository under 100GB in size. In addition to size, a data mart can also be defined by its purpose, which is often of much more limited scope than a full-sized data warehouse. Examples of data marts might be those that are for a specific company product line.

Data marts are sometimes built because a company does not want to invest two or three years and the millions of dollars associated with building enterprisewide warehouses. They also might be created to prove the viability or need for an enterprisewide data warehouse. The META Group predicts that corporate investments in data marts and single-subject data warehouses will grow 21 percent over the next 12 to 18 months.

According to David Folger, program director for workgroup computing strategies at the META Group, the emergence of data marts is also due to developments and refinements of client-server tools to help view and analyze data. In addition, Folger says the emergence of the Web has moved data reporting and analysis to the midrange server.

"Effectively, when you build these Web servers you are creating a data mart. The midrange market is super-robust. In fact, it is more robust than the high-end market right now," Folger says.

Cushing says more simply, "People know there is a return on investment at the end of a data warehousing project, but they often don't want to wait 18 months or two years to get it. So they start with data marts."

Companies use the data in their warehouses or data marts for every-

thing from targeting mass mailings to fine tuning product mixes. Using its data warehouse, for instance, Bloomingdale's department store has been able to determine that its average customer is female, visits its stores 12 to 16 times per year, is well-traveled, affluent, highly-educated and mobile. The company is using this understanding of its customer base to target mailings and promotions to specific markets and groups within these demographics.

RIGHT ON TARGET

One of the larger companies helping companies do such targeted mailings is Acxiom (Conway, Ark.). Acxiom stores and sells consumer data to hundreds of Fortune 500 companies, including the country's largest banks, insurance companies, telephone com-

panies, manufacturers and retailers.

Tim Donar, systems database administrator for Acxiom, says he is working with banks and data warehouses for credit card pre-approval mailings. While a typical bank might have 20 million names in its database, it might only want to send a pre-approved mailing to 100,000 of those names. Acxiom can look at demographic and consumer data on the 20 million and select those for the mailing based on criteria outlined by the bank.

While Acxiom built its business running data queries on large mainframe systems, Donar says he too sees movement toward new niche markets in data warehousing for smaller and quicker systems and software.

"We're not unplugging the mainframes right now, but I'd say some of

Vendors In The Data Warehousing Market

Arbor Software Corp.
Sunnyvale, CA
(408) 744-9500
www.arborsoft.com

Essbase software is an OLAP application that integrates data from data warehouses and other storage areas, allowing users to analyze data using a spreadsheet.

Cognos
Burlington, MA
(800) 426-4667
www.cognos.com

Scenario is a software product for enterprisewide guided data analysis and data mining. Powerplay is an OLAP client. Impromptu is a query and reporting tool.

Computer Associates International Inc.
Islandia, NY
(800) 225-5224
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Jasmine applications execute on client workstations and communicate with a database server that executes business logic and provides storage for multimedia objects. CA-OpenIngres is a suite of relational database management products.

Geac Computer Corp. Ltd.
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DataBlade Modules are plug-in object extensions that expand the general purpose capabilities of Informix-Universal Server to manage complex data types such as video, audio, image, spatial, time-series and Web (HTML).

the projects we're doing are not too far away from going to open systems solutions," Donar says.

HP is particularly well positioned to take advantage of this move from mainframes to open systems. Surveys conducted at the META Group's DCI Data Warehousing conferences over the last two years have shown HP to have both the highest percentage of organizations using their data warehousing applications (33 percent, followed by Sun at 24 percent, IBM at 22 percent, and Digital and Compaq at 16 percent each). According to a report by IDC (Framingham, Mass.), a business research group, HP's new 64-bit D-class and K-class servers present a strong offering in the low end and heart of the UNIX midrange market to compete with Digital and Sun.

George Ferguson, Open Warehouse

program manager for HP, sees data warehouse and data mart needs driving a demand for midrange systems.

"No matter how large a system people are asking for, typically you do not build that large system overnight," Ferguson says. "You'll end up with the project from hell, which has no end, makes no one happy and shows no results for a couple of years. So we definitely advocate that you start with a single subject area, very data mart-ish, minimal automation and that shows some results within a few months for a more limited environment. This should be done even if you intend, eventually, to have a multiterabyte warehouse."

It was exactly this type of strategy that the Canadian Bank of Imperial Commerce pursued when it first approached HP. Ferguson says the bank's interest was in studying risk

management of its holdings throughout Asia, Europe and North America, and that it initially set up a warehouse that sourced about 20 systems around the world for economic and political information and data. The system was installed on an HP T500 server.

STOCKPILE SOLUTIONS

Also setting up their system on a T500 is MacMillan Bloedel Ltd., Canada's largest forest products company. Based in Vancouver, British Columbia but with a large U.S. branch in Atlanta, Ga., MacMillan Bloedel has an annual turnover of inventory of \$3 billion.

HP provided data warehouse consulting services and set up an HP 9000/T500 server with 25 to 30GB of storage, using Sybase-SQL software to store, track and view customer sales data and regional distribution patterns.

"We're a distribution business.

Before there was no way to track sales on a day-to-day basis, you got market feedback much later," says Chris Abel, manager of business development for MacMillan Bloedel. "We are now looking at things on a daily basis. This makes a big difference in the way we stock and sell items."

Sharing data through MacMillan Bloedel's data warehouse has had another less-anticipated effect on the business. What was previously seen as a Canadian business in Vancouver with a U.S. branch in Atlanta is now being drawn closer together due to the ability to simultaneously and almost instantaneously share the same data.

BUILT FOR LIVING

Moen Inc. (Cleveland, Ohio) is another HP client using a data warehouse strategy to better understand its business practices and customer needs. The \$600 million per year plumbing and bathroom fixtures company uses its data warehouse to view data in an almost infinite variety of ways, according to Jim Lach, manager of application systems for Moen.

Lach says Moen uses PowerPlay software from Cognos to see things such as multiyear sales histories, service level information and open orders. He likes the fact that the software and

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Prism Solutions Inc.
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Prism Warehouse Manager automates the construction of data warehouses. The software provides "meta data" — including what the data is, where it came from and how it has changed over time.

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WHAT'S BEHIND DATA WAREHOUSING

Seduced by statistics such as an average 401 percent ROI over three years, it's tough to find a company today that isn't in the process of implementing its own data warehouse. The META Group (Stamford, Conn.) reports that most data warehouses double in size after the first 12 to 18 months. Exponential growth is a sign of success in data warehousing, but it can be a tactical nightmare if components fail to scale easily.

One-third of the average \$3 million initial cost of a data warehouse project is typically spent on professional services. Another one-third goes to specialized software for extracting, transforming, storing and analyzing data. The remaining one-third goes to systems and storage.

Companies that build data warehouses using commodity storage soon find themselves at a disadvantage in maximizing the business value of their information assets. There are several key differences between commodity storage and more intelligent enterprise storage solutions in a data warehouse environment — scalability, availability, flexibility, manageability and investment protection.

To date, many open systems configurations have not proven reliable or scalable enough to support the very large databases involved in data warehouses. Groups of standard server disks and external disk arrays are one answer to the capacity issue, but those solutions fall short of the robustness necessary for a decision-support environment.

Many corporate decision makers involved in the warehousing

effort fail to recognize the true capacity requirements of a multidimensional database; that is, the three- to five-fold difference between 100GB of raw data extracted from an operational system and 300 to 500GB of fully indexed, usable information needed for data warehousing applications.

Flexible storage that continues to add value and functionality throughout changes in server vendors, configurations and applications is not only a convenience, but a necessity.

If a company is running a six-hour query that's critical to their business and there's even a momentary interruption in availability because of a storage failure, hours of processing time are wasted.

Flexibility means offering enterprise-level connectivity so that servers from all major vendors can connect to the storage system simultaneously.

Managing critical data becomes increasingly complex as the size of the warehouse grows. The processes of storage configuration, optimization and administration, including backup, recovery and business continuance, can become overwhelming when they require the repetition of each activity for data residing on multiple, isolated islands of commodity storage.

As data warehouses grow to multiterabyte mountains of information, an organization's IT decisions will determine whether they become powerful competitive weapons or organizational nightmares.

Failure often traces back to one simple cause. The implementors didn't plan for success.

—Mitch Seigle is senior Product Planner with EMC Corp. (Hopkinton, Mass.).

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Data Warehouse

hardware lets him and others break things up into categories that are relevant to them.

"We might want to do a trend analysis," Lach says. "We want to see how the bathroom faucet line is doing.

80 percent of the world's 2,000 largest companies have some type of data warehousing initiative.

Or we can go into the kitchen faucets line. We also break it down into wholesale, retail, OEM and international. You can analyze the data by product lines such as faucets, sinks or accessories, or by customer level."

The company has spent over \$100,000 in the past six months upgrading servers, UNIX and Oracle database systems, and expenditures are only expected to increase as Web technologies facilitates access to corporate information resources. Today, approxi-

mately 100 employees have access to the data.

The data warehouse has contributed to a couple of notable internal improvements in the way Moen does business. "The number one thing is that it has enabled people not to need IT resources in order to get the information," Lach says. "So the immediate benefit is enabling people to go get the information they need. It also helps clear up the data. Today, we still have too many people walking into meetings with reports that don't match."

The benefits of managing data versions is central to what Ferguson sees as the future impact of warehousing and data marts in midrange systems.

"Conceptually, the data warehouse should be a resource to just about anyone in your company," Ferguson says. "In the 1980s, though, decision support systems were only used by 2 percent of the knowledge workers, basically a small group of market analysts

or financial analysts. Today it might be 20 percent. The Web holds the promise of greatly expanding this. It will probably take it over the 50 percent level. So we will see great impact from the Web in terms of bringing it out to more users and at lower cost."

— James Dukart is a writer and business analyst with the Washington News Bureau.

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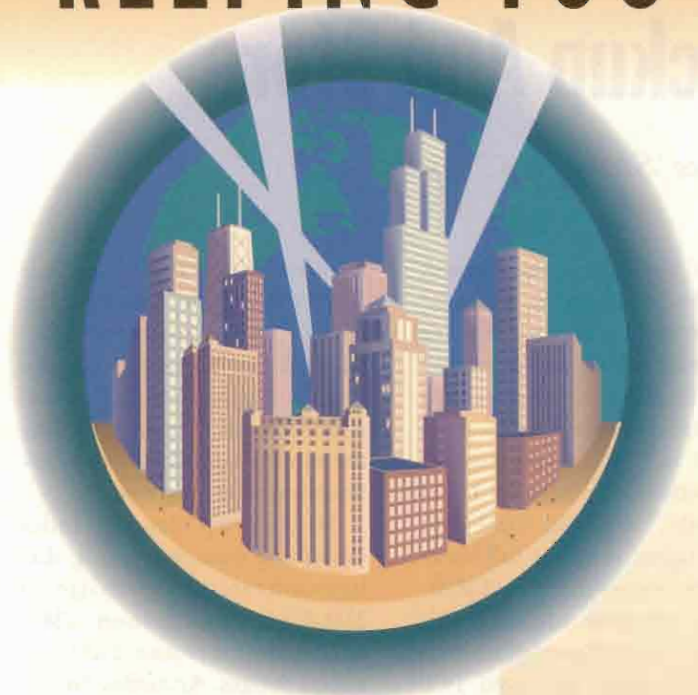


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To Protect, Backup And Store

Circuit Center Centralizes Storage Control

Dick Davies

When Lins Alt, IS director at Circuit Center (Dayton, Ohio), decided to look for a commercial backup/restore product, he focused on three key requirements: protecting data by ensuring regular backup, centralizing the process, and simplifying data restore so users are able to manage it themselves.

Circuit Center Inc. fabricates printed circuit boards for a who's who of the Fortune 100 and international electronics companies. Customers range from Ford Motor, General Motors and General Electric, to international computer leader Thomson Consumer, and includes local companies that make specialized military communications equipment.

Two major problems convinced Alt and his organization to move from scripts and utilities to commercial backup.

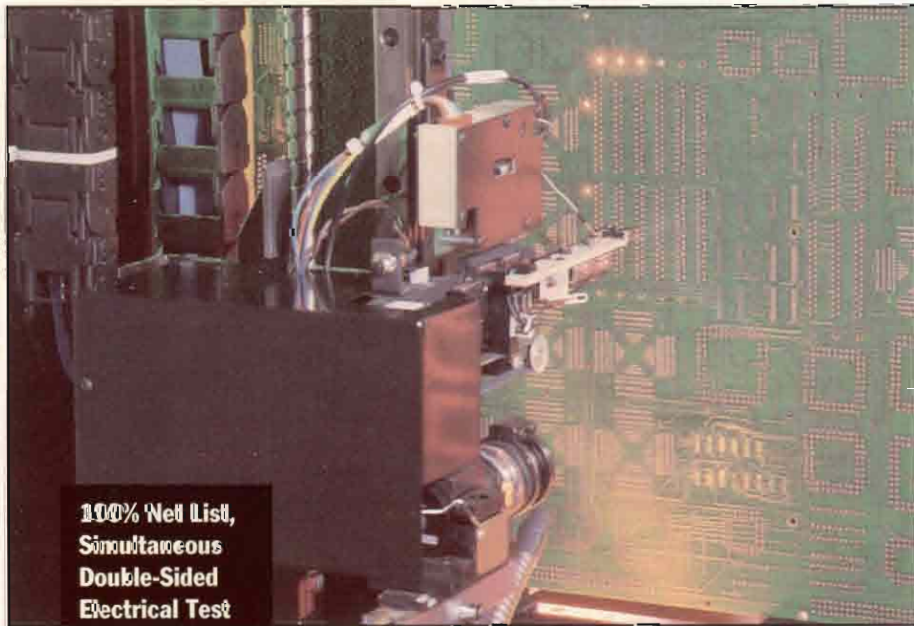
First, one of Circuit Center's hard drives, containing proprietary in-progress CAD designs, was lost — fortunately, just temporarily. Second, Alt wanted to ensure the safety of the company's increasingly valuable intellectual property, particularly as new employees arrived or experienced workers left the company.

The need for a centralized, reliable commercial backup/restore product — to replace random backup on Windows NT and HP-UX workstations was clear: "We decided to put a system in place to backup all workstations. We back up 12GB per night," says Alt, "and over seven nights, we get a full backup. Not every night is 12GB, but on our peak night Circuit Center is reconfiguring the network to have the two NT servers with the tape libraries on different segments of the network, using a network switch, which should increase bandwidth to close to 2GB per hour."

The second tape drive has always been on a separate

machine. This is possible because Software Moguls' (Minnetonka, Minn.) SM-arch supports distributed tape drive and libraries from a single backup control point. Circuit Center is moving the remote tape device to a different network segment.

Backed up data includes everything from accounting data spreadsheets to International Standards Organization (ISO) documents for process control to circuit designs. According to Alt, ISO documents in progress sometimes were not left in a file with reference notes when an employee left the company. As a result, files had to be recreated. Implementing the backup-restore planning eliminated that problem.



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THE DECIDING FACTORS

Alt's criteria for backup is not complex, but it is clearly defined. The backup system needed to be fast enough to do the required backups in a tight window. Speed became a top priority based on the amount of information that Circuit Center needs to backup, and the lack of time to complete it.

"We work a 7x16 week here, with two shifts of eight hours each day, seven days a week. Obviously we need to backup the system when the users are offline and the network is idle," says Alt. "That does not give us much time. We have only an eight-hour window at any given time to do the backup. We want things backed up incrementally every day."

Weighing all the factors in the process that affect backup speed — network bandwidth, client speed, network configuration and backup software — Alt found that SM-arch was "one of the top runners in terms of backup speed, with its ability to write

the indexes locally and have multiple indexes online," maintains Alt.

Circuit Center also needed software that would handle jukeboxes and

"I think that recovery is improved if a user is able to specify what files they need restored."

autochangers, so they could automate the backup process. "Several products did the backup job but required a manager to feed tapes all the time for backup," Alt indicates. "That automated capability was a big consideration. Software Moguls does this the best of anybody that I looked at."

While central IS control was always considered essential as a fundamental part of the backup function, restore was a different matter. It also rated as a

key priority, with the objective of simplifying user-based recovery and removing IS managers from restores. "I think that recovery is improved if a user is able to specify what files they need restored," says Alt. "If we are going to tell users that they can have multiple versions on tape, then they need to be able to make the decision about which files

need to be recovered when restore is necessary. To put the burden on a single administrator to be forever going back to fetch files for users is too much work. The recovery process should be controllable by the user."

Software Moguls Inc. can be reached at 6400 Flying Cloud Dr., Eden Prairie, MN 55344; (612) 914-7057; info@moguls.com; www.moguls.com.

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E-Money Makes The World Go 'Round

“Have you ever bought anything over the Internet?” It’s a question I often ask my students after

lunch during one of the occasional Internet courses that I teach. The gasps are usually audible:

“Of course not. They’ll steal your credit card information.”

“Heavens, no! I heard there are hackers out there waiting for the chance to grab all your personal information.”

This dark veil of paranoia could keep electronic commerce from gaining any ground in North America until the next century. But this past April, HP signed an agreement to acquire the stock of VeriFone (Redwood City, Calif.), a company already in electronic commerce.

GET SET FOR ELECTRONIC PAYMENTS

Few also noticed that in the same week as the HP-VeriFone deal, the first SET interoperability tests had been completed. SET, which stands for Secure Electronic Transactions, is the protocol developed by Visa and MasterCard International that allows payments and electronic transactions to take place over the Internet. The gradual acceptance of a secure, industry standard protocol — SET — for moving stored electronic value through the Internet, has made possible the first pilot uses of electronic money.

Given the enthusiasm for retailing on the Internet, it may come as a surprise that HP thinks that Web-based commerce will be a late bloomer.

“The first major users of electronic payment systems will be banks and other financial institutions,” says Glenn Osaka, general manager for HP’s Enterprise Systems Business Unit. “After that we can expect to see a wave of big businesses use the technology and finally, small businesses and consumers.”

“What really limits consumer retailing on the Internet today is the number of people online and the perception that their transactions aren’t safe,” says Osaka. With the infrastructure in place, merchants, banks and technology providers can work together to build confidence in the security of retail transactions.”

THE BUSINESS OF BUSINESS-TO-BUSINESS

The acquisition of VeriFone gives HP an enormous advantage in marketing business-to-business technologies. The scope of value of electronic commerce between businesses dwarfs consumer-to-business commerce. HP’s Osaka puts it this way: “The difference between making a profit and not making a profit is optimizing which things in the supply chain are yours and which things aren’t. The impact of secure electronic commerce is that the four walls of your organization have really opened to become a collection of allied, internetworked organizations.”

In addition to making business-to-business payment transactions more

efficient, the VeriFone acquisition is likely to have a substantial effect on financial institutions. “Eighty percent of all payment transactions are still made using cash,” says Osaka. “Banks have figured out that there are a whole new set of services they can offer if they deploy digital payment schemes, and with those new services come new revenues.”

BANKING ON SUCCESS

VeriFone controls between 60 percent and 70 percent of the point-of-sale readers in today’s merchant networks. With two-thirds of that software upgradeable to smart card technology, banks can be expected to quickly educate consumers on the advantages of smart card technology over credit or ATM cards. According to Osaka, “this is an investment banks can’t wait to make.”

What the acquisition of VeriFone really means is that HP has the key technology to enable electronic payments over any public or virtual network — including the Internet. It also means that HP has the technology to enable banks to provide new services to their business customers and consumers.

HP’s relationship with Microsoft means that it can deliver Internet commerce solutions to a huge number of corporate and personal desktops.

Maybe the next time I should ask my students, “*What did you buy recently over the Internet?*”

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Not too long ago, companies stored their data the way they stored their hard goods—in out-of-the-way warehouses where the real estate was the cheapest. But enterprises of all types are becoming increasingly aware that accessible, centrally located data warehouses are crucial cogs in the business machine. “Storage is becoming much more strategic as a component in the IT environment.” says P... direct...

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Share & Share Alike

The challenge for today's data center — with its combination of mainframes, open systems and network servers — is to provide end users with instantaneous access to information throughout the enterprise. As the amount of data moving among platforms increases both in volume and transfer frequency, data sharing gives customers the tools to solve the technical problem of getting immediate access to data stored in today's heterogeneous systems.

Traditionally, data access with diverse platforms has been handled by cumbersome and inefficient methods such as tape-based file copies and movement, network-based file transfers (see *Figure 1*) or channel-to-channel system connections.

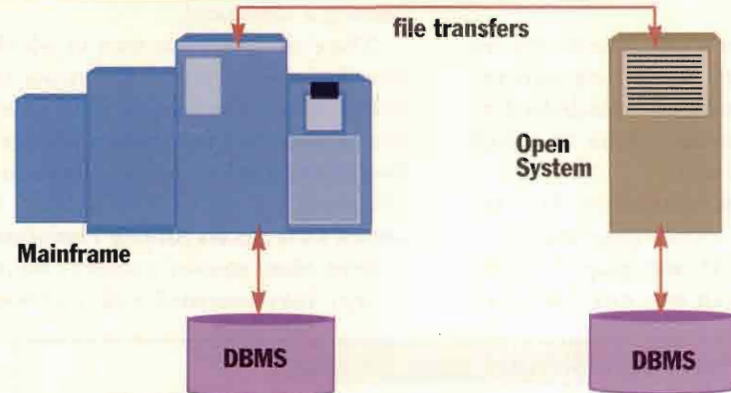
Although tape transfers can easily handle the largest file movements and are relatively secure in their data availability, they can be slow due to equipment limitations and the physical requirement of moving tapes between machines. The human element of tape movement also adds to the unpredictability of the process.

Network-based transfers create a direct connection between data source and destination, eliminating the physical transfer required in the tape transfer methodology. This creates a more predictable transfer, but — depending on network traffic and bandwidth — it is not necessarily faster.

For open systems to access mainframe data over a network requires TCP/IP running on the mainframe or a front end processor (which adds fixed and recurring licensing charges) and a network connection to the open system platform. A communications software package running on the mainframe then allows data requests to be made.

The main failing of this transfer methodology is the time required to complete the task. When transfers are infrequent or small (kilobyte sizes), the delay across a network — or channel — is manageable. As the

Figure 1: Network-based Data Transfer



• Network Bottlenecks • Low Performance • Reliability Issues

WILLIAM A. DYKAS

transfer frequency and size increases, the limited bandwidth of the network or channel causes bottlenecks. The time delay prevents the development of applications that need frequent and large updates of data, such as data warehouses. Performance varies directly in proportion to the size of the pipe. Channel-to-channel connections deliver similar results, except at faster speeds.

Transferring data takes time and requires system-based resources to complete the task, duplicate storage requirements for source and destination data, and has inherent human and equipment unreliability. To all this add personnel, licensing and training costs.

While these data transfer methods are common and clearly defined, they fail because of unreliability, excessive resource usage and their inability to keep up with the increase in the amount of data being transferred.

Get Your Share

As today's storage technologies attempt to address the data transfer problem, one methodology that eliminates transfers is data sharing.

While there are several different approaches, true data sharing eliminates data transfer problems by enabling direct access by dissimilar systems to a single copy of stored data.

Consider the case where HP 9000 users need to extract large amounts of data from IBM and plug-compatible mainframes. With true data sharing, HP

9000 users can read IBM and plug-compatible mainframe data as if it were located on local disks (see Figure 2). The mainframes view the shared volumes as Block

network access to transaction-oriented mainframes can be eliminated with data sharing. Data sharing enables the writing of specific mainframe datasets that are

Data sharing enables the writing of specific datasets that are readable by open systems, but shields other data from view.

MUX Channel or ESCON-attached IBM 3990 controllers with 3380/3390 DASD, while the HP 9000 systems see them as local SCSI-connected disks.

So, users connected to an open system or a LAN who want to read mainframe information can directly access a single image of the mainframe data and load or read the data into an application on the destination systems — instead of copying files and data extracts — from the mainframe to the destination systems (i.e., HP 9000s, NT servers or other open platforms). As a result, the time needed for data transfer or data copying is eliminated.

There are four main ways in which true data sharing brings efficiencies to today's data center: secure data access among platforms, data transfer elimination, function offload and function consolidation.

Secure Data Access Among Platforms
Systems administrators' concerns about security risks associated with end user

readable by open systems but shields the other data from view — essentially building a firewall between the shared data and other mainframe data.

This ensures complete security of any mainframe data that the customer chooses not to share with other systems. With true data sharing, the mainframe writes the data to the storage system and this data is then immediately readable by other systems attached to the storage system. SCSI-attached and mainframe channel-attached platforms have direct access to each others data.

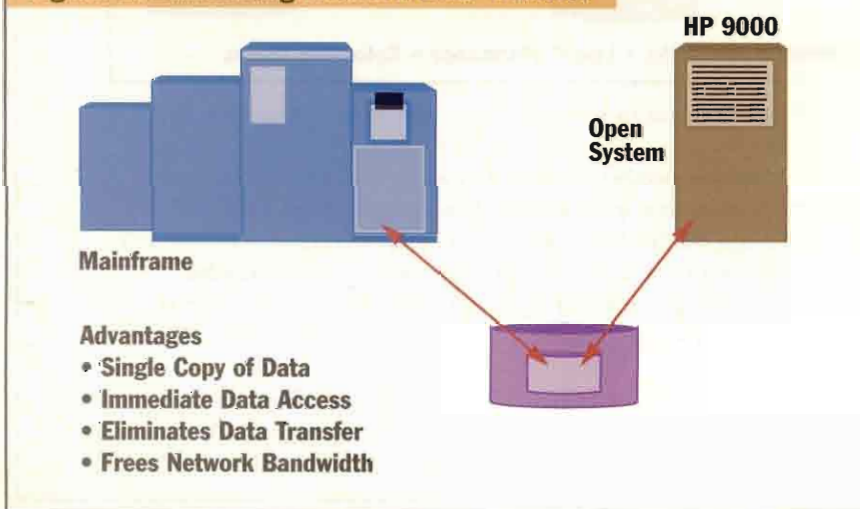
Data Transfer Elimination

In data transfer elimination, the goal is to increase the timely access to large amounts of data. Transfers by network or channel connection increase the time delay for data availability, and also add significant costs associated with software, hardware and administration. Because true data sharing enables a single copy of the data to be stored in one location, the network or channel connection can be eliminated and the data can be immediately accessed, which eliminates the transfer.

For example, timely access to data in data warehouses increases the ability to turn data into information for critical business decision processes. The user can now offload data summarizations from the mainframe without concern for extract data volume. Once written, the mainframe extract data is available immediately to the open system's host for analysis.

It is now possible to manage very large extract data volumes, meet service targets, and have real-time data availability, so that less time is spent waiting for data. This allows more time to address the

Figure 2: Eliminating Network Data Transfer




```
corp:/acctg >ls general.ledger
UX:ls: ERROR: Cannot access general.ledger:
No such file or directory
```

```
corp:/acctg >ls payroll.1qtr
UX:ls: ERROR: Cannot access payroll.1qtr:
No such file or directory
```

```
corp:/mfg >ls inventory.cont
UX:ls: ERROR: Cannot access inventory.cont:
No such file or directory
```

```
corp:/mfg >ls order.entry
UX:ls: ERROR: Cannot access order.entry:
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Function Offload

Function offload represents the case where a process, or part of a process, is moved to a platform with a more suitable price/performance ratio. For example, moving data from a mainframe to a high performance open system such as an HP 9000 for a sort operation. In this case, the cost and inefficiency of the mainframe performing the sort operation makes sending the data to another kind of system appealing.

Using data sharing to make bi-directional data exchange available, the sort can be moved. The end result is completing the sort faster and saving expensive mainframe processing power.

Function Consolidation

Typically, disparate hosts require independent backup solutions for their data storage. Replicated systems duplicate tape hardware, software licenses, personnel and training. True data sharing function consolidation is achieved because traditional mainframe tools and procedures can be used to back up complete open systems volumes (such as database volumes/partitions) to mainframe tape subsystems.

True data sharing makes direct data access possible. Immediate access to data allows users to run applications that previously were inefficient, costly and even impossible. Eliminating data transfer simplifies the development of applications, reduces costs associated with hardware, software, licenses and training, and prevents the duplication of storage.

Benefits of true data sharing are increased performance of data warehouses, increased security of open systems backup through the use of standard mainframe backup tools (i.e. for disaster recovery), and offloading processes to platforms with optimum price and performance. It creates the potential to increase operational efficiency and build competitive advantages for an organization.

— William A. Dykas is DataShare product marketing manager for Encore Computer Corp., (Ft. Lauderdale, Fla.), a provider of scalable real-time data storage, data retrieval and data sharing technologies.

TAPE UP THE EDGE

A database crash or accidental deletion could ruin the chance of getting a competitive edge. The challenge is exacerbated because your company, like so many others today, can no longer afford to take down your databases in order to perform backup. More companies rely on their mission-critical data 24 hours a day, seven days a week. There is no time for downtime.

Performing data backup has to be done on the fly; this is known as "hot backups," in industry terminology. You'd prefer not to think about it. Having upgraded or recently installed a new, state-of-the-art database, the last thing you want to hear is that something could go wrong. You could procrastinate, reasoning that you don't want to incur the additional cost associated with backup and storage.

However, you realize that you can't ignore the reality — the cost of not backing up your information. Industry analyst Michael Peterson, of Strategic Research (www.sresearch.com) says, "Few, if any, companies can really afford to have downtime which can run at a cost of more than \$50,000 per hour." Conventional backup methods, he says, are too slow, and lack the reliability and scalability required by UNIX-based systems.

Peterson says a number of factors present problems for MIS directors at sites which run very large databases (VLDBs):

- Short to no backup window
- High system and application availability
- Heterogeneous platforms and complex networks
- Distributed and replicated databases
- File systems ranging in size from hundreds of GBs to TBs
- Thousands to millions of tapes under management

It is these very factors that make tape storage a viable solution. Yes, tape. Several years ago, conventional wisdom held that tape would be phased out. It was too old-fashioned, not fast enough, not cutting-edge enough. Optical storage was clearly the way to go. So it was said.

However, tape has continually proven itself as an inexpensive, reliable storage solution costing companies less than a penny a megabyte in many cases. Peterson estimates the cost advantage ratio for tape versus optical media at approximately 50:1.

More importantly, tape has kept up with industry demands. Recent advances in its capacity, performance, durability and reliability have kept tape at the top of the list for offsite data transportation, backup and restoration. For instance, tape cartridges can routinely hold as much as 10GB of data. By contrast, PC optical drives top out at 650MB.

What does all of this mean to your company? Tape, in conjunction with good software tools and a reliable backup/recovery plan, continues to be a desirable tool to help you manage your backup function. It allows data to be quickly stored at an offsite location, while permitting quick restoration of that data when the need arises.

— Paul Wordeman, VP at SCH.

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Shedding Light On Optical Storage Or The Lowdown On LIMDOW

Hey MO

The demand for higher-capacity online storage is growing so rapidly that analysts at IDC (Framingham, Mass.) estimate that storage shipments will grow from less than 75 petabytes (PB; a petabyte is one quadrillion bytes of data) in 1996 to more than 280PB by the year 2000. This translates to an increase of approximately 98 percent per year.

With storage capacity requirements rising to new heights, the need to minimize the risk of data loss has become significantly greater. Because

no other storage medium offers the unique combination of features that optical provides — high capacity, low storage cost, long-term performance, durability and high availability — the technology is becoming increasingly important in departmental, corporate and enterprisewide storage solutions.

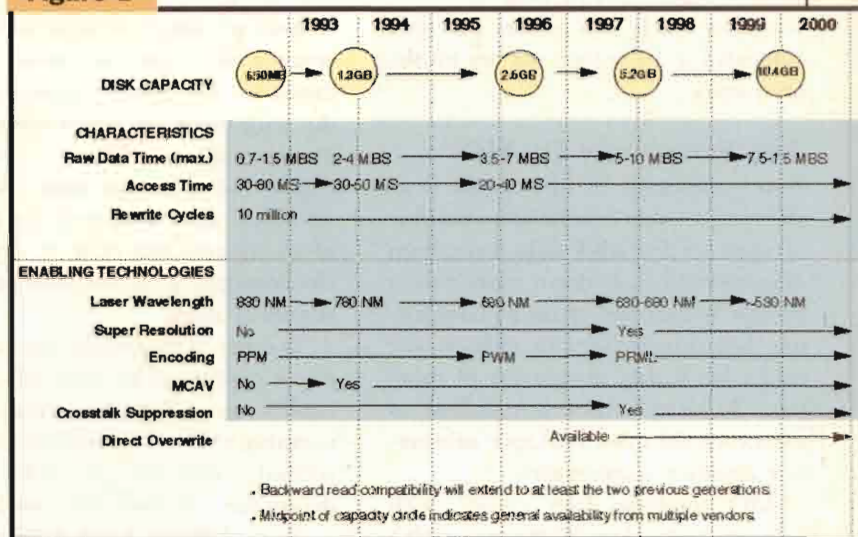
Magneto-optical (MO) disks specifically address this need. To maintain its position in the storage hierarchy, MO (like any storage technology) has had to continually increase its capacity. Two years ago, MO capacity doubled from 650MB to 1.3GB. Early in 1996, capacity increased to 2.6GB. Recognizing that corporate managers must plan for the future, members of the Optical Storage Technology Association (OSTA; Santa Barbara, Calif.) developed a roadmap of capacity and performance improvements (see *Figure 1*).

ENABLING TECHNOLOGIES

The key enabling technology which has permitted MO manufacturers to improve storage capacity and read performance has been the shortening of the wavelength of the laser used to write the data marks from 730 to 680nm (the shorter wavelength, the smaller the data mark). This permitted designers to reduce the distance between tracks from 1.39u to 1.15u. Even though laser wavelengths have become shorter, they have remained within the red spectrum. Until blue laser technology can be economically used in MO drives (sometime between the years 2000 and 2002), designers are focusing on shortening the laser wavelength even further to 530nm or less.

In addition to shortening the wavelength, designers also changed data encoding from pulse position

Figure 1



MASAYUKI ONOSE

modulation (PPM) to pulse width modulation (PWM). With PWM, the laser-written marks can vary in width allowing more information to be stored and read from a given amount of disk space. Current PWM recording code (Run Length Limited or RLL 1,7) means that the data mark can be any size up to a maximum of seven zeros.

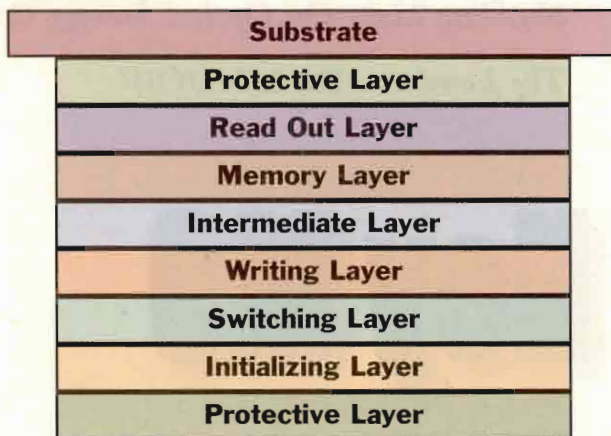
The third enabling technology was the implementation of the Zoned Constant Angular Velocity (ZCAV). ZCAV allowed tighter data packing on the outer tracks (66 sectors per rev), compared to 33 sectors per rev on the inner tracks.

THE EVOLUTION OF MO

A key advantage of MO media is its ability to tolerate a tremendous number of erase cycles. MO disks have been demonstrated to perform more than a million write/erase cycles without losing their functionality. In addition, the media has a data storage life of more than 30 years, which is sufficient to meet even the most restrictive information retention requirements.

MO combines laser science with magnetic technology. With current MO

Figure 2:



technology, data is written to the disk when a laser heats the surface of the media to the "Curie" temperature — the temperature at which polarity can be reversed — which is about 200 degrees Fahrenheit. This allows the heated area to align itself with the polarity of an adjacent bias field. A switchable electromagnet is used to record the data as ones or zeros.

In order to remove the data, an erase pass is required to set each data bit to a "null" state before new data can be recorded. After the process has been verified, a new data bit can be written during the next pass under the laser.

To read data, a lower laser power is

passed over the bit. The Kerr effect, or magnetic orientation of the recorded bit, causes a slight polarity rotation in the reflected beam which is detected by the drive's optical system.

Over the years, conventional MO technology came to be associated with well-defined drive/media interchange standards, widespread marketplace acceptance and multiple drive and media sources. However, while lower prices and increased capacities have been instrumental in the growth of the optical industry, applications for MO

have been limited because of the two passes required to overwrite data. With today's large files, the write transfer rate is a consideration for many organizations.

To solve the problem, Nikon developed its patented Light Intensity Modulation, Direct OverWrite (LIMDOW) technology.

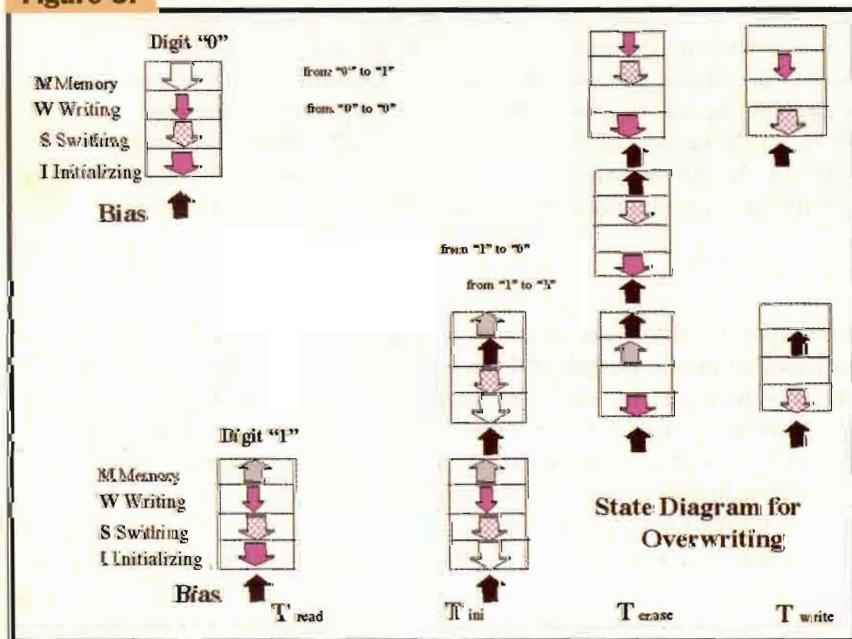
Like conventional MO technology, the LIMDOW approach is fully compliant with existing and proposed industry standards. However, there is one important difference: the overwriting process is streamlined from the two-pass process to a single pass. Drives incorporating the direct-overwrite capabilities of LIMDOW technology provide an overall performance improvement of up to 100 percent over conventional MO drives.

BREAK ON THROUGH

To overcome the earlier shortcoming of MO technology and its multiple pass writing process, LIMDOW technology combines multiple media layers with fast variable laser intensities (see Figure 2) to provide on-the-fly recording. By modulating the laser, rather than the magnetic field, drives incorporating LIMDOW achieve performance that is comparable with hard drives.

The technology eliminates the need for a second bias magnet by using media with one memory and five reference layers. This approach not only simplifies the drive design, it lowers manufacturing costs and improves overall drive reliability.

Figure 3:



LIMDOW technology consists of: media with layers for memory, writing, switching and initializing; a bias magnetic field for writing; and a laser modulated at three levels for reading, erasing and writing.

When the data storage domain is under the drive's read/write optical mechanism, the laser's intensity changes from erase to write in nanoseconds. In Figure 3, T read, T erase and T write are the laser powers of reading, erasing and writing, respectively. T ini stands for initialization, which is the process between T erase and T read.

Immediate and direct rewriting occurs because the LIMDOW media has a Writing layer which magnetizes the Memory layer through the Intermediate layer without requiring the switching of the bias field. The data storage domain instantly assumes the polarity characteristics of the underlying layer's magnetic field.

Once the new data is written, it is permanently stored and will not be affected by stray magnetics or contamination, which can quickly destroy data stored on standard hard disk drives. The MO media remains polarized and retains the data until the laser is applied to the data bit at the Curie point. Direct-overwrite MO drive reading is carried out in the same manner as with conventional double-pass MO drives.

COMPLIANT CONVERSION

Drives incorporating the direct-overwrite technology provide the most complete media compatibility in the industry. Unlike many other drives on the market that are only read-compatible, LIMDOW drives are both read- and write-compatible with non-DOW ISO-standard 650MB, 1.3GB and 2.6GB MO media, as well as CCW (write-once) media. Backward compatibility and media interchangeability allow organizations that have been using non-direct-overwrite MO drives to upgrade to a direct-overwrite MO drive without having to convert previously recorded optical disks. Standards compliance also ensures that as newer, higher-capacity drives and media are introduced, they will provide this same

protection with backward compatibility for two generations.

Because the new MO drive complies with all published and proposed industry standards, OEMs and integrators can integrate them into new jukeboxes to immediately double their storage capacity and their performance. For example, a 20-slot jukebox with 1.3GB drives can be instantly transformed from a 26GB jukebox to a 52GB jukebox. A 300-slot 1.3GB jukebox can be upgraded from a capacity of 390GB to 780GB — all without a substantial increase in cost to the manufacturer or integrator.

ON THE HORIZON

Committed to improving the storage capacity and read/write performance of MO drives, leading manufacturers continue to refine and enhance today's user-proven direct-overwrite technology. Designers and engineers are working to shorten laser wavelengths and devel-

op enhancements such as super resolution and crosstalk suppression. PWM encoding will give way to an even better and more compact encoding technique. At the same time, lighter laser and higher-speed drive motors will continue to improve read/write performance.

—Masayuki Onose is a senior manager with Nikon Optical Storage (Belmont, Calif.).

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Information storage has become a critically important element of IT managers' extended enterprise computing system environments, and continues to grow in importance as new applications drive a continuing explosion of data creation and use. This explosion of data is driving IT managers to demand ever-increasing amounts of capacity, higher data availability and faster performance from providers of storage system solutions.

Hewlett-Packard Enterprise Storage Solutions offers the broadest portfolio of information storage systems of any major systems provider in the market today. HP offers a broad spectrum of high-availability solutions that provide best-in-class products and technologies to meet the high-availability, scalability, performance and capacity requirements of its HP 9000 and HP 3000 enterprise systems customers. HP Enterprise Storage also works closely with third-party partners and other diverse HP divisions to create an open, standardized enterprise computing environment that allows IT managers to operate seven-day, 24-hour per day operations with no downtime and plenty of room to grow.

"Enterprise systems managers are clearly faced with maintaining and increasing storage system performance while rapidly adding capacity to meet their needs," said Liz Montgomery, manager of product marketing for HP Enterprise Storage. "We recognize that they not only continually need faster performance and higher capacity, but flexibility in adding and managing storage without loss of performance or functionality. Perhaps most important of all, we recognize the need for very high levels of fault resilience and data availability to keep mission-critical applications running."

HP Enterprise Storage offers best-in-class online storage that ranges from its external SCSI disk array enclosures to its self-configuring/self-optimizing disk arrays with AutoRAID technology to Fibre Channel-base High Availability Disk Arrays and very high capacity HP Symmetrix 3000 families. HP provides near-line storage solutions with its highly reliable and fast magneto-optical (MO) jukeboxes, and also offers best-in-class off-line automated data backup storage solutions based upon Digital Linear Tape (DLT) and Digital Audio Tape (DAT). HP also supports Storage Technology's very high capacity 3480/90-compatible tape subsystems and silos. HP also recently announced a full suite of Fibre Channel products that enable 100 MB/sec throughputs. Those new products include not only Fibre Channel versions of the HP High Availability Disk Array (its Model 30/FC) and the HP Symmetrix 3000 Integrated Cache Disk Array, but a new Fibre Channel storage network hub and SCSI-to-Fibre Channel multiplexer. All HP Fibre Channel products are based upon HP-developed Fibre Channel ASIC chips that today form the foundation for the vast majority of Fibre Channel products available today.

For its high-end online enterprise storage, HP partners with EMC Corp. to provide mainframe-class online storage solutions that deliver high performance in highly flexible, scalable subsystems with up to 2.95 Terabytes of information capacity. Fibre Channel versions announced in May (HP Symmetrix Models 3700, 3400/3430



and 3300/3330) have FC host interfaces that handle up to 100 MB/sec data transfers to meet the growing performance requirements of HP's K-Class, T-600 and V-Class Enterprise Server and cluster environments.

HP's midrange online storage solutions include the recently-announced HP High Availability Disk Array Model 30/FC, which provides up to 264 GB of raw capacity per enclosure for HP's K-Class, T-600 and V-Class Enterprise Servers. These arrays are based upon an innovative architectural design that emphasizes high availability and capitalizes

on the performance, flexibility and scalable benefits of Fibre Channel technology.

All of HP's new Fibre Channel products have one important attribute common: they provide IT managers with new dimensions of flexibility and configuration capability. Fibre Channel allows for connections of up to 3 Kilometers between servers and subsystems today, with up to 10 KM distances possible as early as 1998. HP's total Fibre Channel portfolio includes an FC-AL Hub that gives system managers the means to place hosts and/or subsystems farther apart, freeing up distance constraints imposed upon them by SCSI limitations. Up to ten ports can be used per hub to attach additional subsystems or servers to a single server, enabling higher degrees of fault resilience and data availability

while allowing IT managers to add more capacity. Finally, a new Fibre Channel-to-SCSI multiplexer allows IT managers to protect investments in older SCSI subsystems as well as add new SCSI-based tape subsystems. The multiplexer, or MUX, has two FC ports and 4 SCSI ports per device, and works at distances up to 500 meters to allow attachment of HP Advanced DLT Tape Libraries and Storage Technology's TimberWolf, Timberline and Redwood automated cartridge system silos.

To round out its online storage portfolio, HP offers its revolutionary HP Disk Array with AutoRAID models L2 and

“We recognize the need for very high levels of fault resilience and data availability to keep mission-critical applications running.”

**Liz Montgomery, product marketing manager,
HP Enterprise Storage Solutions Division.**

12H. These self-optimizing, autoconfiguring RAID storage systems take the pain out of configuring RAID for IT managers by automatically tuning and optimizing for the best possible performance for an enterprise system manager, particularly in online transaction processing (OLTP) applications. Features such as its

Dynamic Data Migration capability, which automatically stores active data in high-performing cache or RAID 1/0 mode and places less active data in low-cost RAID 5 mode, lie at the heart of its optimization capabilities. The arrays also feature a unique Active Hot Spare, which adds to fault resiliency by ensuring that the extra spindle works when a drive goes down and needs replacement. AutoRAID's outstanding performance--verified by recent TPC-C benchmark testing--allows IT managers to meet departmental performance criteria while reducing downtime associated with conventional RAID solutions, which tend to require lengthy and disruptive tuning. HP Disk Arrays with AutoRAID also reduce cost of ownership thanks to its ease of installation and configuration.

HP Enterprise Storage offers both near-line and off-line storage solutions as well. Its magneto-optical jukeboxes provide IT managers with a highly reliable means to store hundreds of gigabytes of data within easy access of HP 9000 and 3000 Enterprise Servers. HP's Advanced DLT Tape Libraries and DDS-3 DAT drives provide backup and recovery capabilities for enterprise and departmental servers, and HP supports StorageTek's mainframe-class Redwood, Timberline and TimberWolf ACS tape silos. All are supported by HP's OpenView OmniBack II suite of OpenView backup management software solutions.

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*Storage Management Expectations For
HP 3000 Environments*

Raising The Bar

As HP 3000 shops have moved to heterogeneous environments, there has been a growing need to manage common backups across multiple computers. Network integration and optimized efficiency being so critical in today's competitive environments, companies could certainly benefit by integrating backup and restore procedures for the HP 3000 into the enterprise model. And while separate network and HP 3000 local backups may be required in any given

scenario, automating HP 3000 storage management operations with a new "lights-out" tape library and autoloader technologies can only facilitate what otherwise are labor-intensive, error-prone procedures.

Recognizing these market needs, HP partnered with Legato Systems Inc. (Palo Alto, Calif.) to port and integrate NetWorker's client product with HP's TurboSTORE/iX offering integration and automation features. NetWorker is a cross-platform enterprise storage management solution. The new NetWorker HP 3000 client works by allowing HP 3000 data to be backed up over the LAN to a LAN-based NetWorker server — and its attached tape autoloader devices — allowing all platforms in the enterprise to use a common set of management tools.

"As the computing needs of HP 3000 customers continue to evolve, the HP 3000 has become an integral element in the enterprise, and, as such, its mission critical data and applications must remain secure and accessible in case of a disaster," says Winston Prather, HP 3000 R&D manager with HP's Commercial Systems Division. "While TurboSTORE/iX certainly meets the backup and restore needs for HP 3000 users in homogeneous shops, today's enterprise environment demands a common strategy for backing up enterprise data. The network is fast becoming the vehicle for integrating enterprise backups into one common strategy. The new NetWorker client was developed to address end-user requests to have a common backup strategy."

"By leveraging the TurboSTORE/iX infrastructure," explains Legato's Nora Denzel, vice president of product operations, "the NetWorker client module provides HP 3000 users with a single storage



SAM DIAMOND

management solution that supports all standard operating systems — UNIX, HP-UX, NetWare, Windows NT, Windows and Windows 95 — in addition to MPE/iX. The result: from a single storage management platform, operating under a broad choice of operating system platforms, companies can meet virtually all enterprise backup, restore, and archive needs.”

TAPE IT TO THE BANK

To optimize tape tracking and facilitate tape utilization, the new NetWorker client for MPE/iX supports NetWorker’s media pools that allow separate groups of tapes to be established within the autoloader, for any given purpose. Tapes designated for the HP 3000 on a LAN-based autoloader, for example, could be grouped in a separate pool from those used for the rest of the LAN. Or, customer information files,

whether created on the LAN or the HP 3000, could similarly be grouped into their own media pool. In addition, the module also allows end-users to perform their own restores through NetWorker’s graphical user interface.

The NetWorker clients support automated archiving. As a result, tapes can now also be used for storing infrequently accessed files, rather than keeping them on far more expensive disks. Furthermore, because the NetWorker client automatically documents the savesets and their locations in its library index — and can even maintain a shadow entry in end-user directories for these archived files — end users can access these files as they are needed.

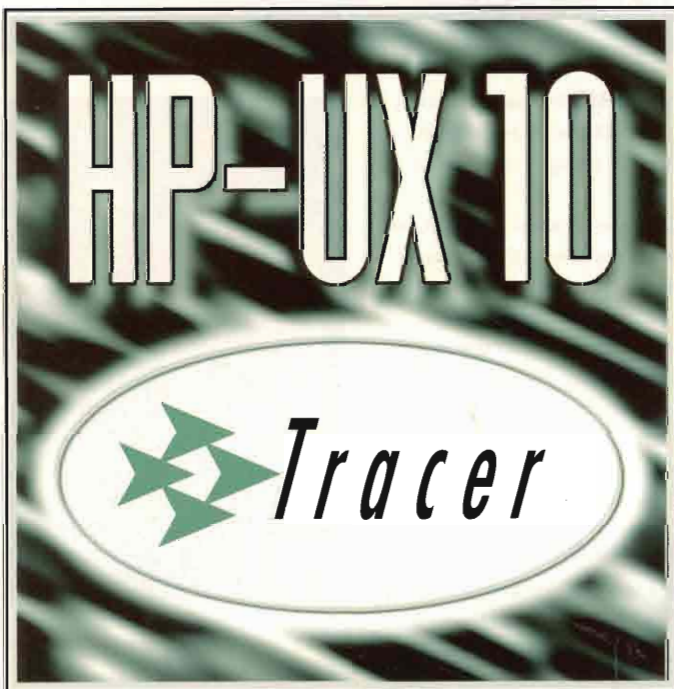
The NetWorker client for MPE/iX product is available directly from HP. In the future, HP and Legato plan to allow users to manage and backup directly to DLT libraries attached to the HP 3000.

Through a concept known as a storage node, the NetWorker client and storage node work together on the HP 3000 to back up both their LAN and HP 3000 data to the HP 3000 itself and its peripheral tape drives and autoloaders — and maintain centralized control over enterprise storage management.

“What the new NetWorker modules offer TurboSTORE/iX users,” says Denzel, “is the flexibility to establish the specific storage management configuration that best meets their operational requirements.”

The bottom line: With the new NetWorker client, HP has raised the bar on storage management in HP 3000 environments to the same high level as the rest of the enterprise network. The beneficiaries: All HP 3000 users.

—Sam Diamond is a freelance writer based in Tucson, Ariz.



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How Much Memory Is Enough?

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The right amount of memory varies according to the work you do and the software applications you're using. Today's word processing and spreadsheet work requires as little as 4 megabytes. However, systems equipped with 8 megabytes have become the low-end assumption by software and operating system developers. Systems used for graphics and multimedia call for at least 16 megabytes, and it's common for such systems to have 32 megabytes or more. The following chart provides a guideline to selecting memory.

Memory Recommendation		
Type of User	Typical Use	Recommended RAM
Light Administration	Light word processing, Light e-mail.	8MB — 12MB
Medium Administration	Word processing, e-mail, fax and communications software, databases. One to two applications open at a time.	12MB — 16MB
Heavy Administration	Word processing, e-mail, fax and communications software, spreadsheets, business graphics. Less than three applications open at a time.	16MB — 24MB
Light Customer Service	E-mail, databases. One to two applications open at a time.	8MB — 12MB
Heavy Customer Service	E-mail, databases, fax and communications software, word processing. Less than three applications open at a time.	12MB — 20MB
Light Number Crunching	Spreadsheets, e-mail, accounting software. One to two applications open at a time.	16MB — 24MB
Heavy Number Crunching	Spreadsheets, statistical applications, research, large databases. Less than three applications open at a time.	24MB — 32MB
Light Graphics	Word processing, page layout software, illustration/graphics software. One to two applications open at a time.	32MB — 64MB
Heavy Graphics	Word processing, page layout software, illustration/graphics software, photo editing, presentation software, font packages, multimedia. Less than three applications open at a time.	64MB — 128MB
Executive/Management	Word processing, e-mail, fax and communications software, spreadsheets, business graphics, databases, presentation software. Less than three applications open at a time.	16MB — 32MB
Light-Medium Design	CAD software, CAM software.	32MB — 128MB
Heavy Design	3D CAD software, CAM software, solid modeling.	256MB — 2GB

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Captain Syslog

One of the common questions asked by new UNIX system administrators and applications

support people is: "How do I find out what has happened in the past?" This is usually related to asking why some process stopped running, when a disk became full or who has been trying to log in.

Syslog is the primary UNIX logging mechanism. It's extremely customizable, which is obvious if you remember that it was developed by Eric Allman of **sendmail** fame. The configuration of **syslog** is simple, but it has some quirks. For example, the primary configuration file, `syslog.conf`, requires tab characters to separate fields. Spaces won't work.

HOW IT WORKS

If you don't use **syslog**, most system and error messages are written directly to the console (or a console window on a workstation). And thus have usually disappeared when you need them. Other system functions for logging, like the **dmesg** command, are also of a fixed length and FIFO. So again, we cannot look back very far in time. With **syslog**, we can determine which and for how long the information is stored. Or for emergency conditions, we can have data sent directly to us at the console.

Syslog could be called an operating system subsystem. Then it can be broken into three parts: input, processing and output.

Input components are the pieces that generate log data. The UNIX kernel itself has the ability to generate messages

about "bad things" that can happen while it's running, as well as general information (startup, shutdown). You can code in system calls like **syslog()** that will generate log data when special events happen. These programs can be applications like license servers, or system components like `lp` and the login subsystem. Even a shell script or the command line can generate log data by invoking the **logger** shell command. **Syslog** also will accept network log data over sockets.

Processing is accomplished by the **syslogd** daemon. This daemon is conditionally started by either making the `/etc/syslogd` file executable and having a `/etc/syslog.conf` file (HP-UX 9.x), or by editing the proper file in `/etc/config.d` and having the `/etc/syslogd.conf` file (HP-UX 10.x). The **syslogd** daemon reads data that is written to the `/dev/log` FIFO file by any of the input components, and then stores, passes along or ignores this data as determined by the configuration in the `syslog.conf` file. Output can be configured to be sent to files, a particular console, a particular user or even through a network socket for centralized logging.

WHAT IT CAN DO

Each event logged by **syslog** is contained in a **syslog** message sent through the `/dev/log` file. A **syslog** message consists of three parts: priority, timestamp and message.

The priority is used to categorize the data. A priority is the facility or software component that originated the message, followed by a string or numerical priority level of the message.

The timestamp is when the event occurred. Even if a message is passed along to some central data gathering server, the timestamp is from the originating system. You see a message logging an event, but the time from the system you are checking the log on says it is a future time.

Last comes the actual message to be logged. This string contains another copy of the event timestamp (month day hh:mm:ss). The second part of this string is one that is often confused. It contains the host name of the system that sent the message. If you are logging local events only, it will be this systems name. If you are logging events from several hosts around the network, it will be the host that sent the message to be logged.

When you are using a relay system to send data to a main system logger, it will have the relaying hosts name, not the message originator's name. The fix for this is to compose the messages *properly* when you are using applications or shell scripts to send **syslog** messages across the network. *Proper* means to include the host name of the originator in the text of the message body itself, which comprises the third part of the message.

If you are adding **syslog** capabilities to a shell script or source code, you will be hand building these messages. Presumably, a well written application or script will be testing for all the proper conditions before it sends out a **syslog** message. It also should send out the proper priority level. It's annoying to have the system log full of "general

timestamp" messages.

Sending that kind of message at a very low level allows you to configure the **syslogd** to ignore them, or possibly put them in a separate file. Higher level messages can be configured to the normal log. You might even have serious conditions sent directly to a users console, or forwarded on to several machines where you think someone who cares might be logged in.

Let's take a look at how to integrate **syslog** into a script or application. In a shell script, you use the **logger** command. The **-p** option supplies the priority/facility data, and then you can supply the message on the command line or take it in from a file. Because we are talking about shell scripts, this would probably be a command line string. Here is a message example:

```
logger -p local0.notice "LIC Server started on `hostname`"
```

This will generate a **syslog** message that already has the date and host name encoded into it. In this example, I used

the **hostname** command to make sure the host name was in there (in case **syslogd** was configured to send this message on to other hosts). If that happens, I want there to be a way to be sure the reader of the message is able to determine which host had the license server started on it.

Note: we used a facility of **local0** and a priority of **notice**. The facility is used to determine which software subsystem a message came from. **local0** through **local7** are for your own categories. There also are many system-defined facilities, such as kernel, user, mail, daemons, authority and lpr. These facilities are listed in /usr/include/syslog.h. The facility will be used when we configure **syslog** to determine where to store these messages.

The priority is also used when configuring **syslogd**. We can have lower priority messages, like informational or notices of normal conditions logged to a file. But, we also can have higher priorities,

like errors or emergencies, written to every user on a host. These priority levels are also listed in the syslog.h file. Here they are by string name, numerical value and typical use.

Priorities:

emerg	0	System has become unusable
alert	1	Action needed immediately
crit	2	Critical condition
err	3	Some error has occurred
warning	4	Warning messages
notice	5	Significant, but normal condition
info	6	Just informational
debug	7	Debugging messages

Next month, we'll see how to perform logging from source code, and how to configure **syslogd** to categorize these messages in several ways using the **syslogd.conf** file.

—What information would you like logged? Ask Fred at frederm@aol.com.

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Adaptive Information Systems Inc. announced AdaptStor 6900, a series of optical jukeboxes. The Model 6900-500 is a single accessor subsystem featuring a maximum capacity of 797GB while using as many as 306 cartridges and two magneto-optical (MO) disk drives. A maximum of eight disk drives are available in a jukebox. The Model 5900-502 incorporates two cartridge accessors and features a maximum storage capacity of 688GB when configured with up to 264 cartridges and two MO disk drives.

Prices range from \$68,500 to \$88,000, depending on model and configuration.

Contact Adaptive Information Systems, 26001 Pala, Mission Viejo, CA 92691; (800) 678-6978; info@ais-corp.com; www.ais-hitachi.com.

Circle 400 on reader card

Addonics Technologies

Addonics Technologies announced a software utility for its line of printer port external hard drive enclosures called the DataClone, Disk Mirror Utility. This program creates an automatic, constantly updated backup of a PC's internal hard drive on an external hard drive. Addonics will bundle the software with its external 3.5-inch IDE hard drive enclosure as a complete data management kit.

The Addonics Technologies' DataMaster -External Hard Drive Enclosure and Data Management Utility 3 in 1 Kit costs \$149.99.

Contact Addonics Technologies, 48434 Milmont Dr., Fremont, CA 94538; (510) 438-6530; atc@addonics.com; www.addonics.com

Circle 364 on reader card

Aiwa America Inc.

Aiwa America Inc. announced the MicroArray, a fault-tolerant disk array that is compatible with all major operating systems and works with any host platform that supports SCSI.

The MicroArray supports RAID 3 and 5, and is scalable from 2.6 to 8GB per subsystem. The unit accommodates up to five 2.5-inch drives of 2.1GB each. It is compatible with NetWare, Windows, Windows NT, OS/2, UNIX, Banyan, DOS and Macintosh.

Contact Aiwa, 800 Corporate Dr., Mahwah, NJ 07430; (201) 512-3606; aiwacs@aaiwa.com; www.aiwa.com.

Circle 399 on reader card

Ampex Corp.

Ampex Corp. shipped their tape drives as part of being chosen to participate in Legato Systems' Enterprise Solutions Partner (ESP) Program. The Ampex DST tape drives and automated cartridges are designed for data-intensive environments where customers need fast archive and retrieval, backup and restore, or HSM applications. One Ampex DST drive can backup more than 50GB per hour and store up to 330GB on a single cartridge.

Contact Ampex Corp., 500 Broadway, Redwood City, CA 94063; (415) 367-3888; www.ampex.com.

Circle 398 on reader card

Andataco-IPL Systems Inc.

Andataco-IPL Systems Inc. announced GigaRAID/HA, which combines dual active Ultra-SCSI controllers with up to 128MB of cache to speed applications performance.

Each GigaRAID/HA controller features 64MB of dedicated, mirrored write cache

and simulated RAID 3 capability. Variable stripe sizing (64 to 10,245K) lets users scale the size of data blocks to the needs of specific applications.

Contact Andataco-IPL Systems Inc., 10140 Mesa Rim Rd., San Diego, CA 92121; (619) 453-9191; inquire@andataco.com; www.andataco.com.

Circle 365 on reader card

ATL Products Inc.

ATL Products Inc. announced the StorLink series which include the IntelliGrip precision cartridge handling system to deliver mainframe-class reliability. With up to 528 DLT cartridges and 2:1 compression, the StorLink series offers a capacity of up to 36.96TB. With up to 18 DLT7000 drives achieving 2:1 compression, StorLink series can backup and restore information at speeds up to 648GB per hour.

Contact ATL Products Inc., 1515 S. Manchester, Anaheim, CA 92802; (714) 780-7790; altpsales@atlp.com; www.atlp.com.

Circle 397 on reader card

ATTO Technology Inc.

ATTO Technology Inc. introduced their ExpressPCI Dual-Channel SCSI-3 PCI host adapter and RAID Solution Kit. The host adapter is a high-performance, RAID-ready controller which delivers Ultra Wide SCSI-3 transfer rates of up to 50MBps per channel. The Dual-Channel Solution Kit merges the high-performance of ATTO's ExpressPCI Dual-Channel host adapter with ATTO's advanced ExpressRAID software. It ships with the necessary cabling and easy-to-understand user manuals. It supports Macintosh and PC platforms in a single product.

Contact ATTO Technology Inc., Audubon Technology Park, 40 Hazelwood Dr., Bldg. 106, Amherst, NY 14228; (716) 691-1999; mkt@attotech.com; www.attotech.com.

Circle 396 on reader card

Box Hill Systems Corp.

Box Hill Systems Corp. announced RDS, a 23GB disk drive, which boosts the RAID Box 5300 Turbo capacity to 1.3TB. The RAID Box 5300 has an aggregate transfer rate of 60MBps and capacities from 2GB to 1.3TB. If one of the two to 56 hot-swappable disk drives fails, a hot spare drive automatically assumes all drive functions. A 32 to 512MB read-or write-back cache accelerates multiple RAID level UNIX and Windows NT platforms.

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Circle 395 on reader card

Boffin Ltd.

Boffin Ltd. offered 12X CD-ROM drives in its family of CD-ROM Towers. These systems provide instant access to 4.6 to 9.1GB of data, and offer proven reliability to ensure that maximum uptime is achieved. It can network with systems using Novell, Windows NT, OS/2 LAN Manager, or Banyan Vines via optional networking software.

Price for Boffin's seven Bay Tower and seven Toshiba 12X CD-ROM drives is \$2,271, while the 14 Bay Tower with 14 Toshiba drives costs \$4,724.

Contact Boffin Ltd., 2500 W. County Rd. 42, Burnsville, MN 55337; (800) 248-5328; sales@boffin.com; www.boffin.com.

Circle 394 on reader card

Breece Hill Technologies

Breece Hill Technologies and Quantum Corp. announced an agreement that will expand Breece's offering of Quantum DLT tape drives to include the new DLT 7000 products. The DLT 7000 tape drives are featured in Breece's Q1, Q2.151, Q7 and Q47 libraries used for general data storage, archival, system backup and near online applications.

Contact Breece Hill, 6287 Arapahoe Ave., Boulder, CO 80303; (800) 941-0550; www.breecehill.com.

Circle 393 on reader card

CMD Technology Inc.

CMD Technology Inc. announced CRD-5900 Daytona RAIDarray for applications requiring high-performance desktop data storage for small- to mid-size servers and workstations. It includes an embedded CMD CRD-5300 SCSI-to-SCSI RAID controller. Each Daytona supports up to six low profile or four full-height 3.5-inch disk drives in hot-swappable canisters. An 8mm or 4mm tape drive, a magneto-optical disk drive, CD-ROM drive or any other standard 5.25-inch half-height peripheral can be installed in a fixed slot at the top of the enclosure.

It supports HP-UX, Windows NT, DOS, SCO, Sun Solaris, IBM AIX, SGI Irix and Digital VMS.

Contact CMD Technology Inc., 1

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www.cmd.com.

Circle 392 on reader card

Cygnnet Storage Solutions Inc.

Cygnnet Storage Solutions Inc. announced that CD-R models of Infinidisc Modular CD Jukebox support the new release of SmartCD software from Smart Storage Inc. Infinidisc can be configured with up to eight CD-R or CD-ROM drives. Used in conjunction with the SmartCD software, the jukebox provides transparent data recording, retrieval and storage in single- and multiserver environments.

Prices for the Infinidisc Modular CD Jukebox range from \$9,995 for a two-drive, 250-disc unit, to \$24,00 for a fully-configured unit with CD-R drives.

Contact Cygnnet Storage Solutions Inc., 2560 Junction Ave., San Jose, CA 95134; (408) 954-1800; sales@cygnnet.com; www.cygnnet.com.

Circle 391 on reader card

Data Research and Applications

Data Research and Applications (DRA) announced Back Door Backup, which uses 8mm tape cartridges and a robotics system to connect a computer system's hard drive SCSI interface directly to the backup system. It uses a "mirror" command to initiate a direct data dump from the hard drive to the tape system.

It supports UNIX, Windows 3.1x, Windows 95, Windows NT and Stratus operating systems.

Contact DRA, 9041 Executive Park Dr., Ste. 200, Knoxville, TN 37923; (423) 690-1345; sales@dra-hq.com; www.dra-international.com.

Circle 390 on reader card

DataThinK Inc.

DataThinK Inc. announced an integrated HSM solution that takes advantage of IBM's Magstar tape technology and Automated Network Technologies' (ANT) Metior software.

Metior HSM software is based on the IEEE mass storage reference model. It runs on HP-UX, IBM RS/6000, SunOS, Solaris, Silicon Graphics, HP-IX and SCO UNIX.

Price of the Magstar-Metior HSM solution starts at \$25,000.

Contact DataThinK, 5777 Central Ave., Boulder, CO 80301; (303) 448-0420; datathink@datathink.com; www.datathink.com.

Circle 389 on reader card

DynaTek Automation Systems Inc.

DynaTek Automation Systems Inc. announced the CDE260R, a CD-Erasable disc drive. Features include: double speed recording of CD-RW and CD-R discs; up to 6X reading speed of CD-RW, CD-R and CD-ROMs; 2MB data buffer and 350 ms access time at 6X; support for all popular writing modes; and supported by major CD pre-mastering software.

Contact DynaTek Automation Systems Inc., 200 Bluewater Rd., Bedford, NS B4B 1G9; (902) 832-3000; info@raider.dynatek.ca; www.dynatek.ca.

Circle 388 on reader card

EMASS Inc.

EMASS Inc. announced the availability of the AML/S, a SCSI-attached automated tape library. The AML/S is scalable in capacity from 188 cartridges up to 788 cartridges. This equals up to 27.6TB when using DLT 7000 technology.

Contact EMASS Inc., 10949 E. Peakview Ave., Englewood, CO 80111; (303) 782-9700; inquiry@emass.com; www.emass.com.

Circle 387 on reader card

Imperial Technology

Imperial Technology announced that its MegaRam-VA Veritas accelerator has been proven by Veritas Software Corp. to accelerate the efficiency of the Veritas File System and Volume Manager software, increasing NFS RAID-5 throughput by 2 to 1. The MegaRam-VA uses solid-state disk technology to improve system performance by increasing the number of accesses to a file.

The MegaRam-VA Veritas accelerator is available in six models ranging in price from \$6,250 to \$9,750.

Contact Imperial Technology Inc., 2305 Utah Ave., El Segundo, CA 90245; (800) 451-0666; itmarketing@imperialtech.com; www.imperialtech.com.

Circle 385 on reader card

Invincible Technologies Corp.

Invincible Technologies Corp. announced the 30-bay Ultimate-5. Features include: redundant hot-swappable components; multiple, simultaneous RAID level support; and ArrayGuide management software. It supports 30 drives per unit, includes five internal SCSI buses and redundant power and cooling, can be configured with one or two storage processors, and supports up to

264GB of raw storage.

Prices start at \$25,000 (with a single storage processor) and varies, depending on configuration.

Contact Invincible Technologies Corp., 4 Marc Rd., Midway, MA 02053; (508) 533-3099; www.invincible.com.

Circle 384 on reader card

Legato Systems Inc.

Legato Systems Inc. introduced an enterprise storage management architecture and 22 new products which implement the new paradigm. Legato's Global Enterprise Management of Storage (GEMS) provides the core tools a customer needs to manage across multiple data zones effectively, including a policy-based administration, software distribution, flexible software licensing across data zones, and management of all tape media whether inside or outside a tape library.

Legato's Network Edition 5.x performance-related releases include new technology for Windows NT and UNIX which provides greater flexibility to distribute storage devices within a data zone, thus reducing network traffic.

Legato BusinessSuite also addresses the need for high availability of mission-critical database applications.

Contact Legato Systems Inc., 3210 Porter Dr., Palo Alto, CA 94304; (415) 812-6000; www.legato.com.

Circle 383 on reader card

Micro Design International Inc.

Micro Design International Inc. (MDI) introduced SCSI Express 3.0 software for Windows NT environments, providing an optical library sharing solution for multiuser environments. SCSI Express manages a complete line of storage products, including CD-ROM, CD-ROM jukeboxes, stand-alone rewritable optical and now rewritable optical jukeboxes. Express views all supported devices connected to the NT server or workstation on SCSI and IDE buses. It also monitors the jukebox performance so the system administrator can tweak the jukebox for higher performance.

Prices range from \$3,995 to \$8,995, depending upon the storage capacity supported. MDI offers bundled solutions that include SCSI Express software with MDI writable optical jukeboxes that range from \$9,995 to \$99,995.

Contact MDI, 6985 University Blvd., Winter Park, FL 32792; (800) 228-0891; info@mdi.com; www.mdi.com.

Circle 382 on reader card

MGV Memory

MGV Memory shipped its PCMCIA Ethernet Adapter combo networking card. The combo card provides mobile users quick and convenient access to information by linking to a LAN. The Type 1 PCMCIA card includes 10BaseT and 10Base2 connectors and supports most networking protocols including Novell NetWare, Microsoft LAN Manager, Windows for Workgroups and IBM LAN Server. Price is \$99.

Contact MGV Memory, 29B Technology Dr., Ste. 100, Irvine, CA 92618; (800) 440-4648; www.mgvgroup.com.

Circle 381 on reader card

NavStor

NavStor unveiled plans to provide information and services needed for the successful implementation of sales and marketing programs in that market. NavStor consulting services include programs such as company sponsored seminars for reseller and OEM customers, which are designed to help the customer understand the technology and develop a storage strategy that the reseller can help implement.

Contact NavStor, 2381 Lozana Rd., Del Mar, CA 92014; (619) 793-0265; www.navstor.com.

Circle 380 on reader card

Nikon Optical Storage

Nikon Optical storage announced the shipment of the 2.6GB Beluga drive, a high-capacity, high-speed direct overwrite magneto-optical (MO) drive. The new Beluga 5.25-inch multifunction drive is based on Nikon's Light Intensity Modulation Direct Overwrite (LIMDOW) technology, which is fully compliant with all current and proposed industry standards.

Price is \$2,450 for the Beluga drive and \$129 for the 2.6GB LIMDOW MO media.

Contact Nikon Optical Storage, 1399 Shoreway Rd., Belmont, CA 94002; (888) 88-NIKON; monose@nikon.com; www.mo-nikon.com.

Circle 379 on reader card

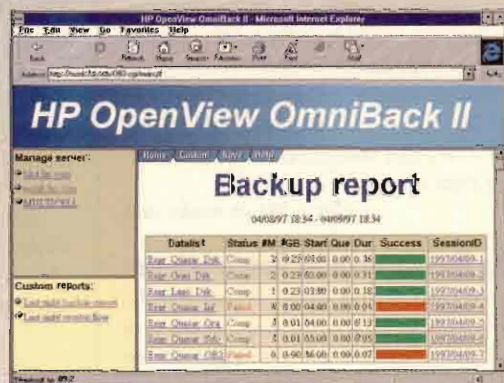
NSM Jukebox

NSM Jukebox announced the formation of NSM Access, an alliance program through which ISVs and system integrators receive comprehensive development and support programs from NSM. The program is designed to increase horizontal market penetration and to augment NSM's continued efforts to build market awareness and "pull" through the channel.

HP/EMC: OmniBack In The Saddle Again

IN May, HP announced a new version of HP OpenView OmniBack II 2.5, which permits more extensive backup of mission-critical data than formerly possible. OmniBack II 2.5's new enterprise backup console defines and transparently monitors a new controlling process; Multiple distributed backup environments throughout the enterprise can be centrally controlled. Mark Nicholett, research analyst for storage management strategies with the Gartner Group (Stamford, Conn.) agrees that OmniBack's architecture allows for the deployment of storage management services in a flexible way.

In addition, scalability in a single backup environment — both the number of supported systems and total data handled — has been increased by a factor of four or more from the previous version. The enterprise backup console implements an overall data-protection master plan, which can be structured according to organizational requirements by setting enterprise policies for enterprise data. However, site or departmental operators also have the ability to define policies for local data. Those capabilities are implemented by a new "manager-of-manager" feature. According to Reiner Lomb, product line manager with OpenView Storage Management, this provides both central and distributed administration capabilities.



"Local administrators can still control their specific areas," says Lomb, "and you can also control everything from a central console."

In addition to the manager-of-manager feature, OmniBack II 2.5 provides storage management across UNIX system and Windows NT environments. "We like that HP is focusing on Windows NT as well," says Nicholett, "especially in the area of storage management." Reporting based on the Web enables administrators to check the completion of backup jobs from any Web browser. A new built-in OmniBack II database allows customers to manage the backup environment more easily and efficiently, saving IT departments time and money. Online backup of business data from Microsoft SQL Server and Exchange Server on Windows NT systems can now also be controlled from the HP-UX-based version of HP OpenView OmniBack II 2.5. Online backup of SAP R/3 also is now available for IBM AIX systems.

HP also announced a planned integration of HP OpenView OmniBack II with EMC's Symmetrix Remote Data Facility (SRDF) and EMC TimeFinder. SRDF provides remote mirroring of Symmetrix systems, and EMC TimeFinder provides snapshots of logical volumes in local systems. The integration of HP and EMC technologies is expected to enable customers to perform automated backup and recovery of mission-critical data in an HP/EMC environment without impact on their business operations, eliminating the planned downtime for backup and performance degradation.

HP OpenView OmniBack II 2.5 is expected to begin shipping this month, with an entry price of \$3,800. The new manager-of-manager feature is \$16,000. The HP OpenView OmniBack II integration with EMC's SRDF and TimeFinder is expected to be available later in Q4 of this year. HP OpenView OmniBack II 2.5 replaces Version 2.1.

— Deborah Schwartz, Associate Editor

Contact NSM Jukebox, 1158 Tower Lane, Bensenville, IL 60106; (630) 860-5100; www.nsmjukebox.com.

Circle 378 on reader card

Overland Data Inc.

Overland Data Inc. unveiled its LibraryXpress Global Control Module (LXG) which provides a single point of control for multiple LibraryXpress modules, accommodates 16 DLT cartridges and offers more than 1TB (compressed) of additional capacity. Cartridges stored in the new LXG are delivered to the DLT drives contained in the base module via the integrated XpressChannel robotics.

Contact Overland Data Inc., 8975 Balboa Ave., San Diego, CA 92123; (619) 571-5555; www.overlanddata.com.

Circle 377 on reader card

Pioneer New Media Technologies Inc.

Pioneer New Media Technologies Inc. reduced prices on its DRM-1004X, 100-disc CD-ROM jukebox. Effective immediately, pricing for the DRM-1004X jukebox has been reduced from \$13,995 to \$8,995 when configured with four readers, and from \$15,995 to \$9,995 when configured with two readers and one writer. Reading at 4.4X and recording at 4X, the DRM-1004X accommodates up to 100 CD-ROM discs using two separate, removable 50-disc magazines. The jukebox is capable of loading discs in less than three seconds without the load process inhibiting read and write operations.

Contact Pioneer New Media Technologies Inc., 2265 E. 220th St., Long Beach, CA 90810; (800) 444-6784; www.pioneerusa.com.

Circle 376 on reader card

ProcomTechnology

Procom Technology introduced the Hyper CD 53X, which delivers CD-ROM data at a 53X data transfer rate or 7.950MBps. The Hyper CD 53X provides users with high-speed access to up to 63 CD-ROMs in large network environments while reducing network congestion. Hyper CD uses a hardware-only implementation, ensuring compatibility with all popular operating systems and CD-ROM networking solutions.

The Hyper CD products range in price from \$8,995 for a seven-drive rack-mounted module, to \$80,995 for a fully-loaded 63-drive rack-mounted module.

Contact Procom Technology, 2181 Dupont Dr., Irvine, CA 92715;

(714) 852-1000; info@procom.com; www.procom.com.

Circle 375 on reader card

SanDisk Corp.

SanDisk Corp. introduced 20 and 24MB CompactFlash (CF) memory cards, which are based on SanDisk's 32Mb flash semiconductor technology and fill the demand for higher capacity CF memory cards used in digital cameras. The cards serve as the

removable and reusable digital film in the cameras. CF cards are based on the industry-standard PCMCIA ATA interface and can operate dynamically on a single supply voltage of 3.3 or 5 volts.

Prices of the 20MB and 24MB cards are \$349 and \$429, respectively.

Contact SanDisk Corp., 140 Caspian Court, Sunnyvale, CA 94089; (408) 542-0500; www.sandisk.com.

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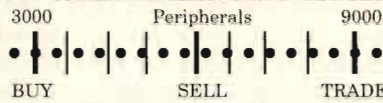
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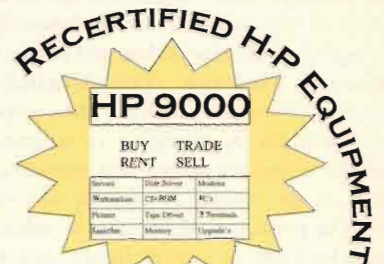
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CIRCLE 255 ON READER CARD

Spectra Logic

Spectra Logic Corp. announced the certification of Alexandria's Informix Personality for high-performance backup and restore of Informix databases. The Alexandria Informix Personality delivers throughput and scalability by managing an unlimited number of parallel streams and interleaving them on any number of available tape drives. The parallelism allows users to achieve large backups in a small time frame by adding more devices.

Contact Spectra Logic Corp., 1700 N. 55th St., Boulder, CO 80301; (800) 833-1132; www.spectralogic.com.

Circle 373 on reader card

Storage Computer Corp.

Storage Computer Corp. announced two new families of storage products based on its RAID 7 Virtual Storage Architecture — the 72-Series OmniRAID Servers and the 74-Series OmniRAID SuperServers/ES. The new 72-Series OmniRAID Servers now include the company's data-configurable RAID implementation with multiple concurrent data protection levels. With the addition of the new OmniRAID Table Vector Parity (patent-pending) and Pipelining features to this storage server family, customers are now empowered to specify protection and performance levels for their data.

Price ranges from \$65,000 to over \$3 million.

Contact Storage Computer Corp., 11 Riverside St., Nashua, NH 03062; (603) 880-3005; www.storage.com.

Circle 372 on reader card

new products

Storage Dimensions

Storage Dimensions extended its family of high speed network backup solutions with the SuperFlex DDS TapeArray, which incorporates next generation DDS-3 DAT drives. The new system provides fault-tolerant backup capacities of up to 168GB, backup throughput of 420MB per minute and a cost per megabyte as low as \$.25. The system is suited for mixed operating system network environments requiring high-speed, high-capacity backup of one or more servers.

An entry-level system consisting of a SuperFlex TapeArray enclosure and one DDS-3 drive starts at \$5,200. Up to six additional drives can be added as capacity requirements change and cost up to \$18,900. A standalone single-drive DDS-3 subsystem is available at \$2,222.

Contact Storage Dimensions, 1656 McCarthy Blvd., Milpitas, CA 95035; (408) 954-0710; www.storagedimensions.com.

Circle 371 on reader card

Tecmar Technologies Inc.

Tecmar Technologies Inc. announced a 200GB, eight-cartridge magazine-based autoloader, the WangDAT 3900 LD8. The autoloader's internal drive mechanism incorporates the WangDAT 3900 drive, which is based on the latest generation of DDS-3 technology and supports the stringent requirements of an autoloader in a high duty cycle environment.

Price is \$4,900. Additional eight-cartridge magazines loaded with DDS-3 media will cost \$449.

Contact Tecmar Technologies Inc., 1900 Pike Rd., Bldg. E, Longmont, CO 80501; (800) 4-BACKUP; info@tecmar.com; www.tecmar.com.

Circle 370 on reader card

TeraStor Corp.

TeraStor Corp. unveiled plans to develop, license and commercialize Near Field Recording. The first products based on TeraStor technology are planned for shipment in early 1998 with initial capacities of over 20GB per surface.

Contact TeraStor Corp., 95 W. Plumeria Dr., San Jose, CA 95134; (408) 324-2110; www.terastor.com.

Circle 369 on reader card

VisionTek

VisionTek unveiled sECCureSIMM, an EDO memory upgrade that contains error correcting and checking (ECC) capabilities

on the module, bring data integrity and security to desktops and servers. Intended for servers and systems that require no down time, the sECCureSIMM is designed for customers that need the data security of ECC but cannot afford a high-end server equipped with ECC on the motherboard.

Price is \$299 for the 16MB module and \$499 for the 32MB module.

Contact VisionTek, 1175 Lakeside Dr., Gurnee, IL 60031; (800) 726-9695; www.visiontek.com.

Circle 368 on reader card

Workstations Solutions

Workstations Solutions announced Quick Restore, a high-performance data backup and recovery solution offering true centralized system management of heterogeneous networks. From a central management console, Quick Restore automates backups of UNIX and Windows NT clients to a variety of storage devices — anywhere on a network. Its intuitive, GUI-based Restore Browser displays a seamlessly integrated view of backed up files to help managers and authorized users easily find data they want to restore.

Contact Workstation Solutions, One Overlook Dr., Amherst, NH 03031; (603) 880-0080; info@worksta.com; www.worksta.com.

Circle 367 on reader card

Zitel Corp.

Zitel Corp. announced the availability of 9GB drives in its CASD-II/Enterprise storage solution. The addition of 9GB modules means that CASD-II/Enterprise now offers large and small IT organizations nearly unlimited capacity/performance/scalability and extreme cost-effectiveness in enterprise-class storage. With the 9MB drives, CASD-II/Enterprise delivers RAID 1 Mirroring for mission-critical environments — as well as the scalability and performance advantages provided by CASD-II.

Price is \$.87 per megabyte for entry-level systems.

Contact Zitel Corp., 47211 Bayside Pkwy., Fremont, CA 94538; (800) 622-5020; www.zitel.com.

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Data WhereHouse?



Ken S. Moser
MIS Director
American
Production and
Inventory Control
Society Inc.

Do you know anyone with a real data warehouse? Not a pilot project — a really significant chunk of data that's been updated at least three times and that's in active use by real end-users? Not one you read about, or heard about — one you've actually seen with your very own eyes?

Sure, most of us pull data out of our active files and some of us even keep it around for occasional use, but that's usually nothing more than year-end cleanup. Given that storage space is so cheap and compact now, almost no one I know ever really purges data. In my experience, however, the situation is not driven so much for any great demand for the data as it is by the fact that no one will authorize a purge any more.

Don't get me wrong here: I think data warehousing is a wonderful concept!

After all, it wasn't so long ago that data warehousing (the general term now, not the concept) was a thankless job that no one wanted to pay for: a job either charged to MIS or to that great void marked "overhead." It's not as if our peers out in marketing, sales, customer service and finance didn't find the data useful. It's just that we used to do most of this stuff, only we called it data maintenance and no one cared.

Somewhere along the way, however, it became terribly sexy for certain senior managers to talk with each other in hushed tones about data warehousing. No two of them seem to mean exactly the same thing when using the term, but data maintenance is suddenly quite fashionable — and not a moment too soon.

It's not uncommon for an organization's best customers to be among its most mobile; ours seem to change work, home or preferred addresses at least once every 18 months. Keeping pace with this kind of change can be challenging enough when these customers are contacting you regularly, but how do you keep your data up to date if they stop? Any marketing expert will tell you that it's much easier to keep old customers than it is to attract new ones, so this is worth some effort.

However, that effort can be rather considerable.

The latest trend in marketing — something called customer intimacy — makes this even more challenging. Today, it's not enough for a business to know that Mr. Smith has moved to Washington, D.C. Now, marketing wants complete demographics along with fax and cell phone numbers, e-mail address, latest measurements, political affiliations, most recent photograph, and anything else we can ferret out and display on a screen.

Other trends also affect customer data. For example, Congress decreed a few years ago that all organizations involved in direct marketing refrain from distributing customer names to other firms or using them for other purposes, and new fields were born in files throughout the land. The increasing trend toward professional certification also has caused many firms to begin tracking these fields as well, simply because many customers resent their omission — "I worked hard for that CNA, darn it, and I do want to see it on my labels!" And now, they want metadata too?

Moreover, in case you haven't noticed, both ZIP codes and telephone area codes are breeding like rabbits. There are good tools available to help us with this, but we have 400,000 customer records on file, each one with three telephone numbers and two addresses, so it's still a fairly big job. And the data we use to update these fields must be replaced two to five times each quarter!

Finally, despite all of the interest in data warehousing, most of my colleagues are still trying to convince their organizations to invest what they should in new data, never mind the older stuff.

I'm not sure if my organization will ever have a true data warehouse — in any sense of the term. I do intend to take full advantage of the concept, however, to improve the organization's data resources. I encourage you to do the same.

— *Kenneth S. Moser, CNA, CNSA is an MIS director with American Production and Inventory Control Society Inc. (Falls Church, Va.).*

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