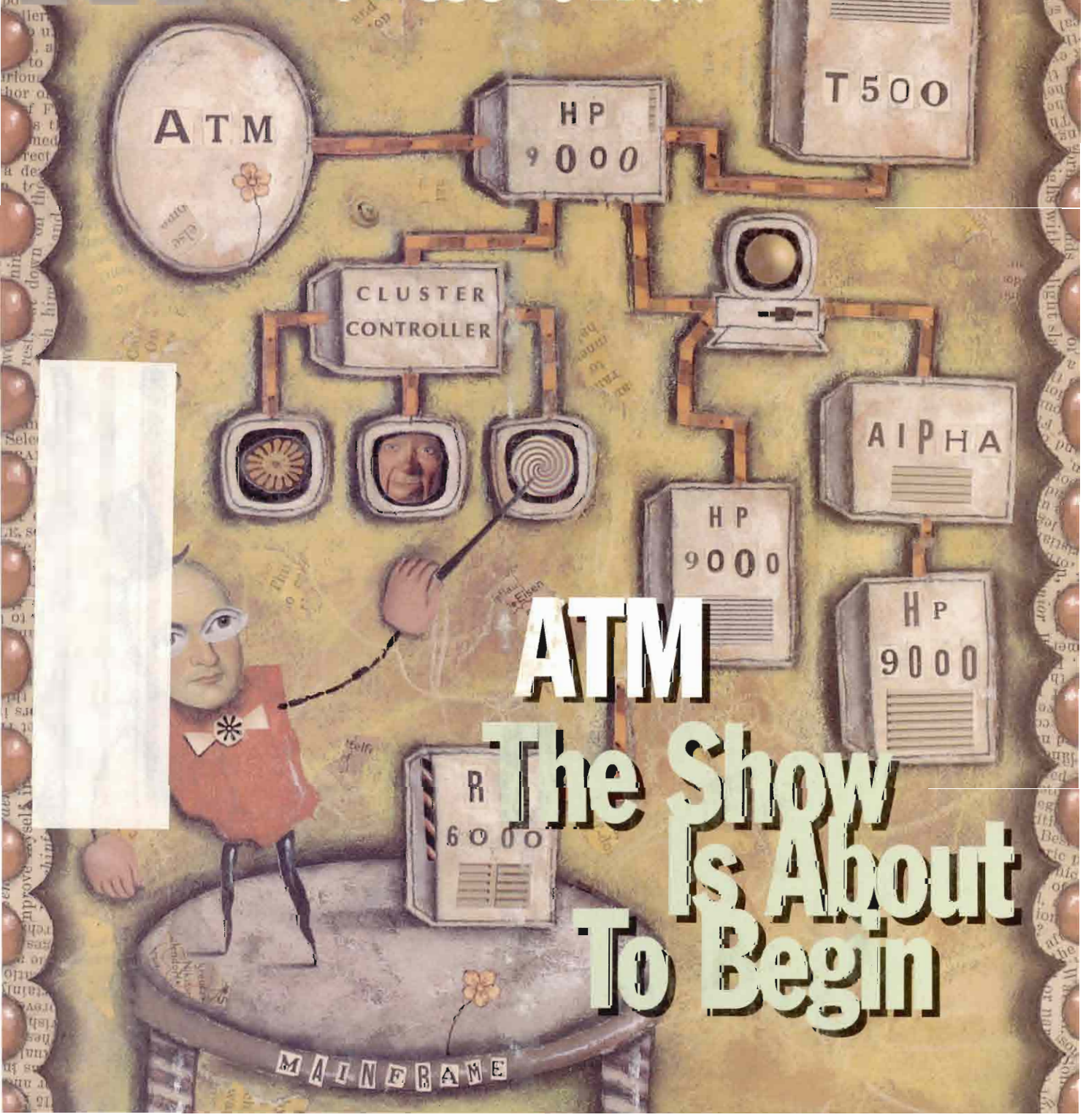


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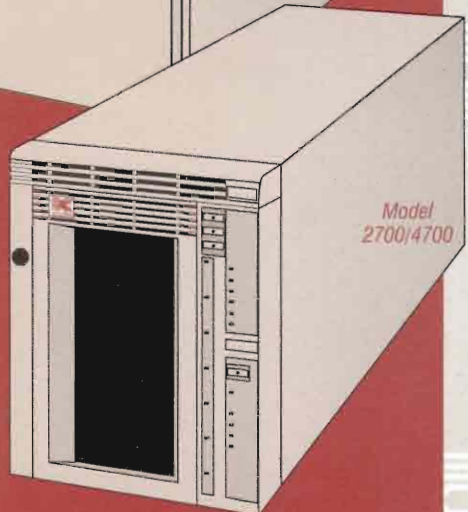
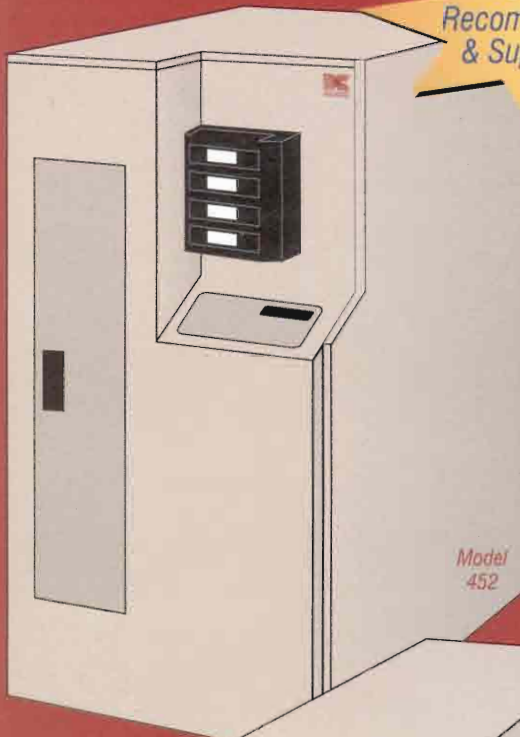
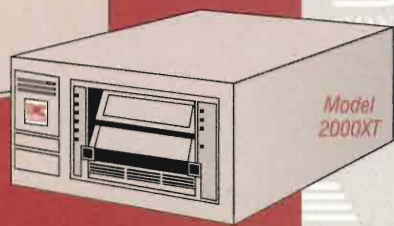
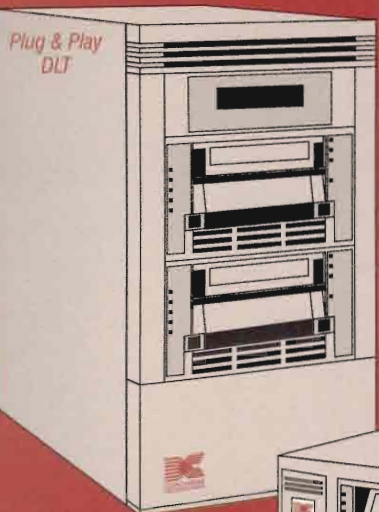
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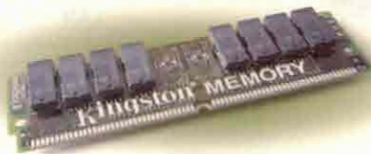
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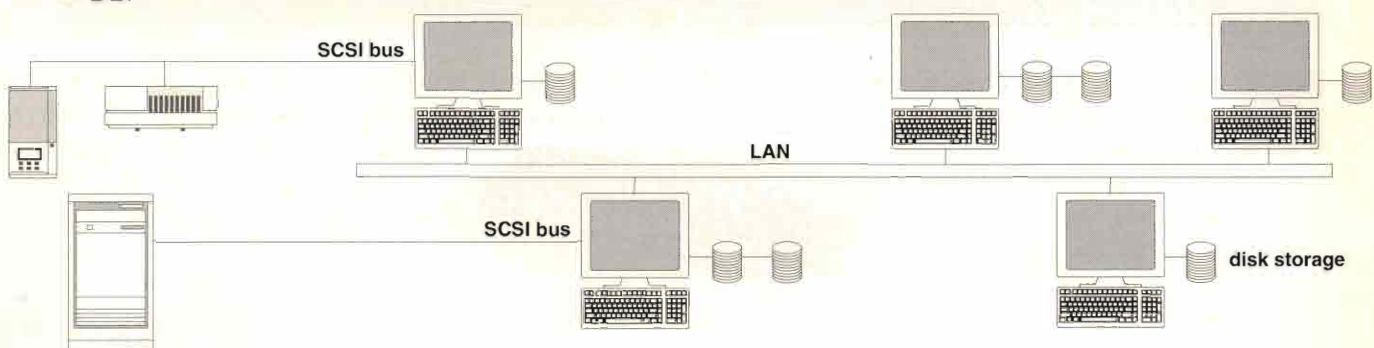
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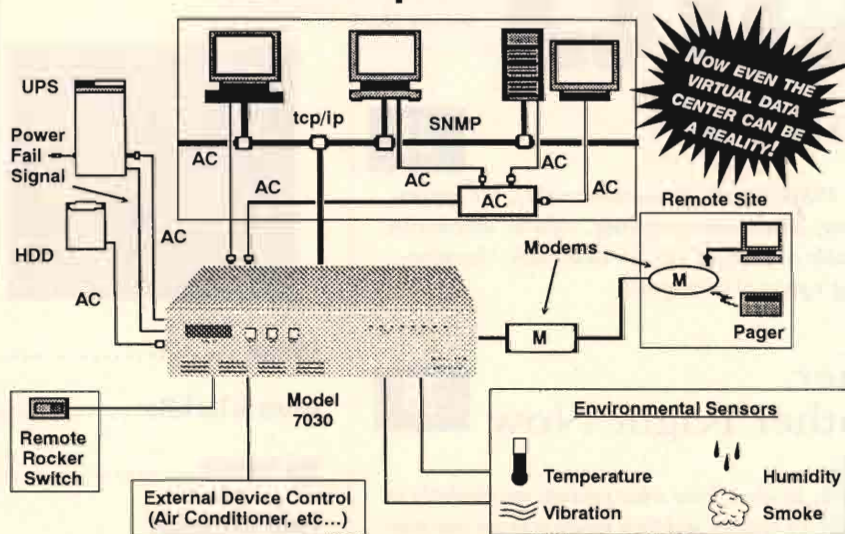
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HP PROFESSIONAL ISSN 0896-145X is published monthly by Cardinal Business Media Inc., 1300 Virginia Dr., Ste. 400, Fort Washington, PA 19034. Subscriptions are complimentary for qualified U.S. and Canadian sites. For reprints, contact Reprint Management Services, 505 E. Airport Rd., Lancaster, PA 17601; (717) 560-2001, FAX (717) 560-2063. Second Class postage paid at Fort Washington, PA 19034, and additional mailing offices. POSTMASTER: Send all correspondence and address changes to HP PROFESSIONAL, P.O. Box 3052, Northbrook, IL 60062. COPYRIGHT © 1996 by Cardinal Business Media Inc. CANADIAN POSTMASTER: Send all correspondence and address changes to Cardinal Business Media, C/O N.L., P.O. Box 44, P.O. Box 44, Mississauga, ON L4Z 9Z9. All rights reserved. No part of this publication may be reproduced in any form without written permission from the publisher. All submitted manuscripts, photographs and/or artwork are sent to Cardinal Business Media, Inc. at the sole risk of the sender. Neither Cardinal Business Media, Inc. nor HP PROFESSIONAL organization is responsible for any loss or damage. HP PROFESSIONAL is an independent journal not affiliated with Hewlett-Packard Company. HP and Hewlett-Packard are registered trademarks and HP PROFESSIONAL is a trademark of Hewlett-Packard Company.

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An American Band On The Run With A Bullet

It's got a great beat. You can definitely dance to it. And all the kids are diggin' it. Skipping up two notches this week on America's Top 20 companies — it's none other than Hewlett-Packard's "The HP Way." With the release of the 1995 annual report, HP moved up on the Fortune 1000 list of companies to number 20 overall and number 2 in the computer industry.

In their past fiscal year (ending in October 1995), after adding \$7 billion in orders and \$6.5 billion in revenues, HP increased its net earnings by more than 50 percent. In his letter to the shareholders, Lew Platt attributes this success to the teamwork of HP people. Platt cites two examples of how HP worked together: the re-org of the Computer Organization under Rick Belluzzo last August, and the Telecom '95 Show in Geneva, Switzerland. In fact, HP's telecom sales reached \$2.5 billion in 1995.

Despite the success, Platt keeps his feet firmly on the ground, offering a realistic prediction. "It will be a major challenge to replicate this year's growth rates in fiscal 1996." But he said that last year too. Just what were the numbers for HP in 1995? Well, total orders were \$32.5 billion, up 28 percent from 1994, with U.S. sales totaling \$14.6 billion and international orders at \$17.9 billion. Net revenues were up 26 percent to \$31.5 billion with earnings from operations at \$3.6 billion — up 40 percent. Net earnings rose to \$2.4 billion, up 52 percent. At fiscal year end, there were 102,300 employees compared to 98,400 at the end of fiscal 1994. However, HP just reported that as of the end of March 1996 there were 105,200 employees.

Broken down by industries, HP ranked number two in the top 24 computer companies in the Fortune list. HP's \$32 billion in revenues trailed IBM's \$72 billion (number six overall in the Fortune 1000), but exceeds Compaq Computer's \$14.8 billion (72 in the Fortune 1000) with more than double the revenues. In case you're wondering, Digital took the number four computer spot (number 77 overall) with almost \$14 billion, Apple Computer was fifth (114 overall) with \$11 billion and Sun ranked sixth (222 overall) with nearly \$6 billion in revenues.

We know what this means to the average HP investor — they are getting a great return on their money. But what does this good news mean to the average HP user? Well, HP has poured over \$2.3 billion into research and development. This effort has yielded strategies such as "build to order" and products based on UNIX and Windows NT, as well as new technologies in its medical and communications divisions. Build to order is nothing new for many businesses; however, build to order is an approach just recently introduced to HP's PC division during 1995. In fact, 100 percent of HP Vectra PCs are now built to order. HP no longer stockpiles a full warehouse of PC configurations. Take that, Michael Dell.

And while NT has always been on the PC server side of the brain, HP's UNIX servers group announced that it will be shipping the HP Advanced Server/9000 system which includes the Windows NT-based AT&T Advanced Server 3.51 operating system. Yikes. What does that mouthful mean? One thing it doesn't mean is to rush out and sell your UNIX systems — not just yet. This is just one more hybrid offering HP is providing in a roundabout way to give the customer what they want, no matter what that is; much like any good sales team would. However, look for another big NT announcement next month and find out what it means for you in the pages of *HP Professional*.

Maybe some day we'll get tired of saying it; but for the foreseeable future, HP will remain at the top of the charts. I wonder if they're hiring?

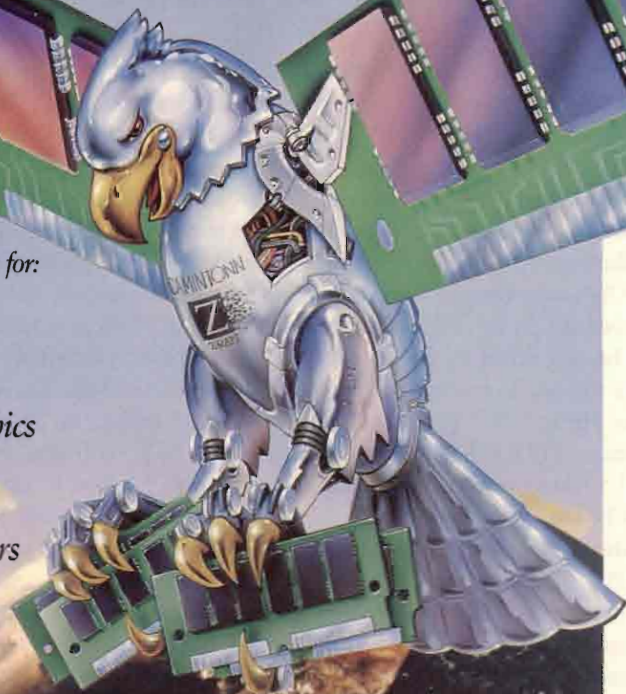


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CIRCLE 294 ON READER CARD

INDUSTRY WATCH

George A. Thompson

HP'S HIGH FLYING FINANCE

In April, HP's Finance and Re-marketing Division was renamed HP Technology Finance. Because the new name will replace the different monikers HP had used around world, the change will provide HP with a consistent worldwide image. Once the leasing arm of HP, the Technology Finance division now helps corporate customers with "life cycle management." In other words, acquiring, managing and disposing of their HP and non-HP technological assets.

Although the new identity isn't ground shaking news, the newly renamed division with 30 percent to 40 percent growth rates is one of HP's fastest growing divisions. With services in more than 100 countries and \$1.9 billion products financed in 1995, HP Technology Finance is one of the five largest technology leasing organizations in the world, according to the Equipment Leasing Association (ELA; Arlington, Va.). HP

Technology Finance is one-fourth of HP's \$4 billion Worldwide Customer Service Organization (WCSO). The other three units comprising the WCSO include the Operation Services Division (OSD), Software and Support Technology (SST) and Multivendor Support Division (MSD). ●

EMPOWERED ENGINEERING IS A BIG HIT FOR HP

HP now ranks as the industry's fastest-growing UNIX-based *technical-systems* vendor in calendar year 1995, according to Dataquest (Mountain View, Calif.). HP recorded the highest overall revenue growth rate of all leading vendors and also demonstrated the fastest revenue growth across four hotly contested technical markets: mechanical computer-aided design/manufacturing/engineering (MCAD/CAM/CAE); geographic information systems/mapping (GIS); electronic design automation and architecture (EDA), and engineering and construction (EAC).

At 28.9 percent, HP's revenue growth rate (combined for all four markets) was nearly twice that of SGI (16.5 percent) more than twice that of IBM (13.4 percent), and nearly three times that of Sun (10.9 percent). "HP's 1995 revenue growth rate demonstrates the widespread acceptance of HP's graphics workstations and servers in all technical markets," according to Sharon Tan, a Dataquest senior industry analyst. However, Tan cautions that the

data is still preliminary and is subject to change before it's officially published later this year. But the early results do show HP to be the clear winner.

It's the culmination of a two year plus focus on "Empowered Engineering," says Janet Muto, an HP technical marketing manager. "We saw the benefit in the early '90s of helping customers to solve problems, rather than just delivering new technologies. And not just to the engineers, but to all kinds of users like IT managers." For example, she says that SGI goes after the sizzle in animation, referring to SGI's dominant position in the 3D animation market. According to Muto, HP's compound annual growth rate in the 3D market has been 70 percent plus since 1991. ●

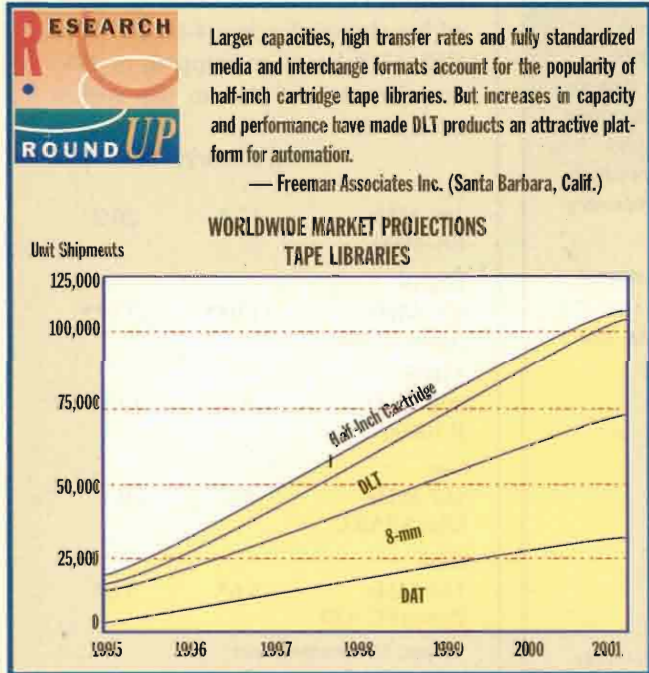
IN MEMORIAM

DAVID PACKARD

Sept. 7, 1912 — March 26, 1996

On March 26, 1996, ten days after being taken to Stanford University Hospital, David Packard, co-founder and chairman emeritus of HP, died from pneumonia and other complications. Mr. Packard, of course, was one-half of the Hewlett-Packard Company that he started in 1938 with his college friend William Hewlett in a garage (designated a California State Historical Landmark in 1989) with \$538 in capital. When HP was incorporated in 1947, revenues amounted to \$679,000 with 111 employees. HP is now a \$31 billion a year manufacturer of computing, communications and measurement products with 105,200 employees worldwide.

Although HP is respected for its well-engineered and reliable technological products, Mr. Hewlett and Mr. Packard also worked together to develop a number of innovative employment and management techniques which became known as the "HP Way," and



which are now widely envied and emulated. For example, catastrophic medical coverage, flexible work hours, open offices, decentralized decision-making, "management by walking around," stock options, picnics and "coffee talks" are among the legacies left to his employees by Mr. Packard.

"Mutual understanding and responsibility have been, for many years, key characteristics of the HP style of manage-

ment."— Dave Packard, from his book *The HP Way: How Bill Hewlett and I Built Our Company* (Harper Business, 1995). ●

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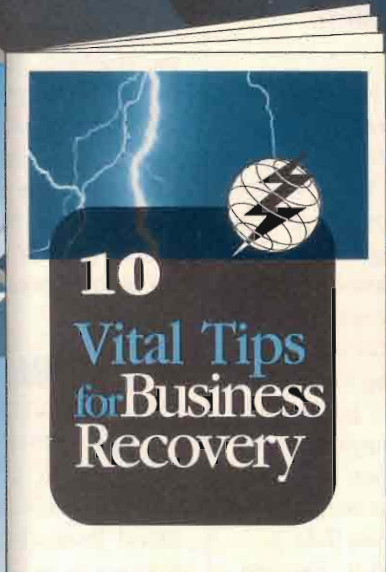
Now that you know what the HP Technology Finance division is all about, get ready for its first product. Called AssetView, it's the closest thing to a digital bean counter. HP's AssetView pro-

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After using it for two years as part of its Asset Management Services, "so many customers wanted it for their own, we finally gave it to them," says Mandeep Khara, worldwide operations manager for asset management. He points out that Technology Finance is still offering services, which are often outsourced by large corporations, but "we now have a product that our customers can use on their own." The HP-UX-based AssetView runs on HP 9000 servers and can be used with PC or workstation clients. You can use it on Windows, Windows NT, UNIX, Macintosh, OS/2 and MS-DOS platforms. A single user license costs \$22,000, and includes a database, report writers and 4GL runtime module. It is now available in North America and Europe. Product availability in Australia and Singapore in the Asia Pacific market as well as Brazil and Mexico in the Latin America market is expected in the second half of this year. ●

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PA-8000 BENCHMARK UPDATE

In April, HP issued the following updated benchmark for its 64-bit PA-8000 CPU. HP has been shipping to ISVs since January and plans to ship systems this month.

	SPECint95	SPECfp95
HP 180 MHz PA-8000	11.8	20.2
Digital 400 MHz Alpha 21164	11.0**	14.0**
MIPS 200 MHz R10000	8.9	12.50
Sun 167 MHz UltraSPARC	5.6	9.1
IBM 133 MHz PowerPC 620	5.6*	5.6*

* Source: *Microprocessor Report*

** Vendor Estimates — systems not shipping

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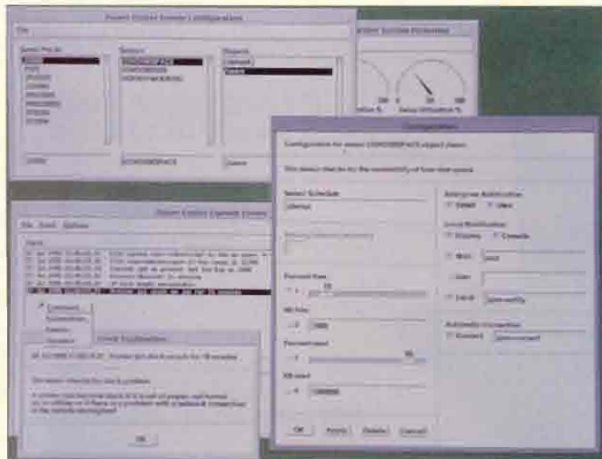
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CIRCLE 353 ON READER CARD

According to Jay Whitney, chief technology officer with Innovative Software (Englewood, Colo.), "A lot of people are shocked by the amount of money that is lost when your system goes down." System managers can find relief, however, with Innovative Software's Power Center software. Power Center is primarily used by telecom companies such as Airtouch Cellular, Alcatel, British Telecom and MCL.

Power Center 1.1 is a software suite comprised of three components — the System Problem Monitor, the Enterprise Notification System and the Mission Control

Station. Power Center features: 88 built-in sensors; network monitoring; E-mail monitoring; improved disk and process monitoring; and enhanced support for SNMP.

The System Problem Monitor (Power Center/SPM) consists of configurable sensors that monitor system performance, disks, printers, processes, file systems and networks. Additional sensor packs can monitor other hardware and applications. A single-coverage sensor monitors a single entity on your system, and a multiple-coverage sensor can monitor several objects of the same type. SPM includes a policy-driven monitor that detects, notifies and corrects problems with systems, software, hardware and applications.

The Enterprise Notification System (Power Center/ENS) supports a variety of alert notification mechanisms. Release 1.1 allows the ENS to notify staff of enterprise events from the SPM, or from any other SNMP-compliant device or application, including bridges, routers and hosts.

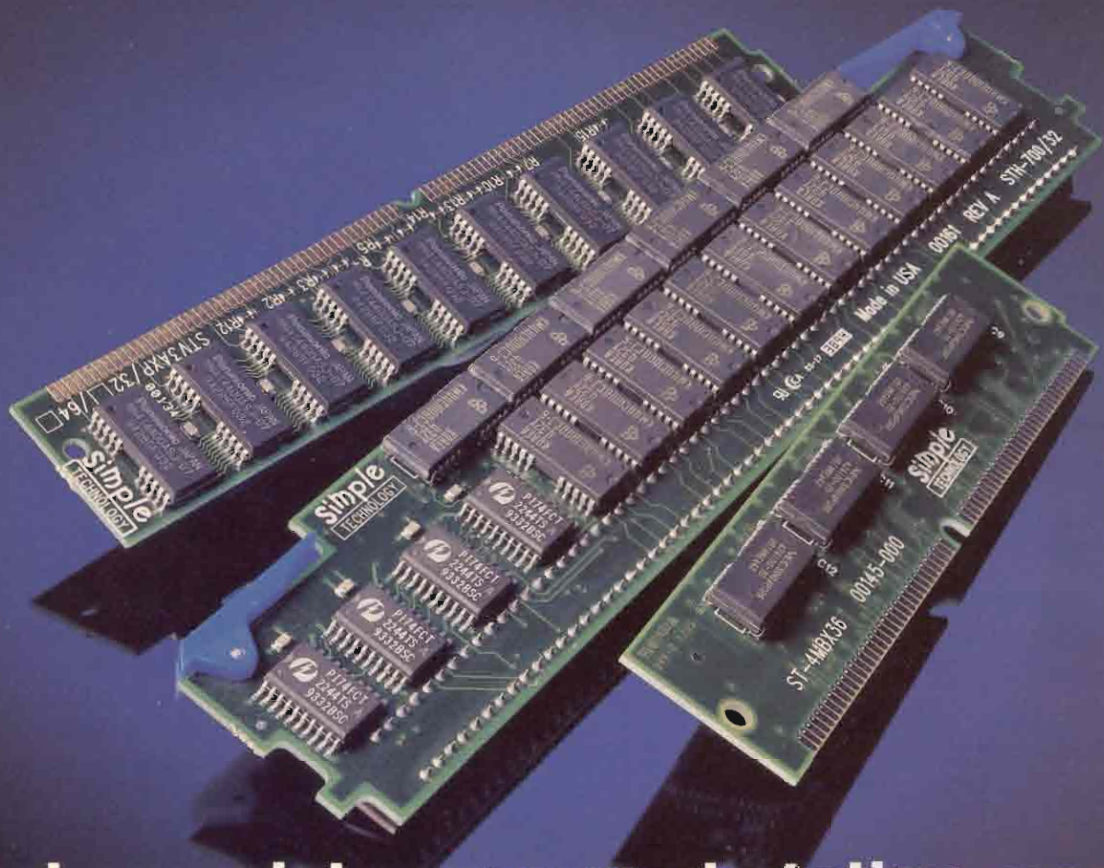
ENS continuously receives messages and performs notification based on a site's notification policy. All messages include: originating host, event name, affected system or network object (if any) and the message text. It

provides 24-hour lights-out event notification. If the designated person is unreachable, ENS can escalate to a different staff member who can handle the situation. ENS will invoke a predefined correction routine, as well as execute any operating system, database or application command.

The Mission Control Station (Power Center/MCS) is an OSF/Motif-based GUI which provides: point-and-click configuration of sensor alarm levels (SPM), notification options (ENS), printers, disk and file systems, and at-a-glance status of any system on the network with a continually updated graphical representation. Additional notification can take place via page, E-mail or interface to network managers such as HP OpenView, Sun NetManager, IBM NetView and Digital PolyCenter Manager on NetView.

Power Center supports HP-UX, Sun Solaris, IBM AIX and Digital UNIX. Versions for IBM AS/400 and Windows NT (on Intel and Alpha) are planned. Pricing is based on a per system basis and starts at \$495 for a desktop version.

—Deborah Schwartz,
Associate Editor



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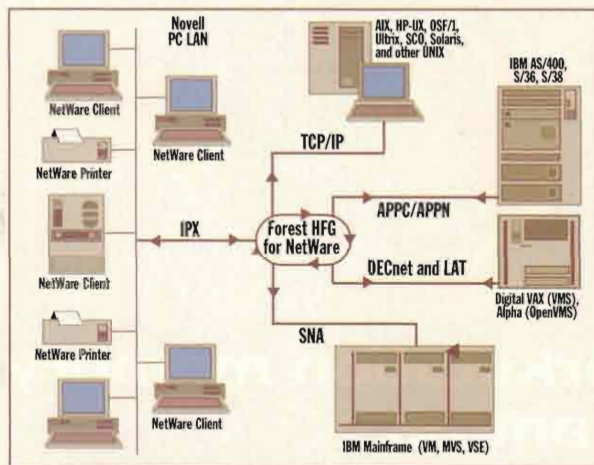
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CIRCLE 351 ON READER CARD

In the world of computing, connectivity is everything. With corporate networks constantly in a state of flux, you need interconnectivity software and hardware that can support a variety of network architectures and platforms on your LANs and WANs. This need to interconnect different network architectures has created a modern line of gateway products. In the Novell market, these products are often referred to as "NetWare gateways" where all provide the same basic solution — the integration of different networks — but are limited to basic transport services and connectivity to one, and only one, type of network.

An alternative to the gateway products offered by Novell and Microsoft is Forest High-Function Gateway (HFG) for NetWare from Forest Computer. It's a self-contained Digital Alpha-based hardware/software product that does not require NetWare Loadable Modules on any NetWare servers or additional software in any of the HP, Digital, IBM or UNIX hosts that it supports.

The Forest gateway provides NetWare connectivity to HP-UX, OpenVMS, ULTRIX, UNIX, PATHWORKS, TCP/IP and SNA environments. With Forest HFG, you can interconnect with UNIX systems including HP-UX, Digital UNIX, AIX and Solaris; VAX and Alpha systems via DECnet LAN links; AIX, AS/400, S/36 and S/38 computers via APPN and APPC LAN or WAN links; IBM VM, MVS and VSE mainframes via SNA LAN or WAN links; and SCO, AT&T and BSD implementations via TCP/IP.

Forest HFG allows NetWare clients to initiate terminal sessions to HP-UX, Digital and IBM environments over IPX, which eliminates the need for multiple protocol stacks or emulators in client PCs. Moreover, NetWare clients can initiate file transfers

between any of these hosts using the standard DOS "copy" command or Windows File Manager. You get instant upload/download capabilities with your host systems without having to implement custom client-server software for each type of host. Furthermore, because Forest HFG employs standard DOS and Windows utilities, your users can initiate file transfers using native transfer facilities. Printer routing also is seamless with Forest HFG because host printers appear as NetWare print servers. You can print to a virtual NetWare printer port and have the output delivered to a Digital, IBM or UNIX printer. Similarly, you can direct output generated by Digital systems and the like to NetWare printers.

The Forest gateway does not require additional layered software on any of the interconnected hosts. The product is also sold on a flat-fee license. No user-based or session-based charges are applied and no third-party client-side software is required. It includes remote diagnostic capabilities for end-to-end support. Pricing for the Forest High-Function Gateway starts at \$17,500.

—Donna Gasiewski,
Contributing Technical Editor



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CIRCLE 108 ON READER CARD

Mainframes Get An Open Forum

CNT And Brixton Technologies Provide The Glass House Gang With SNA-To-TCP/IP Connectivity



"We looked at interconnectivity products and saw the value in converting between two network protocols."

Scott McCourt
Vice President of
Software Development
CNT

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CIRCLE 352 ON READER CARD

Computer industry analysts, like so many psychics routinely predicting the end of the world as we know it, have been predicting the demise of the mainframe. Well, the software engineers at Computer Network Technology's (CNT) Cambridge, Mass. office (formerly Brixton Systems) certainly aren't preparing for Armageddon. And because they have been working on connecting IBM mainframe and midrange systems with UNIX, Microsoft Windows, Windows NT and Macintosh platforms since 1989, they aren't giving up on the mainframe any time soon.

CNT (Minneapolis, Minn.), better known for its Channelink products, a combination of hardware and software protocols for high-speed local and wide-area data transfer between mainframe CPUs, acquired the privately-held Brixton in 1994. "When Brixton was founded, IBM's SNA (Systems Network Architecture) was dominant. And TCP/IP was just then emerging," recalls Scott McCourt, vice president of CNT software development.

"So we looked at interconnectivity products and saw the value in converting between two network protocols." Consequently, the Brixton PU2.1 SNA Server, its flag-

ship product, is its fastest growing application. "It runs in the UNIX environment. Keeping it off the mainframe, frees up host cycles and doesn't tie up the mainframe."

The PU2.1 SNA server acts like a distributed server providing terminal emulation, printer emulation, application access and file transfer for IBM mainframes and AS/400 systems. It also manages the physical as well as the lower-level SNA protocols. Although IBM would like to replace it with Advanced Peer-to-Peer Networking (APPN) SNA, as the traditional legacy (host-centric) protocol, it remains very popular in AS/400 and mainframe sites. Consequently, "It plays well in the enterprise," says McCourt. Customers include Ford Motor, John Deere, Federal Express and UPS — all of which are Fortune 500 companies. International customers include British Telecom, Nomura Bank and Volkswagen among others.

Brixton also has developed a "reverse gateway" or "virtual mainframe" for the 180,000 3270 terminals out there, according to McCourt. The CNT Brixton PU5 SNA Server and PU5 Applications Toolkit implement the appropriate level of SNA's PU4 and PU5 functions to integrate 3270s into open systems. For

example, British Petroleum South Africa uses the PU5 Server to connect 500 3270 terminals to UNIX-based applications.

If you're using HP's OpenView, Brixton's Brx-OpenView captures and converts OpenView alarms into SNA alerts. CNT Brixton SNA servers are OEMed by Digital, IBM, Sun and Sequent, but not by HP which has its own mainframe-to-UNIX connectivity products.

Other products include Brixton Integrated Gateways, a set of channel-attached and LAN-attached turnkey gateways blending Brixton and CNT Channelink technologies. CNT's Brixton and Channelink products are sold directly to end-users and OEMs in the United States, as well as through subsidiaries in the United Kingdom, France and Germany.

Belying the assumption that the mainframe is dead or dying, CNT revenues have grown 433 percent since 1990. Revenues in 1995 however, only matched 1994's \$80 million. Going forward, capitalizing on connecting corporate mainframes to the Web and Internet is important. "There's an opportunity to deliver 3270 data streams to every desktop with a browser."

—George A. Thompson,
Senior Editor

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As part of the ongoing challenge to keep underwriters satisfied and operations profitable, Penn National Insurance (PNI; Harrisburg, Pa.) recently attained significant information systems performance improvements. Determined to get internal customers faster access to information with which they can manage their personal and commercial property and casualty insurance businesses, PNI moved from mainframe-based management information on multiple systems to a data warehousing solution under a client-server architecture. The Information Warehouse project team transitioned that system twice until it met PNI data analysts' standards.

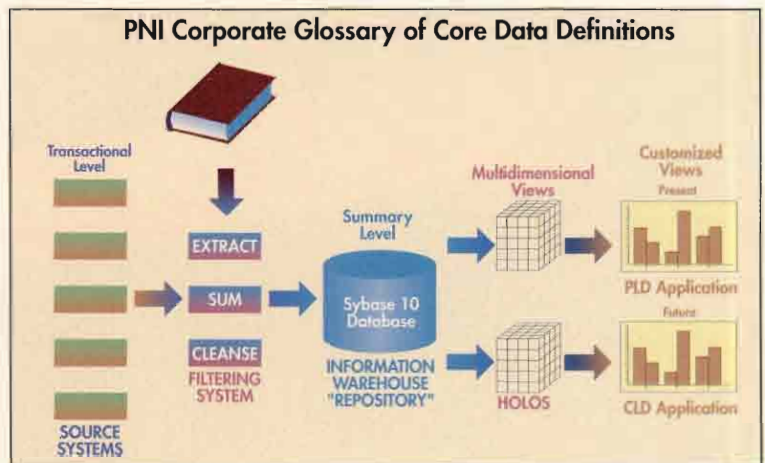
Just three years ago, PNI employees were receiving Personal Lines Division (PLD) profitability and performance summaries through monthly hardcopy reports dumped off a mainframe. The report content was voluminous and disjointed. Analysts were spending more time gathering data than analyzing trends. The process was cumbersome because analysts had to perform profitability analyses with bits and pieces of information from multiple

reports and data sources. PNI's conclusion? The mainframe just didn't provide tools to accomplish the types of in-depth information analysis PNI needed to make managerial decisions.

Today, the Information Warehouse team has built a 3 GB data warehouse solution that provides underwriters and decision makers financial OLAP in a timely fashion. This high-performance, client-server solution consists of Holistic Systems' Holos business intelligence software and a Sybase 10 database

messages about how they can help PNI's business.

Although PNI has a high-performance warehouse solution today, this wasn't the case when the system went live in June 1994. Under the initial data warehouse client-server architecture that specified Holos and Sybase running on a non-HP platform, underwriters complained that data display took too long. Once the complaints started coming in, the Information Warehouse project team realized that the number one



running on an HP 9000/K200 system. (see figure above).

With the Information Warehouse, PNI tried to provide underwriters with a single, common source of management reporting information. They now receive timely, high-quality data that is easily accessible from their computing desktop. Underwriters spend less time gathering data, which offers them more time and better ways to study the profitability and performance information. This benefit also extends to the insurance agents, who now receive better profitability reports and clearer

priority was to make the underwriters successful. The internal customers had to be convinced that the data warehousing solution would not only work to their satisfaction, but also would enhance productivity.

Solving the performance issues on the Personal Lines Key Results (PLKR) application became the team's biggest challenge. The PLKR application delivers aggregate information to support PNI employees who analyze insurance-related information (i.e., underwriting and claims adjudication) and make managerial decisions about the



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LETTERS

vi-ing To Hear From You

Nice [UNIX At Large] piece in the March 1996 issue. I use vi all the time and everyone makes fun. Glad to see someone else appreciates the universality of this tool.

David A. Wellman
FEMA Internet Support/Webmaster

Way to go. [Fred Mallett's] article on vi in the [March 1996] issue caused me to re-subscribe! Keep up the good work!

Tom Thurman
Principal Engineer
Rockwell Collins Avionics and
Communications Division

I never had any problem with vi, but it's really cool to find out about some new tricks! Thanks for the article.

P. Dutko
EDS

THE SHOW MUST GO ON

I went to one of HP's seminars, one about upgrading to HP-UX 10.

I found it useful to go there, and the food was good too! The people were California-types, which livened things up quite a bit. When pitching HP's new fault-tolerant features, they had a "thunderstorm" in the studio, and the speaker continued aided by a flashlight!

Steen Hansen
Computer Specialist
University Technology Services
The Ohio State University

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Letters may be edited



PLD and PNI's insurance business.

PNI enlisted the help of regional consulting firm Information Technologists Inc. (ITI; Conshohocken, Pa.) to isolate the source of PLKR performance issues, and to ultimately design and integrate the Information Warehouse solution.

PNI and ITI together sorted through and tested several potential reasons for PLKR performance degradation. Was the SQL generated by Holos optimized? Was the Sybase database design impacting performance? Or, was it simply a lack of CPU processing speed? It was quickly identified that the hardware platform alone was the issue — the single CPU machine didn't have the processing power needed to handle the significant demands of the Holos and Sybase decision support application. In addition, the team suspected that the information management needs required a platform that provided not only increased processing speed, but also a multiprocessing architecture.

To prove PNI/ITI's theories, the Information Warehouse team performed five-, 10-, 15- and 20-user PLKR application benchmarks on several combinations of non-HP processors, and on an HP 9000/K200 multiprocessor. While running the 20-user benchmark of the Holos/Sybase/HP solution, the information display took an average of 300 percent less time than on the original non-HP processor. With PNI's average of 10 to 12 users tapping the application at any given time, real-world information display can occur even more quickly.

Upon seeing the HP results, PNI chose the HP machine. Then, they moved the Holos application and the Sybase database to the HP server with little effort and with no significant interruption to the production use of the system.

The Information Warehouse team's mission was accomplished. They were able to cost-effectively improve the data warehouse system performance to the satisfaction of PNI's internal customers by implementing a solution that didn't require ripping the existing system out of production, rewriting soft-

ware or redesigning the existing database. Now PNI's underwriters can quickly view and analyze Personal Lines performance data to help forecast whether their operations are helping PNI or dragging down the company's profitability.

The Holos application provides underwriters with dynamic analysis functionality, such as the ability to run "what if" scenarios. For example, if PNI incurs \$100,000 in loss in a certain state, how will that affect year-end profitability? PNI's data is not stagnant. With Holos, analysts can perform more in-depth analysis than they could with a simple report writer. Holos gives underwriters the ability to drill down and graphically view the data by various lines, including by state and by agent. These multidimensional data views can act as a second pair of eyes to analysts craving more data with which they can make decisions.

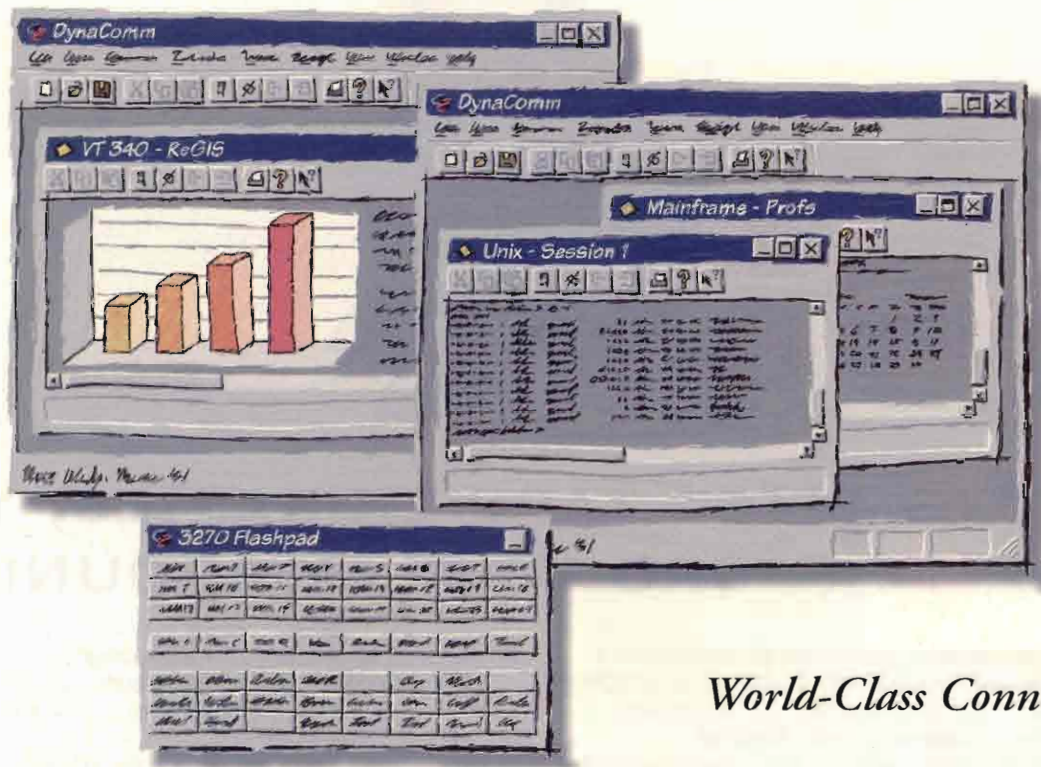
In addition, PNI's analysts don't have to be experts in SQL or relational database design in order to use Holos. The Holos application integrates tightly with the underlying Sybase 10 database. This seamless integration enables users to do complex data analysis, including dynamic retrieval of detailed data from Sybase, without worrying about the technical foundation of the application. Holos offers an easy to use front end, with a nice look and feel to it at each underwriter's desk.

Sybase helped the switch over to a relational database paradigm, after years of working with corporate data stored in multiple flat files on the mainframe. PNI underwriting data now resides in one, accessible spot, and duplication of data isn't a concern.

The next information-systems application on the horizon for PNI — a profitability analysis application for its Commercial Lines Division (CLD) — will quadruple the data warehouse storage from 3 GB to 13 GB. Holos headquarters is located at 510 Thornall St., Ste. 270, Edison, NJ 08837. For more information, call (908) 321-6500 —Cindy Todoroff, Corporate Project Manager at PNI.

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ATM...

Henry H. Wong

Its
Time
Has

Come

Just as the eagerly anticipated networking technology of the 1980s is finally becoming an economic reality, the applications of the 1990s — multimedia, document imaging, collaborative computing, software distribution and video conferencing — have generated an almost insatiable demand for network bandwidth. Asynchronous Transfer Mode (ATM) has rapidly become networking's point of convergence.

A scalable, high-performance, broad-bandwidth technology, ATM can use the same protocol that is used on the desktop (through the LAN and across the LAN) to simplify net architectures. Because of its fixed-length cell format, ATM switches can economically ramp up band-



ATM Technology

width availability from several megabits to hundreds of gigabits per second.

CHECKING THE CELL STRUCTURE

THE TECHNOLOGY'S 53-byte cell structure enables support of isochronous and bursty traffic over a single transport. Cell relay structures enable networks to handle evolving corporate applications such as desk-to-desk video conferencing, multimedia conferencing, multimedia messaging, remote education, imaging tasks (including CAD/CAM), animation and cooperative activities.

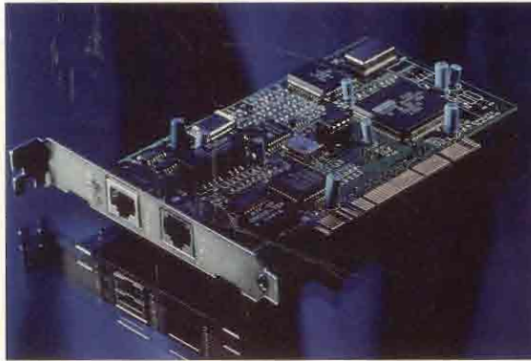
Using the cell structure, ATM switches and Channel Service Unit/Data Service Unit (CSU/DSU) can handle many streams of information simultaneously, interleaving cells from different sources and then re-assembling them at the receiving end into seamless text, unbroken voice or flicker-free video. Its end-to-end, connection-oriented service, which is compatible with LANs and WANs, reduces some of the expense, pain and risk of network conversion.

WATCH FOR FALLING PRICES

WITH AN UNLIMITED budget, an organization could set up an ATM-only network infrastructure. However, most desktops will probably never require such high-speed, high-bandwidth interfaces to the network. So, while today's thin and thick networking cable isn't optimal, it doesn't have to be completely replaced with fiber-optic cable.

Today, network managers can implement ATM WAN backbones and preserve much of their investment in Ethernet/Token Ring adapters, cabling, concentrators, hubs and routers. However, they will still have to address what may be new terminology/technology such as Smart-Jacks, demarcation points, punchdown blocks and CSU/DSU.

Factoring in the cost of ATM hubs, NICs, port cards, fiber-optic cable,



Fast Ethernet Adapter Cards like this offer a potential throughput of 200 Mbps.

CSU/DSU and other components, ATM started out at a per-desktop cost of nearly \$8,000. In early 1994, the cost per ATM desk was about \$6,000. Early this year, it was \$1,000 for 25 Mbps ATM, and by the end of the year, it is projected to be about \$850. The technology is finally competitive with switching hub-based LAN technology, giving users 25 Mbps full duplex rather than 10 Mbps or 16 Mbps half-duplex.

Early implementation of ATM has been as a multiplexing technology because it can handle all types of communications traffic. As a result, it can optimize broadband pipelines by eliminating idle periods. To protect the network manager's investment and leverage existing technology, leading internetworking vendors provide an ATM path for supporting existing

routers and hubs, and implementing schemes that connect present Ethernet and Token Ring LANs to the ATM backbone.

NIC OF TIME

WORKSTATIONS use ATM NICs that connect directly to ATM switches through an ATM link. The NICs convert the message to ATM cells, which the switch receives from one link and sends to the next link. Today's high-performance ATM NICs support the most widely used microcomputer buses but EISA is generally used for existing servers, and PCI is the bus of choice for future systems. The latest NICs support switched virtual circuits (SVCs) and permanent virtual circuits (PVCs), which conform to the ITU Q2 931 specification and all five current ATM Adaptation Layers (AALs).

ATM will first be applied to increase performance for backbone LANs and selected workgroups which require low latency and high performance and can cost-justify the added bandwidth. As a result, compatibility with existing networks and applications has been a prime concern for leading networking suppliers. Upgrading to an ATM backbone with ATM and LAN

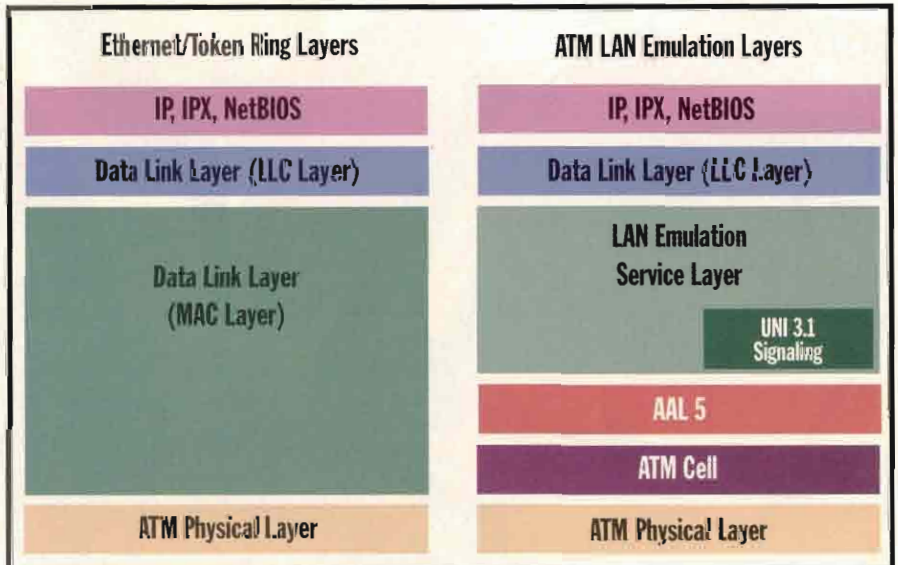


Figure 1: The layered architecture of LAN emulation clients.

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emulation equipped routers and switches increases backbone capacity without changing the balance of the network infrastructure. Protocol independence is vital in backbone network structures, because most carry multiple protocols including IP, IPX, SNA and NetBIOS.

LAN EMULATION AND PIVOTAL SWITCHES

LAN EMULATION (see Figure 1) simplifies the network manager's job and gives workstations, servers, ATM bridges, routers and switches the appearance of traditional LAN devices. This allows existing LAN protocols and applications to work transparently over ATM. It also enables communication with other ATM devices on the network in a connectionless broadcast or multicast fashion.

LAN switches boost network capacity by allowing dedicated, high-speed connections to be set between any client and its server.

As a result, the deployment of multiplexed ATM allows the use of existing routers, bridges and servers that are directly connected to the backbone. These units can be upgraded with ATM interfaces running LAN emulation to boost their bandwidth while continuing to serve Ethernet and Token Ring clients.

A key component in the ATM structure is today's third-generation LAN switch. While fundamentally different

from bridges, routers and hubs in use today, they're really multiport bridges with added intelligence that allows for traffic filters and "directed" broadcasts. Each port is considered a separate segment and learns the MAC (media access control) addresses on the workstation on each segment. Increasingly, these switches provide one or more ports that support connections to workstations with high-speed 10/100 or 100 Mbps Ethernet LAN adapter cards.

The LAN switches boost network capacity by allowing dedicated, high-speed connections to be set between any client and its server. They not only boost capacity at the desktop, they increase backbone capacity when installed at the center of the network to link departmental LAN switches.

Depending upon the applications, today's organizations can segment their ATM networks based on price/performance requirements (see Figure 2). ATM-ready workstations and devices can be connected to ATM hubs and WAN routers and have direct access to the ATM WAN. Organizations with traditional LANs can use an ATM-ready router to obtain similar benefits without having to replace workstations or wiring. Higher-end multiplexers also are available that can connect traditional data devices, mainframe channels and video to a cell relay WAN network by supporting ATM on the trunk side. Some multiplexers also are available that support traditional LANs over a frame relay interface.

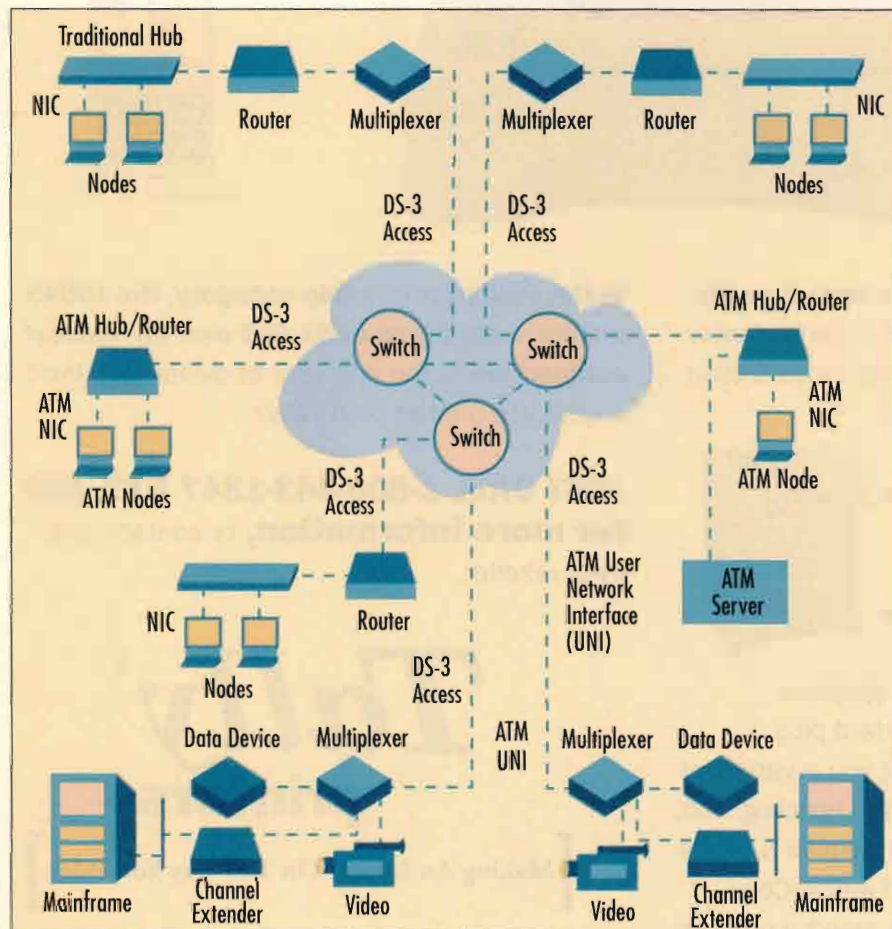


Figure 2: The diagram illustrates a mixed environment ATM WAN to multiple sites. Depending on the applications, ATM-ready workstations and devices can have direct access to the ATM WAN.

EASING THE TRANSITION

TO SIMPLIFY THE transition to ATM, leading hub and router vendors now support high-speed switched networks — switching traditional LAN protocols as well as ATM. This approach is helping network managers move forward using their present platforms by providing LAN-to-ATM backbone switching and conversion. Hubs are the core switching platforms for desktops and backbones. They also support the physical LAN wiring and backbone router that connects the physical LAN segments.

Until networks are pure ATM, multiprotocol routers will still be required to support communications between logical LANs and segment virtual LANs in a logically defined collapsed backbone. Today's better routers help users get the most from their WAN bandwidth by incorporating WAN data compression that supports a wide range of WAN protocols. In making the transition, network managers have to ensure that their routers are not only compliant with all relevant standards, but that they provide interoperability, scalability and congestion management, because LAN and WAN growth is inevitable. In the WAN environment, remote management is important because organizations often have to carry out online and offline diagnostics and configuration changes.

"LEGACY" COMPATIBILITY

IT IS INCREASINGLY obvious that ATM will ultimately be deployed as a common technology within LANs and WANs because it is backward compatible with existing networks. This is important, because the network architecture will have to have the same appearance to management applications, regardless of scale or geography. It also will have to have the ability to be managed from any point on the network.

Today's ATM hubs, routers and multiplexers provide connections between ATM networks such as Ethernet as well as fractional T1/T3 and DS-3 wide area links. While ATM LAN emulation preserves present networking investments, it also allows users to easily and economically integrate ATM-specific applications into this environment. By providing bandwidth-on-demand, ATM solutions provide a wide range of solution options for network managers and users in the years ahead.

—Henry H. Wong is executive vice president of CNet Technology Inc. (San Jose, Calif.).

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Everybody Get Together, Got To Link One Another Right Now

George A. Thompson

When you think of system and network management, what images come to mind? Is it a beautiful mosaic — each piece carefully planned with a reason and purpose? Or, is it more like a practical patchwork quilt sewn together from a motley collection of PCs, workstations and servers, a hodgepodge of bridges and routers and hubs plus a myriad of wires? Most likely, it's the latter.

Take heart, it's not entirely your fault if you just realized that system and network management is more than troubleshooting. Vendors haven't been much help. But now you know that it's also about monitoring, maintaining tracking and distributing applications. It's about hardware. It's about software. It's about the infrastructure and all of its components. And while you're at it, don't forget storage management and security. Now, with the trend toward distributed systems, you have scalability problems staring you in the face. Your mother told you there would be data like this, didn't she?

You had to rely on your own wit and wisdom. Yes, you found out the hard way that in the ultra modern IS cosmos, systems and network management (and possibly your fate as an IS manager) are inextricably linked. For example, more than 45 percent of HP's OpenView users have indicated (from a survey taken during the 1995 OpenView Users Conference), that they plan or have already merged their network and system management operations.

So it's no small wonder then that HP and other vendors in the system and network management business are rushing to consolidate their product lines, and insert the phrases like *integrated system and network management*, as well as add the words *enterprise* and *distributed* to their marketing vocabularies. Last year, Computer Associates (Islandia, N.Y.) bought Legent Corp. (Herndon, Va.). IBM intends to integrate Tivoli Systems Inc.'s (Austin, Texas; it's newest sub-

siary) Tivoli Management Environment with its own NetView (which is based on HP's OpenView framework). And PC LAN vendor Symantec has plans to ship an enterprise suite by the end of this year. For its part, HP recently released a distributed version of OpenView Network Node Manager that can now manage more than 2,000 systems, its previous limit. For more detailed information, see this month's *Inner Networking* column.

Although the cost of your LAN/workgroup administration is probably the single most important motivation for the consolidation, it is not surprising that there's more than one trend at work here. As workgroup UNIX-based and PC-based LANs take on mission-critical proportions within the enterprise, the pressure is on IS managers to maximize network uptime and efficiency. So with that in mind, below you'll find the short list of vendors providing system and network management solutions to help you get through the maze.

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Legato Systems Inc. Palo Alto, Calif. tel: (415) 812-6000 fax: (415) 812-6032 www.legato.com	NetWorker Storage management \$2,500 (UNIX); \$1,200 (NetWare/NT/SCO)
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Microsoft Corp. Redmond, Wash. tel: (800) 426-9400 fax: (206) 936-7329 www.microsoft.com	System Management Server (SMS) Software distribution, remote control of PCs, limited network monitoring \$650/server; \$55/client
New Dimension Software Inc. Irvine, Calif. tel: (800) 347-4694 fax: (714) 756-3900 www.ddddf.com	CONTROL-M Production control system \$20,995 (includes network management console) CONTROL-R Job restart system \$11,075 CONTROL-D Detection and automatic responses of systems events \$16,940 CONTROL-B Balancing and quality control in MVS \$29,150
Novadigm Inc. Mahwah, N.J. tel: (800) 626-6682 fax: (201) 512-1001 www.novadigm.com	Enterprise Desktop: Manager Managing distributed software configurations \$20,000; \$200/client Enterprise Desktop: Administrator Configuring and managing application versions \$20,000; \$200/client
Platinum Technology Oakbrook Terrace, Ill. tel: (800) 378-7528 fax: (708) 691-0718 www.platinum.com	AutoXfer Software distribution \$7,500; \$20-\$700 (agents) Apriori Trouble ticketing and problem resolution \$50,000 (10 licenses) NetArchive File backup \$3,000; \$2,000 (site-based client license) Z/Team Enterprise automation \$2,000 AutoSys Job scheduling \$10,500; \$1,000 (agents)
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Tips From The Edge Of UNIX Insanity

After teaching UNIX classes for eight consecutive weeks — sometimes three different classes each

week— finding time off seems to be on my brain lately. That would explain why I keep issuing commands like: **grep frederm /etc/passwd | /bin/vacation -bermuda-duration=2weeks**. So, with that in mind, I'm offering several "short subject" tips. Hopefully one or two will be of interest to you.

First, a note about a not-so-new patch that seems to have been missed by many people. When I mention the **newdisk** and **newdisk_scan** commands, the usual reply from otherwise very competent system administrators is: "Huh?" These commands can be found in patch PHCO_5881, and pulled from the support.mayfield.hp.com ftp site. These commands are very useful when you are adding new disks that do not have disktab entries.

The command syntax is very simple: **usage: newdisk [-v[vv...]] character_device_file**.

The **v** options make the command verbose. The device file should be the character (raw) file, and the disk should be attached and powered up. What this program does, is to query the disk using a SCSI info type access,

and use the information returned to create an entry for the disk in `/etc/disktab`. You then can copy this entry to add versions with the amount of swap you want on that disk, if any. The real beauty of this command is on Series 700s, as it also will create a `/usr/sam/lib/C/pd_devinfo.tx` entry. This entry will allow sam to properly handle the new disk, and give you the ability to select the swap space amount if desired. This is great for after-market and new disks that do not have existing entries. The `/etc/newdisk_scan` command is actually a script that calls **newdisk** for all possible devices, and ensures that all attached disks have disktab entries (and sam entries on Series 700s).

BACKING UP IS HARD TO DO

Next up — http://gis-ww.larc.nasa.gov/~jason/backup_solutions.html — a Web location brought to my attention by someone who wishes to remain anonymous. They were not doing what this comparison chart talks about; namely, system backup. The document (which compares several hardware products) might save a lot of time for some of you making large network backup solution decisions. Thank you Jason Austin.

WHICH ROOT IS WHICH?

The user, or the top of a disk? In this case, a discussion of the **chroot** command, and one example of a use for it.

chroot allows you to specify a directory name as the root (/) level for a command (or program). For example, you can make a user's home directory root, so that if they enter a pathname like /data/file, it would look for the directory data in their home directory instead of /data at the system root level. The common use of the **/etc/chroot** command is for security. You can create a directory, for example, /unsecure-login, then put all commands needed in /unsecure-login/bin. Now when certain users log in, you create a shell for them with **/etc/chroot /unsecure-login /bin/ csh**. This makes the /unsecure-login directory their root level, so that /bin/csh is really /unsecure-login/bin/csh. This also prevents the user from being able to go above the newly assigned root level. All commands that this shell can execute must live under the new root directory. This means you can limit the commands accessible by only putting certain com-

mands into the /unsecure-login/bin directory. This is similar to using the restricted shell (rks), but more configurable.

Another often overlooked use of **chroot** is to "fix" commands that require software to be installed at the / level (for example, if a program looks for its library files in /lib, and you don't want to put them there). The problem here is that all data files now must be under the root directory assigned by **chroot**. This is sometimes done with a secondary disk. Make the mount point root, and store all files and programs needed on that disk.

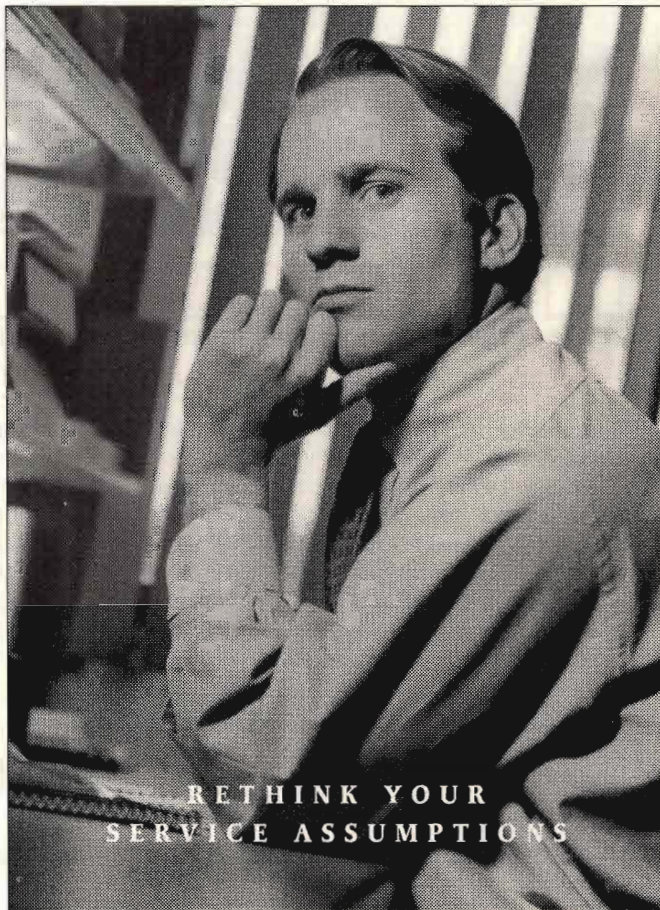
A nice save can be performed with **chroot**. I get tar files sent to me quite often where the files were archived with absolute pathnames. If you index a **tar** file and you see something like at the top of the next column:

```
$ tar tf xbill.tar
/net/gamehost/opt/xbill/bin/xbill
/net/gamehost/opt/xbill/data/highscores
```

This can be a problem to **untar**, as **tar** will try to put the files back on /net/gamehost, which does not exist in my network. The workaround to **tar** not having a target option, is to use **chroot**. The following commands are an example of this:

```
$ su
Password:
# mkdir -p /tmp/bill
# cp /bin/tar /tmp/bill
# mv xbill.tar /tmp/bill
# /etc/chroot /tmp/bill /tar xf /xbill.tar
# ls /tmp/bill/net/gamehost/opt
xbill
# mv /tmp/bill/net/gamehost/opt/xbill /usr/games
```

We created a scratch directory to **untar** the file into, then put the command we needed in the directory (cp /bin/tar /tmp/bill). Because **tar** will not be able to go above the new root, we also had to put the tarball file (xbill.tar) into /tmp/bill. Next we issued the **chroot** command (it must be run as root), with



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/tmp/bill as the root, and **tar** being the command executed.

This untared the file with the new root, therefore, it created /tmp/bill/net/gamehost/opt/.... All that remains is to **mv** (move) the directory where it belongs, in this case /usr/games.

HANDY TIPS FOR HP-UX 10

On HP-UX 10.x, there is a command that I have not yet seen many people using — which surprises me a bit. The command is **/usr/sbin/setup**. It is a menu-like program that can perform the following tasks: set the system clock/timezone/nodename, assign passwords to system logins if they do not already have one and add users. It can be handy at times, especially if you don't remember off the top of your head the new SVR4 pathnames, like /etc/rc.config.d/net-conf where the hostname is stored.

Finally, on HP-UX 10.x, there's a command **/usr/sbin/setuname**. It

can set the system name (**-s**) — you know, the one returned by **uname** — it is typically "HP-UX." It also can set the node name (**-n**), returned as the second field in a **uname -a**. There is a **-t** option to make the changes only temporary (till the next reboot).

Use this when you want to confound someone. Here is an example:

```
# uname -s -n
HP-UX puxy
# setuname -t -s Windoze -n Vectra
# uname
Windoze
# uname -n
Vectra
```

Who says PC's can't run UNIX software? — *We are sorry to say that Fred has been temporarily committed to a home for wayward system administrators. But, we're told they have access to 1200 baud modems and PCs in the cells. Humor him by sending E-mail to frederm@aol.com.*

Would you like to continue to see articles on this topic?
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HELP DESK

Re: "A vi-able Alternative" in the March 1996 issue. "I see people often use :wq! to get out of vi without saving." I'm by no means an expert with vi but, doesn't :wq! force a write file and quit to be executed?

BTW, I very much appreciate the rest of the tips you offered in your article. I need all the help I can get! I do tend to use vuedpad whenever I can versus vi because I don't remember all the vi commands very well.

Marcus B. Vail

Sr. CAE Applications Engineer

Fisher-Price Inc.

mvail@fpp.com

Major oops. :q! is used to exit without saving a file that has changed. :wq! does indeed mean write, and quit. And does so even if the file only has r rights, so long as I own the file. :wq! is used to write a file that you own, but do not have w rights to (force write). — FM

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Tornado Redux

HP OpenView Network Node Manager (NNM), otherwise known as Tornado Release II

(TR2), is finally out the door — much to HP's relief. HP OpenView NNM 4.1, as it's officially called, supports the ability to manage large networks through cooperative communications between multiple copies of OpenView. You could call it distributed management. Or, you could call it manager-to-manager communications. You also could call it a more scalable OpenView. And, you could use the following adjectives to describe it — friendlier, cleaner to configure, faster and much smarter.

But radically different? NOT! Underneath, it's basically the same OpenView. But with a tuned-up engine and some very useful enhancements, it suddenly becomes a very important product to IS/IT managers in companies trying to manage more than 2,000 nodes on a network. The most significant changes in OpenView NNM 4.1 are:

- the addition of two processes, nicknamed "Tornado Send" and "Tornado Receive," that allow one NNM to send/receive information to another
- the addition of filters for various NNM processes

"Tornado Send" and "Tornado Receive" allow multiple NNMs to exchange event (SNMP trap) and topology data. All NNM copies will have this capability.

Consequently, the architecture is very flexible. You can make it hierarchical — forwarding important SNMP traps and topology changes from all OpenView copies to one central copy of OpenView. Or, make it peer-to-peer — allowing all OpenView copies to exchange information as each administrator sees fit. In either case, the "Tornado Send" and "Tornado Receive" commands allow all copies of NNM across the enterprise to be synchronized with respect to network maps and important status events.

GOING TO THE POLLS

As before, each NNM copy is still responsible for polling nodes (bridges, routers, hubs, etc.) and receiving SNMP traps (device failure alerts) in its own domain. Remember, because some networks have tens or even hundreds of thousands of nodes, and each NNM copy typically can't effectively manage more than 2,000 nodes, customers must divide the network into smaller "domains" of 2,000 nodes or less, on average.

But here's what's new: administrators can specify which critical traps or threshold-generated events should be forwarded cross-domain to other NNMs — either a central NNM or other peers. Because only exception

conditions are shared, the need to do active status polling over the WAN is eliminated. In other words, NNM's can talk to each other now. Before, they couldn't. But events represent only one kind of management data that administrators need to collect. Knowing network topology — what's on the network, how it's connected and where its located — is absolutely essential when trying to track down the cause of a network or system failure.

GETTING ON TOP OF THE TOPOLOGY

Also as before, each NNM is still responsible for discovering the location of all nodes in its own domain at start-up. What has changed is this: multiple NNM's can initiate a large-scale synchronization of topology information across all domains (for example, across a wide area). Once this is complete, each NNM has a complete topological picture of the entire network in its SQL database (regardless of whether it is Ingres or Oracle).

It's basically the same OpenView NNM, but with a tuned-up engine.

After this initial map synchronization is complete, changes to network topology may be propagated from one NNM domain to another. As a result, for the first time in OpenView's history, administrators using one NNM copy can actually get their hands on network layout information gathered by other NNM's using HP-provided tools. For both SNMP traps/events and topology changes, the administrator determines which filters to apply when going forward, to restrict exactly what events or changes should be shared across the domains.

As one might expect, the filters are key to manipulating these new OpenView capabilities to full advan-

tage. Domain filters enhance NNM's polling flexibility, making the product easier to configure and use. Inter-domain filters ensure that only pertinent information is shared across domains, reducing bandwidth requirements.

Map filters are important for tailoring operator views to only that portion of the network for which the operator is responsible. Learning how to use the filters will be the OpenView user's biggest challenge. Hopefully, a collective wisdom on proper filter usage will accumulate rapidly and disseminate quickly, especially if HP assists in the education process. So, Tornado II is not a radical change. But it is a change for the better. And that's good for everyone. — *Do you think Tornado II will clear the air? Or do you see stormy weather up ahead? If so, warn Jill at huntinga@mcgraw-hill.com.*

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Windows 95: Little Software Of Horrors

Like the *Friday the 13th* movie series, upgrading to Windows 95 isn't for the faint of heart. Like so

many similar fearful tales, my story starts out innocently enough. A friend, who started a network-related software company, asked me to write about his product. There was one catch: The software runs on Windows 95, meaning I'd have to migrate my NetWare-connected PC from Windows 3.1 to Windows 95.

OK, I thought, here's a legitimate business reason to switch to Windows 95. Far from a technical neophyte, I assumed I'd have little trouble upgrading because I've dealt with IRQs before and I knew to back up everything to protect myself and so on. Consequently, I promised my friend I'd get back to him in three days with a proposed schedule and cost estimate to do the project. I bought the Windows 95 upgrade package that evening. The very next morning, after warily noting the meager documentation, I started the installation program. Prompt after prompt after prompt, I obeyed. So far, so good ... until the screen went dark about 45 minutes later.

IT'S DEAD, JIM

After nervously waiting "a few minutes" (as instructed by the user guide), I

gave it the "three finger salute" (rebooting with [CTRL]-[ALT]-[DEL]). Then, I tried the reset button. No ROM BIOS start-up message. No disk-drive LED activity. No noise whatsoever. Nada. With the exception of the constant humming from the power supply fan, my system was dead.

I turned the system off. I waited about five or six seconds, and turned it on again. No way. I was met with cold, dark silence. This meant I couldn't even restore the system with the backup DOS 6.22/Windows 3.1 boot disk I'd so cleverly created (or so I thought at the time).

A long-distance call (at my expense) to Microsoft's technical support line proved fruitless. Despite my protests that the system had worked perfectly under Windows 3.1, the support specialist told me the problem was "in the hardware, and we don't solve hardware problems." End of conversation. No suggestions about checking Microsoft's Web site for problem reports, looking for interrupt conflicts, or the like.

Next, I called the local computer store where I bought my system which uses Intel's "Zappa" motherboard with the Triton chip set. So, they told me to call Intel. At least they gave me a toll-free number. They promised that, if Intel couldn't help, they'd take a look at the system the next day. A call to Intel revealed two things: An undocumented DIP switch on the motherboard could clear and reset the ROM BIOS — thus

giving my system new life. WHEW! Unfortunately, I had to clear and reset the ROM BIOS each and every time I rebooted or restarted my computer. A time-consuming and bizarre process. And, it was just not acceptable, which leads me to part two: an upgrade of the ROM BIOS was necessary to run Windows 95.

After downloading and running the appropriate BIOS upgrade, which worked perfectly (thanks Intel), I figured a fresh start was in order. I tried to uninstall Windows 95. Although the uninstall utility returned my system to DOS 6.22/Windows 3.1 functionality, it didn't operate quite as well. First, it failed to delete any of the Windows 95 files in my C:\WINDOWS subdirectory. I had to do it manually, including clearing the "hidden" and "read only" file attributes from them. It also totally scrambled my Windows 3.1 Program Manager icons, thus forcing me to rebuild them — another time waster.

More than a bit peeved, allow me to be cynical for a moment: I suspect that Microsoft is aware of these kinds of problems but simply instructs its support personnel to do as little as possible to help Windows 95 users, who, after all, didn't generate much income for

Bill G. Thanks, I needed that.

Did I mention it's been four days now. I had to call my friend and tell him I couldn't deliver the proposal I'd promised. Because he is also a potential client, it's not the best way to start a business relationship. Fortunately, he was willing to wait longer.

IT'S BAAAACK

Filled with confidence over beating the Windows 95 beast, I headed into a second installation. But the second-time was identical to the first: same BIOS crash, same fix — clear the BIOS with the DIP switch. I felt like Bill Murray in *Ground Hog's Day*. Same problem. Same fix. Same frustration.

Of course, no one at Microsoft had ever heard of such a problem, and I talked not only with telephone support personnel but product-management level people about it at the Network+Interop trade show in Las Vegas. Engineers at another Interop exhibit, where a Windows 95 "first aid" software kit was available, said flat out I had a defective motherboard. Meanwhile, after a little snooping around in the system and the setup program I "sort of" fixed the problem.

By resolving a couple of interrupt conflicts not accounted for by the BIOS' Plug and Play feature, I can now reboot or restart the system without clearing and resetting the BIOS *most of the time*. However, the problem still pops up when I make changes in my printer or COM port configurations. Then, I have to clear and reset the BIOS again. It's all very horrifying.

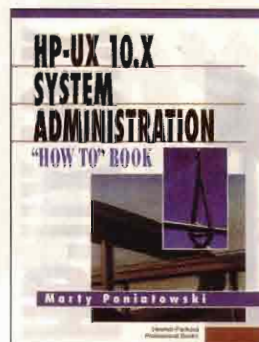
And there's still that proposal ...
—*Jim Carr, a Saratoga, Calif.-based freelance technology and business writer, welcomes any suggestions (short of dumping the PC in the pool) on how to get Windows 95 running properly. Send E-mail to 73561.1577@compuserve.com.*

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WIN95 OR BUST

Before upgrading any PC to Windows 95, here are a few proposals of my own to protect the uninitialized:

- **BACK UP EVERYTHING**, from configuration files to data files.
- **Create a boot disk that will let you log the PC into your server.** Then test the disk to make sure it works.
- **Make sure you have the latest revision of your system's ROM BIOS.**
- **Tell Windows 95 to make the startup disk during the installation;** it will allow you to return to your original environment.
- **Use Plug and Play peripheral cards whenever possible to alleviate interrupt conflicts.**
- **Here's the best advice: Buy PCs with Windows 95 already installed.**



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PC DOCS Releases DOCS Open

PC DOCS Group and Verity Inc. announced a DOCS Open version integrating Verity's search engine technology. The integrated product will allow users to index and retrieve documents from multiple formats.

DOCS Open is a client-server document management system that offers a secure infrastructure to store, locate and manage corporate information. DOCS Open works in virtually any computing environment searching for information across multiple servers and remote sites.

Contact Verity, 1550 Plymouth St., Mountain View, CA 94043; (415) 960-7600; www.verity.com; info@verity.com.

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Frontier Technologies Unveils Intranet Genie

Frontier Technologies unveiled a ready-to-use Intranet solution designed to bring the benefits of the Internet computing paradigm to businesses that do not have extensive in-house computing expertise.

Intranet Genie offers — on a single CD-ROM — the client and server software required to install a secure, fully-functional Intranet. The components include Frontier's Windows NT-based SuperWeb Server, complete with advanced search capabilities and numerous small applications, as well as client software, including an Internet browser, Web administration and authoring tools, and secure E-mail.

Contact Frontier Technologies Corp., 10201 N. Port Washington Rd., Mequon, WI 53092; (414) 241-4555; www.frontiertech.com; info@frontiertech.com.

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Platform Computing Expands LSF V2.2

Platform Computing Corp. released LSF (Load Sharing Facility) Version 2.2. LSF is

the de facto standard in load sharing and batch queuing software for a broad range of heterogeneous UNIX systems. With LSF, interactive, batch and parallel jobs are continuously distributed across the network, making full use of all workstations and servers.

With the release of LSF Version 2.2 comes the introduction of a layered LSF product, LSF-PJS (Production Job Scheduler). The optional LSF-PJS integrates heterogeneous server systems to create a "virtual mainframe." Job processing is done according to user-defined calendars. LSF-PJS supports job failover and dynamic server selection for each job.

Contact Platform Computing Corp., 5001 Yonge St., Ste. 140, Toronto, ON M2N 6P6; (416) 512-9587; www.platform.com; info@platform.com.

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NobleNet Announces EZ-API Family

NobleNet Inc. announced its EZ-API product family of commercial "component APIs." Each EZ-API incorporates NobleNet's "OneDriver" client-server architecture. OneDriver technology transforms industry-standard APIs such as Microsoft's ODBC API and Novell's Telephony Services API (TSAPI) into off-the-shelf, re-usable, multi-platform "component APIs" that developers can embed in their distributed applications. Developers can customize the API and add their own business logic by modifying wrapper source code or by generating additional communications software with NobleNet's EZ-RPC compilers.

The OneDriver ODBC SDK costs \$2,500 per server for an unlimited number of users. Supported client platforms are Windows 3.1, Windows 95 and Windows NT. Supported server platforms are HP-UX, Windows NT, Sun Solaris and IBM AIX. The OneDriver TSAPI SDK is priced to meet individual business models. Supported client platforms are Windows 3.1, Windows 95 and Windows NT. Each

client platform supports both Novell's SPX and TCP/IP communicating with a NetWare-based TSAPI server.

Contact NobleNet Inc., 337 Turnpike Rd., Southborough, MA 01772; (508) 460-8222; www.noblenet.com; sales@noblenet.com.

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Wind River Systems Licenses Epilogue's Envoy SNMP

Epilogue Technology Corp. and Wind River Systems Inc. announced a licensing agreement that will allow Wind River to offer Epilogue's Envoy SNMP and Emissary SNMP MIB compiler as optional products for its Tornado cross-development environment for embedded applications. The terms of the agreement give Wind River resale rights to Epilogue products, and will allow Tornado users to develop their own SNMP solutions for embedded applications.

Tornado consists of integrated components: the Tornado tool suite, a set of powerful tools and utilities on the host and the target; VxWorks, a powerful and scalable real-time operating system which executes on the embedded target processor; and a full range of communications options such as Ethernet, serial line, ICE or ROM emulator for the target connection to the host.

Epilogue's Envoy and Emissary SNMP technology will be offered as optional products for the Tornado development environment allowing Wind River customers to develop their own real-time SNMP applications. Tornado offers networking support for embedded, real-time applications by adding TCP/IP sockets, NFS client and server, Zbuf (or No Copy TCP/IP), CSLIP, RPC, ftp, rlogin, telnet, bootp and SNMP to the VxWorks RTOS. By incorporating Envoy and Emissary, VxWorks is fully compliant with SNMP, and extends support for MIB-II.

Contact Wind River Systems 1010 Atlantic Ave., Alameda, CA 94501; (510) 748-4100; www.wrs.com; inquiries@wrs.com.

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Faxgate Integrates With HP OpenMail

Teubner & Associates announced that Faxgate now integrates with HP OpenMail. OpenMail users can use Faxgate to send and receive faxes with their E-mail systems. Other supported E-mail systems include VIM (Notes and cc:Mail), FFAPI (Microsoft Mail and Exchange), MHS and SMTP-based E-mail systems.

Contact Teubner & Associates Inc., Seventh and main, P.O. Box 1994, Stillwater, OK 74076; (800) 343-7070; www.teubner.com; faxgate.sales@teubner.com.

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Racal's CMS Adds Management Capabilities

Racal-Datacom announced new applications for its CMS (Communications Management Series) software system, providing users with increased integration and control over WANs and LANs.

CMS Release 5.2 enables network managers to integrate management applications on HP 9000/700 workstations running HP-UX 9.5 under HP OpenView v3.3. In addition, CMS Release 5.2 also

includes SNMP management support for the Racal-Datacom PremNet 500 fiber optic backbone multiplexer and the Shiva LANRover devices.

Contact Racal-Datacom Inc., 1601 N. Harrison Pkwy., Sunrise, FL 33323; (305) 846-1601; www.racal.com.

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The Dodge Group Ports To The HP 9000

The Dodge Group Inc. ported its Financial Data Warehouse solution to the HP 9000 server platform. Financial Data Warehouse is a client-server application incorporating a refined data model that can handle a wide range of financial and nonfinancial data. It can produce management, statutory, corporate and other reports in multiple currencies, for multiple time periods and at extremely high volumes required by a large enterprise.

Financial Data Warehouse runs on UNIX platforms from HP, Digital, IBM, Sun, as well Microsoft Windows and Windows NT clients. Databases supported include Sybase and Oracle. Price is approximately \$500,000 per site.

Contact The Dodge Group Inc., 404

Wyman St., Ste. 210, Waltham, MA 02154; (617) 672-8600; www.dodge.com; info@dodge.com.

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HARDWARE

Garrett Communications Offers Magnum 800E

Garrett Communications introduced the Magnum 800E Workgroup Hub for supporting 100 MB Fast Ethernet LANs. The new hub provides standalone 100BaseTX connectivity, as well as interconnection into larger networks. The 800E is a full-featured, IEEE 802.3u-compliant 100BaseTX Fast Ethernet hub.

The front panel includes eight shielded RJ-45 ports. There also is a rear-mounted bonus slot configured for any of a variety of media choices. The first port of the Magnum 800E has an up-link switch, eliminating the need for a special crossover cable and allowing cascading of multiple Workgroup Hubs. Separate indicators display basic network activity for each port, including connectivity and activity infor-

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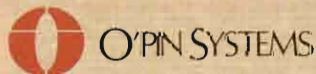
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mation. Power LED and collisions indicators also are provided.

The Magnum 800E Workgroup Hub uses a star network topology with automatic per port partitioning and reconnection. A faulty segment is isolated from the rest of the network, avoiding most network downtime.

Magnum 800E units cost \$1,595. Contact Garrett Communications, 48531 Warm Springs Blvd., Fremont, CA 94539; (510) 438-9071; www.garrettcom.com.

Circle 387 on reader card

Telenetics Introduces Zodiac Multichannel Modem

Telenetics introduced Zodiac, a multichannel modem that houses 12- or 24-port modems in one desktop or rackmount case using one energy-saving power source. By minimizing the size of individual modem modules, Zodiac can fit as many as 12 individual V.22bis (2.4 Kbps), V.32bis (14.4 Kbps) or V.34bis (28.8 Kbps) modems into a single desktop metal case, or 24 modems into a rackmount case.

A 24-modem mounting rack with multiple modem ports, with each port running at speeds as fast as 115.2 Kbps, uses less than

30 watts of electricity.

All modem modules are fully Hayes AT command set compatible with programmable registers, and comply with Bell and ITU (CCITT) standards and protocols. They operate at full or half duplex on dial-up systems. A two-wire and four-wire leased-line version also is available.

Prices vary according to the configuration selected.

Contact Telenetics, 1726 Lake Grassland W., Gallatin, TN 37066; (800) 204-6142; wancom@aol.com.

Circle 388 on reader card

Extended Systems Ships SerialLink

Extended Systems shipped an enhanced version of its SerialLink external serial port product. SerialLink provides a serial printer connection for virtually any parallel printer.

With SerialLink and the "hot-port" capability of HP printers, customers have the flexibility to attach to multiple computer systems. Once SerialLink is installed, users can simultaneously connect a UNIX system to the SerialLink and a PC system to the other printer interface.

SerialLink ESI-2634 costs \$139. Contact Extended Systems, 5777 N. Meeker Ave., Boise, ID 83713; (800) 235-7576; www.extendsys.com; info@extendsys.com.

Circle 385 on reader card

SystemSoft Corp. Provides MobilePRO

SystemSoft Corp. announced that its MobilePRO system-level software suite will ship with the HP OmniBook 5500CT 5/133, a 133 MHz Pentium-based notebook PC. In addition, the OmniBook 5500 also features SystemSoft's Plug and Play (PnP) BIOS, CardWizard and CardSoft PCMCIA software, and MAXIMIZER power management software which, combined with Windows 95, provides a complete Plug and Play solution.

MobilePRO includes a comprehensive, modular suite of BIOS and system control software. The software enables hot docking and hot swapping. Contact SystemSoft Corp., 2 Vision Dr., Natick, MA 01760; (508) 651-0088; www.systemsoft.com.

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Central Data Introduces EtherLite Modem Server

Central Data corp. introduced the EtherLite Modem Server, a PCMCIA-based modem server that connects to an Ethernet TCP/IP network. It is shipping on HP-UX, Windows NT and IBM AIX platforms.

The EtherLite Modem Servers (EM-8 and EM-16) provide slots for 8 or 16 PCMCIA modems, operating at 28.8K. They connect to any TCP/IP network via standard 10BaseT Ethernet.

The EM-8 costs \$1,695 and the EM-16 costs \$2,395.

Contact Central Data, 1602 Newton Dr., Champaign, IL 61821; (217) 359-8010; www.cd.com; sales@cd.com.

Circle 383 on reader card

Biscom, HP Form Strategic Partnership

Biscom and HP announced a strategic partnership to combine network-based scanner and fax technologies. The joint solution combines HP ScanJet 4Si, a network-based scanning device, with Biscom's FAXCOM for NetWare product, which provides users with the ability to send and receive faxes within the Microsoft Windows environment via a Novell NetWare server.

A user will be able to scan a document at 15 ppm on the ScanJet 4Si and route the document over the network to any Microsoft Windows (3.1, 3.11 or 95) client PC. The user can then build a fax document, consisting of scanned and computer-based documents, and then fax them from the desktop. The fax is routed from the Windows workstation to the FAXCOM fax server over the network, where it is transmitted to a remote fax machine.

FAXCOM/WorkGROUP for NetWare starts at \$695 for a five-user license. The ScanJet 4Si costs \$2,999 for the Ethernet version and \$3,199 for the Token Ring version.

Contact Biscom Inc., 321 Billerica Rd., Chelmsford, MA 01824; (508) 250-1800; www.biscom.com; sales@biscom.com.

Circle 382 on reader card

Thomson-CSF Announces TeleUSE For The Enterprise

Thomson Software Products released TeleUSE for the Enterprise, a family of products that promotes multiplatform, user interface development for UNIX and Windows. The development environment features: TeleUSE, a full featured product for developing GUIs on UNIX-based systems; TeleUSE/Win, which enables users

to develop and deploy applications on Windows NT or Windows 95; and TeleUSE/DB, which reduces the time required to build relational database GUIs.

TeleUSE/Win runs on Microsoft Windows NT and Windows 95. Supported UNIX platforms for TeleUSE are HP-UX, Sun Solaris and SunOS, Solaris x86, SGI Irix, IBM AIX, Digital UNIX, Digital VAX POSIX, OpenVMS, DG AViiON, Intel SVR4 and SCO ODT. TeleUSE/Win costs \$5,000 and TeleUSE

(UNIX) costs \$7,500.

Contact Thomson Software Products, 10251 Vista Sorrento Pkwy., Ste. 300, San Diego, CA 92121; (619) 457-2700; www.thomsoft.com; info@thomsoft.com.

Circle 381 on reader card

Network Peripherals Delivers Fast Ethernet

Network Peripherals Inc. (NPI) announced a new family of Fast Ethernet (FE) products for LAN workgroups and departments. The

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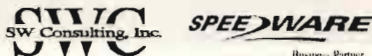
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CIRCLE 109 ON READER CARD

new products

company's NuSwitch FE product family includes two 100/100 segment switching hubs, two 100/100 bridges, six 10/100 segment switching hubs, one 10/100 desktop switching hub, a NuHub 100BaseT repeater, a NuCard 10/100 PCI adapter and NPI's Network Management system.

The NuSwitch 100/100 hubs come with six- or 12-port configurations, and support half or full duplex operations, VLANs, port mirroring, congestion control and a choice of SNMP managed or unmanaged.

The NuSwitch 100/100 bridges allow connections to span distances up to 2 km, support 100BaseTX and 100BaseFX standards and operate in half or full duplex mode.

The NuSwitch 10/100 is a hybrid 10BaseT hub and FE switch which integrates the equivalent of four fully switched 10BaseT clusters or hubs, with each supporting six Ethernet ports and two FE uplink segments.

The NuHub Repeater removes bottlenecks when supporting bandwidth-intensive applications such as 2D and 3D CAD, imaging, multimedia and network video.

The NuCard Adapter is a 10/100 PCI Ethernet adapter that autoconfigures for 10 or 100 Mbps operations and ships with drivers to support all major operating systems.

NPI's Network Management system operates on a PC/Windows environment with HP OpenView platform integration. It also supports SNMP, telnet and ftp for remote network management, and offers port mirroring performance across all ports.

Contact NPI, 1371 McCarthy Blvd., Milpitas, CA 95035; (408) 321-7300; www.npix.com.

Circle 379 on reader card

New From HP

Distributed Print Technology Licensing Agreement

— HP and IBM announced that IBM has licensed to HP the technology underlying Printing System Manager (PSM). PSM is IBM's standard-based print management software for distributed environments. PSM uses the ISO DPA (International Standards Organization Document Production Application) standard based on the Palladium Print Model which resulted from MIT's Project Athena.

The IBM technology is an object-oriented standards-based print management system that allows network administrators to manage global networks of distributed printers from a single workstation, ensuring each user's job goes to the correct printer in the chosen location on the appropriate type of paper at the scheduled time.

With either IBM's PSM or HP's future product, end-users can execute familiar commands to submit jobs from their desktop for output on any networked printer. They are then kept informed with messages from the system about the job and printer status. Users can submit print jobs using HP-UX, AIX, OS/2 and Windows clients, or via a TCP/IP gateway.

10BaseT Adapter Cards/DeskDirect Brand — HP introduced two 10BaseT PCI adapter cards and announced the brandname DeskDirect for its family of network adapter cards. The 10BaseT PCI LAN Adapter has one RJ-45 port for twisted-pair cable. The 10BaseT PCI Combo LAN Adapter has one RJ-45 port for twisted-pair and one BNC port for thin coaxial cable. Both are compatible with HP's existing 10/100 adapters. The DeskDirect 10BaseT PCI LAN Adapters have multiple modes of operation, busmastering and full duplex operation. They offer Microsoft Plug-and-Play operation, which allows automatic configuration by Windows 95 and minimum setup time. Price for the HP DeskDirect 10BaseT PCI LAN Adapter is \$139 for a single adapter, \$129 per adapter for a six-pack and \$119 per adapter for a 24-pack. Price for the HP DeskDirect 10BaseT PCI Combo LAN Adapter is \$159 for a single adapter, \$149 per adapter for a six-pack and \$139 per adapter for a 24-pack.

For more information, contact your local sales office or call (800) 533-1333.

Camintonn Z-RAM Reduces Prices

Camintonn Z-RAM announced new price reductions for their memory upgrades; in some cases they have lowered prices as much as 50 percent compared to earlier this year.

Also, they have announced 14 new memory upgrade products. Memory up-

grades for the HP DeskJet 1600C or 1600CM with 1, 2, 4, 8, 16 and 32 MB modules are respectively priced at \$110, \$230, \$370, \$690, \$1,370 and \$2,970. Contact Camintonn Z-RAM, 22 Morgau, Irvine, CA 92718; (714) 454-2022.

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HP 9000—a focus that makes Mitchell Humphrey & Co. an expert in business systems that run on these platforms. FMS II's object-oriented design and layered architecture are also portable across a wide variety of data bases. And since FMS II allows you to use both terminals and PCs, you can meet the special needs of your organization, while minimizing the impact on your budget.

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Dan Strout
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So you've bet the business on HP hardware. Well, relax. It's a wise choice. But don't be fooled. Buying reliable hardware doesn't make your business invulnerable to a costly disruption. In fact, in tracking close to 230 computer disaster recoveries worldwide only 22 percent of the disasters were hardware related. Power outages, fires and explosions as well as natural disasters are just-as-likely to occur at anytime, anywhere. In a vulnerability survey conducted last year by ICR Survey Research Group (Media, Pa.), 66 percent of the respondents indicated that they had experienced a computer disruption of at least one hour. And, one out of five disruptions exceeded 24 hours.

BE PREPARED

Can your company afford that much down time? Probably not. That's why you must prepare for the unexpected. In that vein, here's a checklist of tips on successful testing and recovery compiled mostly from IS managers, system administrators and others gathered from years of experience.

- Ask for a hardware configuration document from your hot-site provider that lists all the hardware on the recovery processor to use for compatibility and capacity planning.
- Solicit input from your database specialists in developing your recovery procedures.
- Use separate backup tapes for databases, system files or any third-party software. Save non-HP-UX backup/restore utilities to a separate backup tape using **tar**, **cpio**, etc.
- Review backup tapes going to offsite storage for errors, such as parity blocks of missing data. Also, be sure to use high-grade tapes, clean your tape drives before doing backups, recycle your tapes periodically and make a second, yes, make a second copy of critical files for testing purposes.
- Keep a copy of all HP install media, third-party application manuals and updates in your offsite storage vault.
- Keep hard-copy listings of the logical volume and workgroup information both in offsite storage and at your recovery site. You can retrieve information by submitting **vgdisplay** and **lvdisplay**,

respectively. But, be sure your recovery subscription allows for sufficient disk space. Also, be sure to keep current file system information offsite and at your recovery facility. Select the **bdf** command to retrieve this information, and keep a hard copy close at hand for reference.

- Perform a full HP-UX install during your tests; however, when testing the restoration of the production system and data files, do not restore files in the **/et**, **/dev**, **/hp-ux**, **/SYSBCKUP** and **/bin** directories. There are files in this directory specific to the hardware layout of the recovery system.
- Update your network diagram to list all TCP/IP addresses and subnet masks as it pertains to your recovery network. Be certain to bring the diagram to your tests/recovery.
- Schedule tests. When you test, you learn. The more you learn, the less vulnerable you are in the event of a disruption. Don't just talk about it. Do it. Now.

YOU HAVE TO TEST TO BE YOUR BEST

By periodically testing your plan, you'll find the problems that could be devastating in the event of a disruption. Testing also provides a means to try new ideas and processes, and the ability to learn from your mistakes without downtime. Also, learning from other people's mistakes is important to successfully reducing your vulnerability to a disruption. When it comes to disaster recovery, it's clearly a case for actions over words.

Although you're not in a position to control mother nature or the electric company, you are in a position *to control the success of your recovery*. Therefore, it's your responsibility to see that every measure is taken to ensure success and avoid a lengthy disruption.

—Dan Strout is Director of Distributed Systems with Comdisco Disaster Recovery Services (Rosemont, Ill.).

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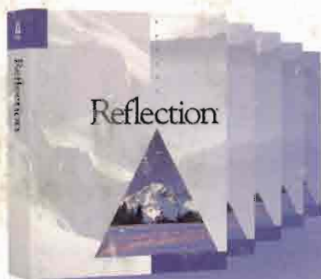
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