The Magazine For Hewlett-Packard Enterprise Computing

# HP Professional

MARCH 1997

HP-UX
•
Windows NT
•
MPE/iX

A Cardinal Publication

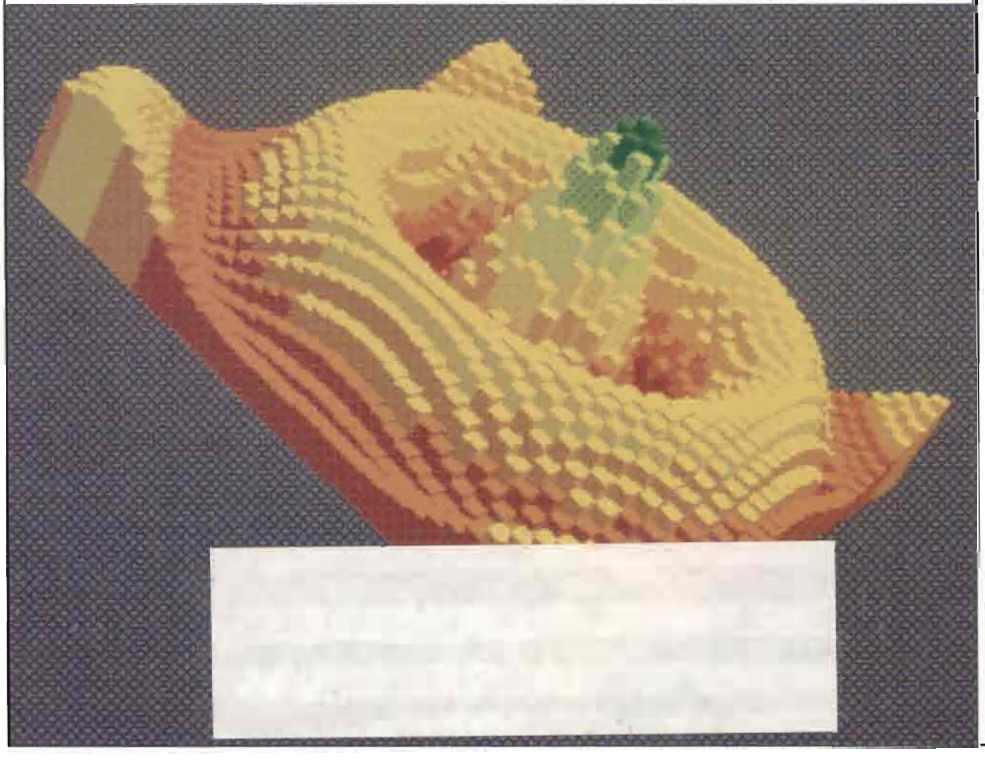
1997 WORKSTATION REVIEW

## Against The NT Tide

RISC workstations once bullied desktop computers, kicking sand in the face of Wintel boxes that couldn't do the math of scientific computing. But today, Windows NT, working out on Intel Pentium-based PCs, poses a threat to pumped up workstations. **PAGE 31**

## Ba-doop Da-boop: Pixel This

Despite ultra-high rez monitors, most graphics harks to the days of Pong. However, Object Graphics let you "visualize" in terms of geometry and attributes such as textures, color, shading and spatial orientation. **PAGE 35**



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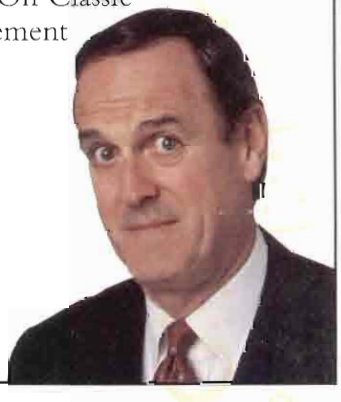
## Industry Watch PAGE 8

- HP-Netscape: Together Again
- Cheap Vectras
- Hitachi-UX?
- HP 3000 Gets Secure
- SPAN, SPAN, SPAN, SPAN...

## And Now For Something Completely Different

John Cleese Orates On Classic Management **PAGE 48**



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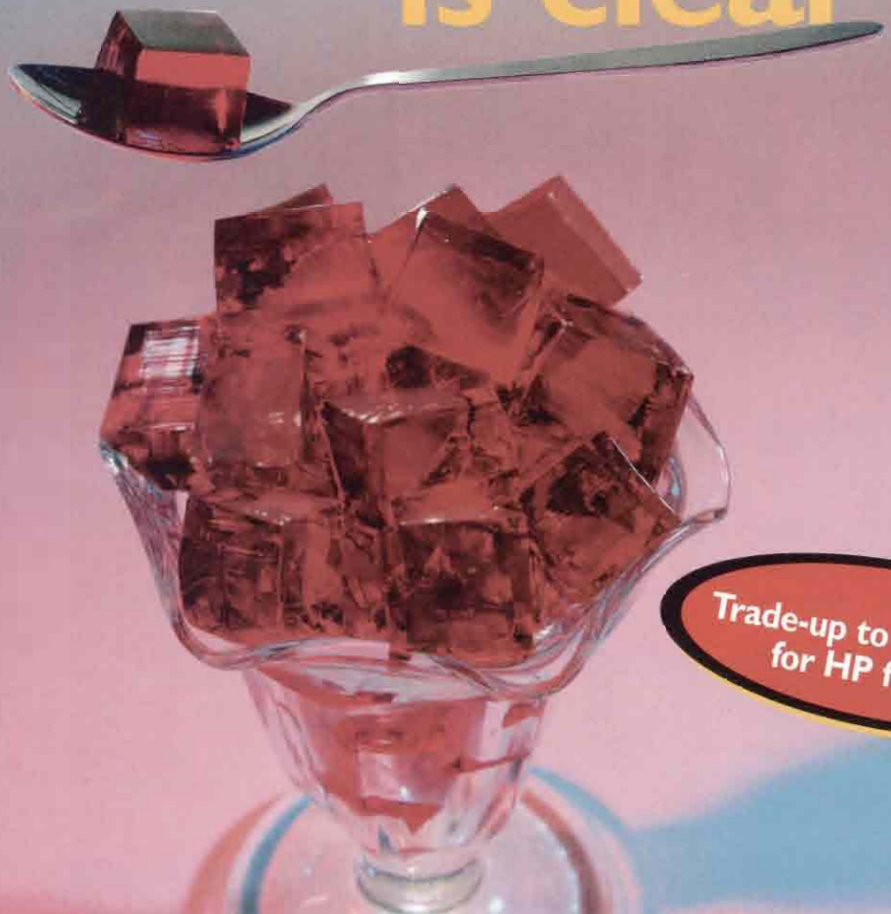

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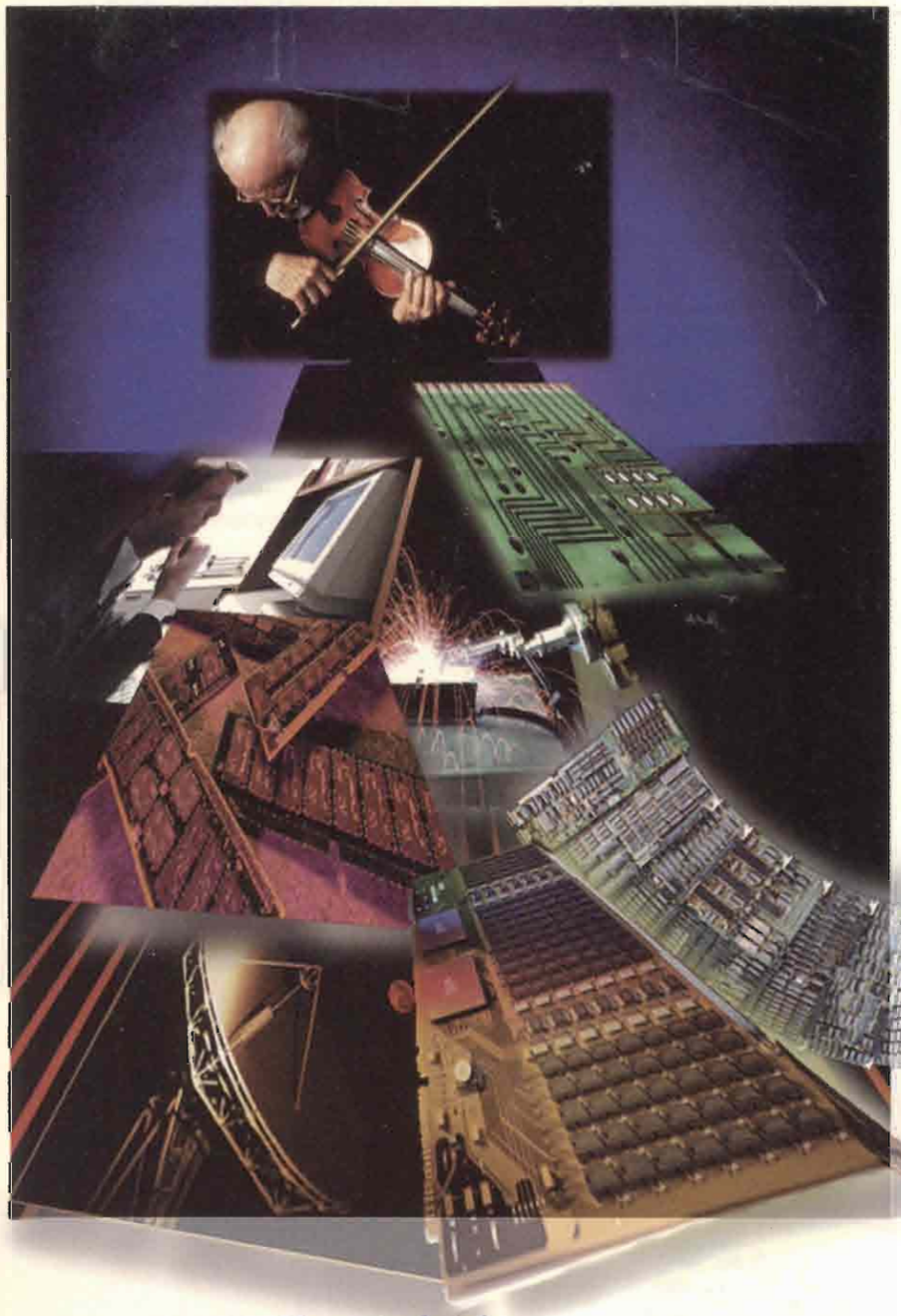

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**By George A. Thompson**

*Since the beginning of 1997, workstation vendors have been cutting prices and re-inventing their strategies. And where total workstation shipments rose 18 percent, total revenue declined by 1 percent. Additionally, forecasts predict that the revenue for Windows NT workstations will grow by 44 percent per year through the year 2000, and that NT workstations will outship UNIX workstations this year.*

## Picture This 35

**By David Uhlir, Ph.D.**

*Traditional Direct Graphics have merit for applications where data is displayed and then replaced with new, essentially unrelated data. However, today's real-world, real-time applications require a more consistent interactive visualization. Object Graphics architecture imposes a common structure that simplifies the design of complex applications, while facilitating the reuse of pre-existing code objects.*

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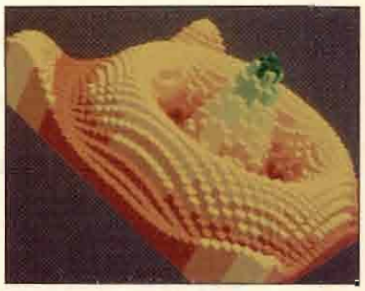

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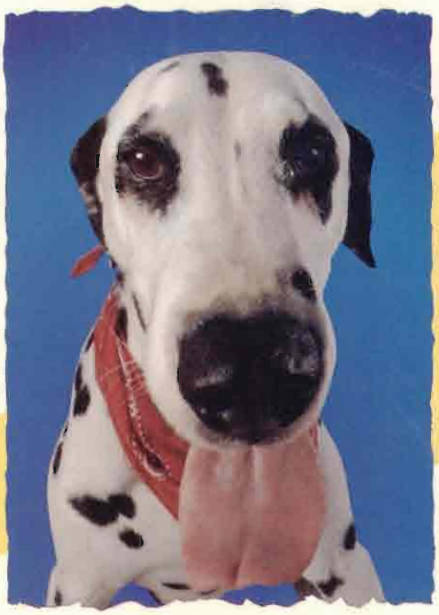

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# HP Professional

**EDITOR-IN-CHIEF** Charlie Simpson
simpsoncm@cardinal.com
**SENIOR EDITOR** George A. Thompson
thompsonga@cardinal.com
**ASSOCIATE EDITOR** Deborah Schwartz
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**INTERNATIONAL EDITIONS EDITOR** Karine Simpson

**COLUMNISTS**
**INTERNET** Mark McFadden
**NETWORK MANAGEMENT** Greg Barnes
**UNIX** Fred Mallett

**CONTRIBUTING AUTHORS** David Acord, Bruce Beasley, Steve Berlin, John Cleese, Tani Haque, Matt Hengey, Mary M. Marks, David Uhlir

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**ART DIRECTOR** Al Feuerstein
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**CIRCULATION**
**CIRCULATION DIRECTOR** Carrie Eisenhandler
**DIRECTOR OF FULFILLMENT** Margie Pitrone
pitronemf@cardinal.com

**MARKETING**
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**MARKETING MANAGER** Amy Wathop
**SENIOR GRAPHIC DESIGNER** Christine Piatkowski
**GRAPHIC DESIGNERS** Mark Broomell, Candace Kent, Patty Wall

**PUBLISHER** Leslie Ringe

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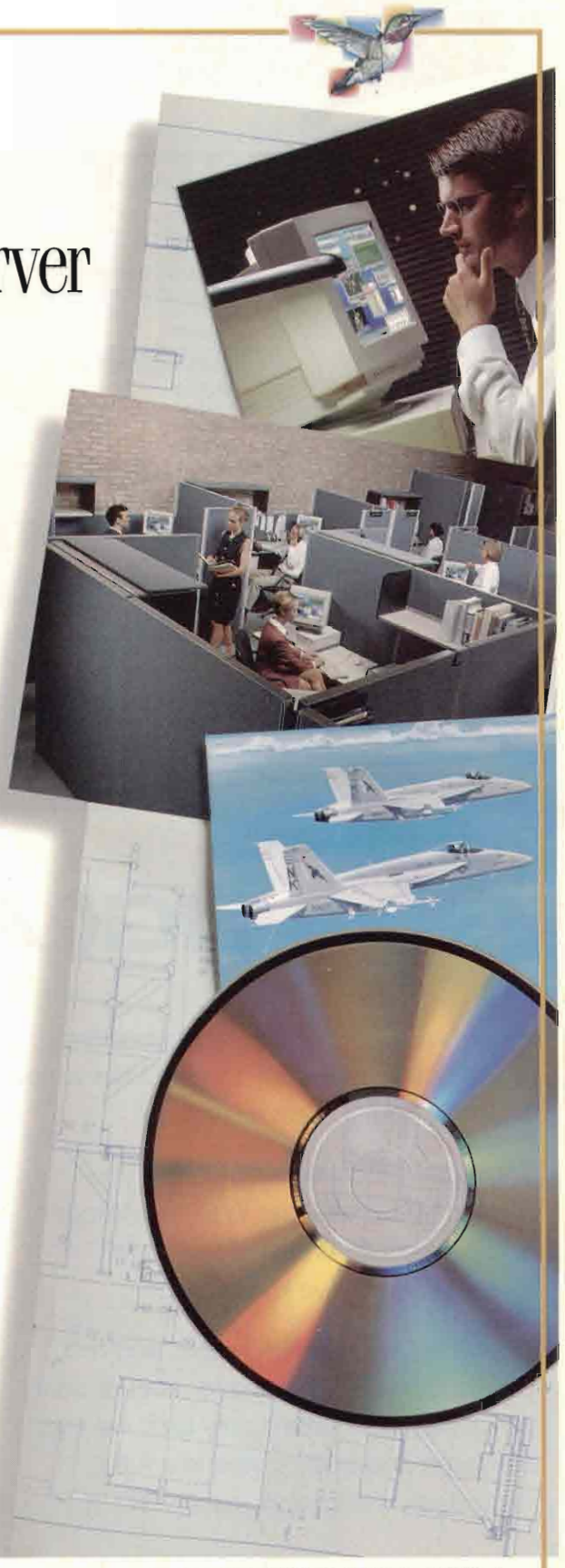

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# If One Happens To Fall . . .

**Charlie Simpson**
simpsoncm@cardinal.com

Good news troops. According to Christian & Timbers, an executive search firm, there's an expected surge of 186,280 new Internet jobs in 1997. Wow! 186,280 jobs on the wall!

So take heart, those of you who responded to our 1996 Corporate Climate survey. That's right, it's that time of year again when we randomly poll our 30,000 readers to find out just what's happening on the corporate job scene. As always, this survey has a high response rate. Unfortunately, although the state-of-the-art may have improved, the state-of-the-state of things hasn't since the previous year. Companies nationwide continue to downsize, people continue to lose their jobs, and those left on the job continue to do more work for less compensation. All the while, the loyalty of your average IS administrator — your peers — is in the toilet.

Of those responding, 40 percent consider themselves management, while 60 percent say they are staff. About three-quarters of those responding report that their company has undergone a structural change within last 12 months, with nearly half of those indicating that their companies are currently in the midst of a downsize. However, 21 percent maintain that their firm has experienced independent growth in the last 12 months. Of those still left with jobs, 72 percent experienced an increase in workload with only 3 percent receiving a wage increase, and 40 percent maintain they now receive fewer benies.

Over 65 percent experienced decreased loyalty to the company, while about 6 percent said they felt an increase in loyalty. But 93 percent agreed that there is a corporate loyalty shift going on in American business, with 85 percent saying this shift will denigrate the business landscape.

Each year, we get the one respondent (maybe it's the same person) who believes that downsizings are good and only through such measures can American industry become strong. It seems there are "substantive issues" not "emotional ones" that we should be addressing when discussing downsizing. It's probably that Disney exec who was just fired and received a $90 million severance package — sounds pretty substantive to me.

When are we going to see the positive results of all this restructuring anyway? Things haven't changed much in the last five years. Yet, some of the reasons for the bad news have changed. For example, the "Democrats have definitely sold the American worker down the river," according to one aspiring political pundit who responded to this year's survey. Or as another astute reader points out: "It may be good for the company's economy in the short term; but if there are no good jobs in long run, who will be the consumers?"

It's easy to extrapolate stats. But the reality is that these are people, not numbers, losing their jobs, while those who remain with multiple responsibilities live in fear of unemployment.

But who's to blame for the current environment? Society? Or the government? Or "Mr. Business" CEO who continues to get fat while people are laid off? Is it that "management are thieves that continue to take the money and run"? Or, is this just the latest business model?

One conclusion, based on the unfortunate consistency of the responses, is that the controlling powers really don't care if employees are loyal. One reader claims his company's philosophy is "let the staff go — if we need them later, we'll hire them back or get someone new." Sure this saves a few bucks today, but what they fail to acknowledge is the cost of hiring "green" staff.

Whatever the reason, the feeling of "all is lost" wasn't quite as pervasive as in previous years. Many were unhappy about the "restructure," but believed the situation forced them to "internalize the fact of finding a new job" causing them to "expand [their] horizons."

Finally, one enterprising philosopher wrote, "Chaos always leads to opportunities; especially when immediate upper management is confused and searching for solutions." I'm going to hold onto that thought, at least until next year's survey.

# INDUSTRY WATCH

Charlie Simpson

## WEB IN A BOX

In a move to make it easier for customers to adopt Web technology, HP and Netscape will "work together" to include the HP 9000 Enterprise Server and HP 9000 workstations with Netscape FastTrack Server software and Netscape Navigator Gold client software for the HP-UX operating environment.

"Bottom line — to make the Web technology pervasive and to help our customers and partners implement Web technology, HP and Netscape are teaming up today," says Mark Hudson, marketing manager of HP's Enterprise Systems division.

This expansion of the HP and Netscape relationship, which was formally announced in May 1996, makes it possible for both customers and partners to take advantage of Web technology with their HP 9000 "right out of the box." This means that every HP 9000 customer can be equipped with Web server, authoring and browsing capabilities.

Although this is not an exclusive relationship on either end, Netscape maintains its importance because such

things as HP's security (Praesidium) and HP's PSO are what makes this solution unique.

Hudson maintains that there are three key benefits to this announcement: Internet access and the ability to quickly establish an intranet; an enhancement to the HP-UX operating system; and Web services for HP partners and customers.

Growing with a customer's Internet applications by combining Netscape FastTrack Server software with HP-UX, HP lets every HP 9000 customer begin creating a presence on the Internet with a stepping stone to HP's enterprise Internet solution — HP Domain. HP Domain Enterprise Servers are built on common technologies and interfaces — including Netscape SuiteSpot, integrated server software suite. (see *In This Domain* for latest Domain server pricing, page 10)

The HP Domain Enterprise Server delivers a turnkey yet manageable platform for customers using a series of multiplatform, pre-integrated soft-

## AT PRESS

### HP Earnings Up 15%

HP reported a 15 percent increase in net earnings, 11 percent growth in revenue and a 9 percent increase in orders for the 1997 fiscal year's first quarter, which ended Jan. 31. Net earnings for the quarter were a record $912 million. Net revenue for the quarter was $10.3 billion, with U.S. Net revenues contributing $4.3 billion.

### HP - Symantec Deal

With all that financial good news, HP went shopping last February. HP and Symantec signed a non-binding letter of intent in which HP will acquire Symantec's Networking Business Unit as part of HP's OpenView Key products. In addition to products like Norton Administrator, HP will integrate Symantec employees as a result of the acquisition.

According to Olivier Helleboid, GM of HP's Network Systems, there are three immediate benefits to the deal: the products already complement OpenView; the NT experienced personnel that HP will gain; and the fit the product line will have in HP's Channel. Symantec management is happy as well, stating they believe that their people "will be well taken care of at HP."

## VERBETA

David Packard 1912 - 1996

**"If I hear of anyone refusing to reject a bad lot of components because it is needed on the manufacturing line, I will see that he is fired."**

**— Seigfried Falk, HP Mechanical Engineering Manager, Boeblingen, Germany, remembering Dave Packard in the 1996 HP annual report.**

ware/hardware components. Netscape FastTrack Server software — which includes Netscape Navigator Gold — is a Web server designed to let users get up and running with a Web site on the Internet or an intranet. With support for Java and JavaScript, Netscape FastTrack Server provides a platform for publishing traditional Internet documents, as well as developing and deploying network applications.

According to Hudson, the Netscape FastTrack Server software and Netscape Navigator Gold client software for HP-UX solution is available at no charge for future customers and existing users who are on an HP service contract. Existing customers can download the software via the Web or receive it on a CD.

## HP CUTS VECTRA PRICES

An entry-level HP Vectra VE PC, configured with a Pentium 120MHz processor, a 1GB hard drive and 8MB of RAM, now starts at an estimated street price of $931. The price cuts also are expected to bring the Pentium processor-based HP Vectra VL PC, as well as the Pentium Pro processor-based HP Vectra VA commercial PCs, to estimated street prices of 6 percent to 9 percent below comparable Compaq models. Price cuts are effective February 1997. *(see Table below)*

Using International Data Corporation's (IDC; Framingham, Mass.) Pricing Database as a basis for comparison, HP estimates its entry-level 120MHz and 133MHz HP Vectra VE PCs offer comparable memory capacity; hard-disk capacity; graphics bandwidth — as well as a host of special features, such as safety off and dynamic video allocation — for approximately 9 percent less than Compaq's 120MHz and 133MHz Deskpro 2000 PCs.

**HP Vectra VE, VL and VA PCs:** Selected U.S. Prices and Configurations

| | Pentium Processor | Hard Drive/ Memory | Cache | Audio/ Graphics | Old Street Price | New Street Price |
|---|---|---|---|---|---|---|
| **HP Vectra VE PC** | | | | | | |
| VE 5/120 | 120MHz | 1GB/8MB | — | — | $1,056 | $ 931 |
| VE 5/120 | 120MHz | 1GB/16MB | — | — | 1,182 | 1,020 |
| VE 5/133 | 133MHz | 1GB/8MB | — | — | 1,173 | 967 |
| VE 5/133 | 133MHz | 1GB/16MB | — | — | 1,289 | 1,056 |
| **HP Vectra VL PC** | | | | | | |
| VL 5/133 | 133MHz | 1.2GB/16MB | 256K | —/S3 Trio PNP | 1,271 | 1,083 |
| VL 5/150 | 150MHz | 1.2GB/16MB | 256K | —/S3 Trio PNP | 1,424 | 1,101 |
| VL 5/166 | 166MHz | 1.2GB/16MB | 256K | —/S3 Trio PNP | 1,504 | 1,253 |
| VL 5/166 | 166MHz | 1.6GB/16MB | 256K | —/S3 Trio PNP | 1,791 | 1,558 |
| | **Pentium Pro Processor** | **Hard Drive/ Memory** | **Audio/ Graphics** | **CD-ROM** | **Old Street Price** | **New Street Price** |
| **HP Vectra VA PC** | | | | | | |
| VA 6/180 | PP180MHz | 1.2GB/16MB | —/ Cirrus | 8X | $1,961 | 1,827 |
| VA 6/180 | PP180MHz | 1.2GB/16MB | —/ Cirrus | 8X | 2,320 | 2,131 |
| VA 6/200 | PP200MHz | 2.5GB/32MB | —/ Cirrus | 8X | 2,588 | 2,328 |
| VA 6/200 | PP200MHz | 2.5GB/32MB | 16-bit/ Matrox | 8X | 2,803 | 2,543 |

*Source: Hewlett-Packard*

## VECTRA GETS HIGH MARKS

**A new report by Audits and Surveys Worldwide indicates that HP Vectra PCs were the industry's best-selling Pentium Pro processor-based PCs in the U.S. reseller channel in 1996. In addition, Audits and Surveys indicated that the HP Vectra VL PC was the best-selling Pentium processor-based PC in the U.S. reseller market. Audits and Surveys Worldwide measures actual sales from the dealer and retail channels.**

## HP 3000: NOW MORE SECURE THAN EVER

According to Monterey Software Group (Cupertino, Calif.), the HP 3000 was often used as a standalone computer running a small number of applications for minimal users, and the security provided by MPE was adequate in this limited environment. Today, however, the HP 3000 has evolved into a general purpose system running a diverse set of applications for large user populations.

Many security challenges face all users of the HP 3000, from end users through system managers to corporate management. These challenges result in the need to protect computing information, while allowing access to resources on the system.

SAFE/3000 from Monterey Software Group addresses the challenges by providing a set of access control and auditing tools. SAFE/3000 provides security services in several areas including: control, detection, verification and prevention of unauthorized access at both the system and file/database level.

Files are accessed by multiple users in an auditable manner. For example, SAFE/3000 allows the owner of a file or database to control who may access the file or database by:

- Specific user ID
- MPE access mode (Read, Write, Update)

- What program is being used to access the data
- Time the file or database is being accessed
- Date or day of week on which the access occured
- What terminals are being used to access the file

Contact Monterey Software Group at (408) 253-1778 or at www.editcorp.com/Business/MontereySoftware.

## 186,000 JOBS ON THE WALL

According to Christian & Timbers (Cleveland, Ohio), a retained executive search firm, four factors are expected to contribute to a surge of 186,280 new Internet jobs being created in 1997.

The first being the almost 4,700 Internet companies, with about half started and funded by venture capital firms in 1996. Second, the founding

Internet companies are implementing phase two of their development, with many founding CEOs moving to chair positions, being replaced by seasoned managers. Third, many established firms like Microsoft are establishing Internet divisions. And finally, Fortune 1000 companies are hiring managers to set up their own Internet businesses.

## SPAN, SPAN, SPAN, SPAN

Innovative Tech (Warminster, Pa.), developer of facilities automation software SPAN-FM for Windows, was awarded a corporate licensing agreement by HP for full worldwide acquisition of SPAN-FM solutions to develop and implement HP's new facilities automation plan.

SPAN-FM allows HP to better track and control the management of

**In This Domain**

**New HP Domain Enterprise Servers are now available**

| | |
|---|---|
| Model B132 | $7,995 |
| Model D222 | $14,500 |
| Model D350 | $35,000 |
| Model K220 | $44,000 |
| Model K460 | $85,000 |

assets space usage and facilities maintenance and operations at the 500-acre Roseville, Calif. business campus. SPAN-FM includes facilities automation tools, and portable data collection and management systems for operations, maintenance, security and fire safety applications. Contact Innovative Tech at (888)-SPANFM1 or at www.spanfm.com.

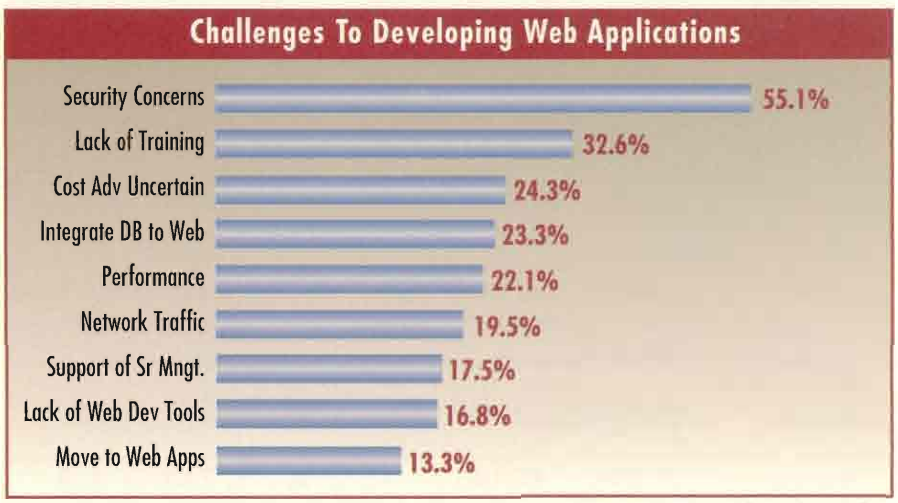
## HP AND HITACHI CO-DEVELOP ON HP-UX

HP and Hitachi Ltd. of Japan expect to coproduce key functionality enhancements to HP-UX. The new technology enables configuration, flexibility and high-availability improvements for HP-UX. It provides an infrastructure to enhance online configurations, letting applications and databases provide service to end users during system reconfigurations. Results of the initial phase of the project are slated to appear in releases of HP-UX which are scheduled to be available later this year.

Since 1989, Hitachi and HP have been engaged in a broad alliance that includes the joint development of HP's PA-RISC CPU chips and the design and building of Hitachi's PA-RISC systems running HI-UX/WE2, a UNIX 95-branded operating system derived from HP-UX.

Says Mitsuhiko Kodaira, general manager of Hitachi's Software Development Center, "Hitachi intends to continue this cooperation and, potentially, to make further contributions of our technology and skills to HP-UX, as well as to the next generation of UNIX system software, which will run on the 64-bit architecture currently being developed by HP and Intel."

Hitachi is a major reseller of HP 9000 Enterprise Servers and HP 9000 workstations under the name of Hitachi 9000V Series. Hitachi and HP also are working on such joint software development as OpenView Network Node Manager for Microsoft Windows NT and OSF Distributed Computing Environment (DCE).




*Source: Strategic Focus*

**THE CHALLENGES CHART**

According to a survey of 399 MIS managers, Internet users and application developers, conducted by software evaluation and research firm Strategic Focus (Milipitas, Calif.), the greatest challenge corporations face in developing Web applications is security. Other obstacles include lack of trained personnel and unclear or uncertain cost advantages.

# THE NEXT TIME YOUR BOSS SAYS HE'D LIKE TO HAVE YOU FOR DINNER, WHAT EXACTLY WILL HE HAVE IN MIND?

StorageTek

STORAGETEK TAPE LIBRARIES: *StorageTek's 9714 tape library allows up to a six Digital Linear Tape (DLT) drive configuration with a maximum storage capacity of 3.5TB. The 9710 Tape Library* (PICTURED) *allows up to 10 DLT drives with a maximum storage capacity of 20.58TB!*

## *Cranel.* STORAGE SOLUTIONS TO DO THE JOB RIGHT.

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HEWLETT PACKARD

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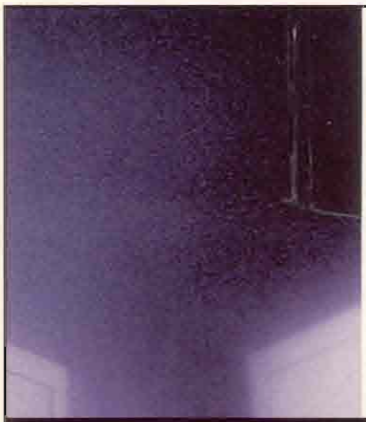
CIRCLE 478 ON READER CARD



Backup, restore and archive process have become a central issue in network management. The amount of data generated in networks is exploding at an average rate of 50% or more per year while the value of this data is continuing to increase dramatically. More distributed network environments are implementing Hierarchical Storage Management programs to help automate file management and save valuable magnetic disc space. On a typical network, 75% of the files stored have not been accessed within 30 days.

## How to Cut Information Storage Down to Size

Computer Upgrade Corporation offers automated solutions to make the most of your network storage. Utilizing our **OmniLib** series of automated libraries, with **AMASS** and **DataMgr** software from **EMASS**, we offer turnkey solutions for all your archival requirements. Backup systems are also available.

Subsystems range from 20 to 1,000 cartridge Optical libraries and 7 to 900 cartridge DLT libraries, all with onsite maintenance, software support and turnkey installation. Get the most from your computers storage capabilities.

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EMASS
Storage Management Software

CIRCLE 120 ON READER CARD


# LETTERS

## WINDOWS NT TUG-O-WAR

The writer of "Push Me, Pull You," [January 1997] misses rather badly the significance of HP giving in to the Microsoft NT marketing juggernaut.

The significant viewpoint that was missed was the historical view of firms that have attempted to collaborate instead of compete with Microsoft.

If the writer would look back in recent history, he would not be able to find one industry-leading computer firm that has been able to successfully build market acceptance and profits by trying to cooperate with Microsoft. What makes HP think that they will be different?

The writer's view that HP will not be any worse off for trying is foolish. HP's plan to embrace NT, instead of embracing the Net and Netscape, will only help Microsoft in their battle to the death with Netscape. For every point of market share that Microsoft gains because of their ability to point to all the followers in the market, they take several points away from HP and the rest of the followers.

In my view, the Microsoft juggernaut has met its match in Netscape, and HP is foolish if they acquiesce to Microsoft's well-funded marketing. When the "software meets the road" and the software community finds out the difference between Java and ActiveX, Microsoft will have a tough time keeping their market share without all the followers in the market.

*Glenn H. Jacobson*
*President*
*Unique Systems Inc.*

**ADDRESS LETTERS TO:**
Editor, HP Professional
1300 Virginia Dr., Ste. 400,
Fort Washington, PA 19034
Fax: (215) 643-4827
Internet: SIMPSONCM@CARDINAL.COM

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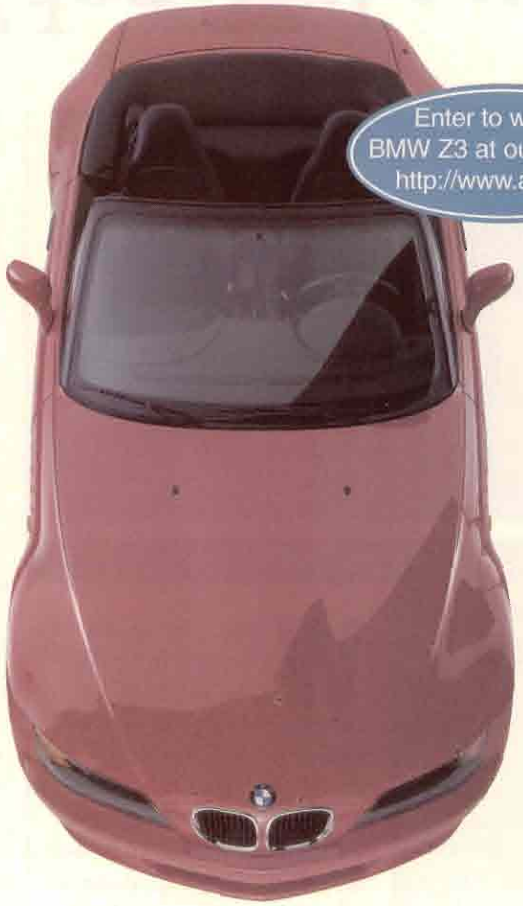
# Kick The Tires on Our DLT Storage Machine...

# ...Win The Ultimate Driving Machine.

Quantum DLT 7000




**New 7-drive ATL7100 DLT Library**

**New BMW Z3 2.8 Roadster**

The ATL7100 DLT™ subsystem and the BMW Z3—they're both beautifully designed, solidly built high-performance machines.

Our ATL7100 with IntelliGrip™ precision cartridge handling system and Quantum® DLT drives is designed to steer you reliably through terabytes of backup. The Z3 will speed you over terra-firma in safety and style.

We think you should be driving them both! In fact, we're so sure you'll love driving your DLT tapes with our new ATL7100, we'll give you a chance to win the Z3 just for kicking our tires. Details on this special limited-time promotion are available on our website, from ATL sales representatives or can be requested by calling 1-800-677-6268.

Call now to get all the facts on ATL's line of DLT libraries.

ATL PRODUCTS

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1. NO PURCHASE NECESSARY. Open only to professionals employed as Data Center/MIS Managers who are legal residents of the U.S. and 18 years of age or older. 2. Sweepstakes entries subject to Official Rules. To enter the sweepstakes electronically and download the Official Rules, access the ATL website through the Internet at http://www.atlp.com. To request an entry form and Official Rules by mail, hand print your name, company, title, mailing address, daytime phone number and e-mail address, along with a self-addressed stamped envelope and send to: ATL Products, Attn: Smart Drivers Sweepstakes, 2801 Kelvin Ave., Irvine, CA 92614. VT and WA residents may omit stamped, self-addressed envelope. 3. Prize: One 2-year lease on a BMW Z3 Model 2.8 will be awarded (taxes, automobile insurance, fuel and regular maintenance are the sole responsibility of the winner). Void where prohibited by law. Quantum is a registered trademark and DLT is a trademark of Quantum Corporation.

CIRCLE 241 ON READER CARD

# Don't Just Copy It

**DOCUPRINT 4512 AND 4232**

- The 4512 has PCL5e emulation drivers for Windows 3.x, Windows 95, Windows NT 3.5, IBM OS/2 version 2.1 and OS/2 Warp
- The 4232 supports Novell NetWare, Windows NT, UNIX TCP/IP LAN Server and Macintosh
- The 4512 — $1,485
  The 4512N — $1,795.
  The 4232 — $13,495

**Xerox Corp.**
80 Linden Oaks Pkwy.
Rochester, NY 14625
tel: (800) 34-Xerox
fax: (716) 442-1339
www.xerox.com

**CIRCLE 351 ON READER CARD**

When you think of Xerox, invariably you think of photocopies. What you may not know is that the business machine behemoth has been making computer laser printers for some time. And now they have a pair of desktop laser printers available. Xerox's (Rochester, N.Y.) DocuPrint 4512 and 4232 are developed for different sizes of networks, rather than individual stations.

The 4512 is designed for smaller workgroups. Its basic configuration offers two-sided printing and a second input tray. A black-and-white printer, it produces 12 ppm. The 4512N adds Ethernet networking at an additional cost. Both are designed for direct-connect and networked offices for individuals or workgroups of up to 10 people. They offer 600x600 dpi resolution and 4MB of RAM, which can be upgraded to 50MB. Both also come with a parallel interface. Two optional network interface cards — Serial/AppleTalk and Token Ring — are able to handle most network operating systems on LANs.

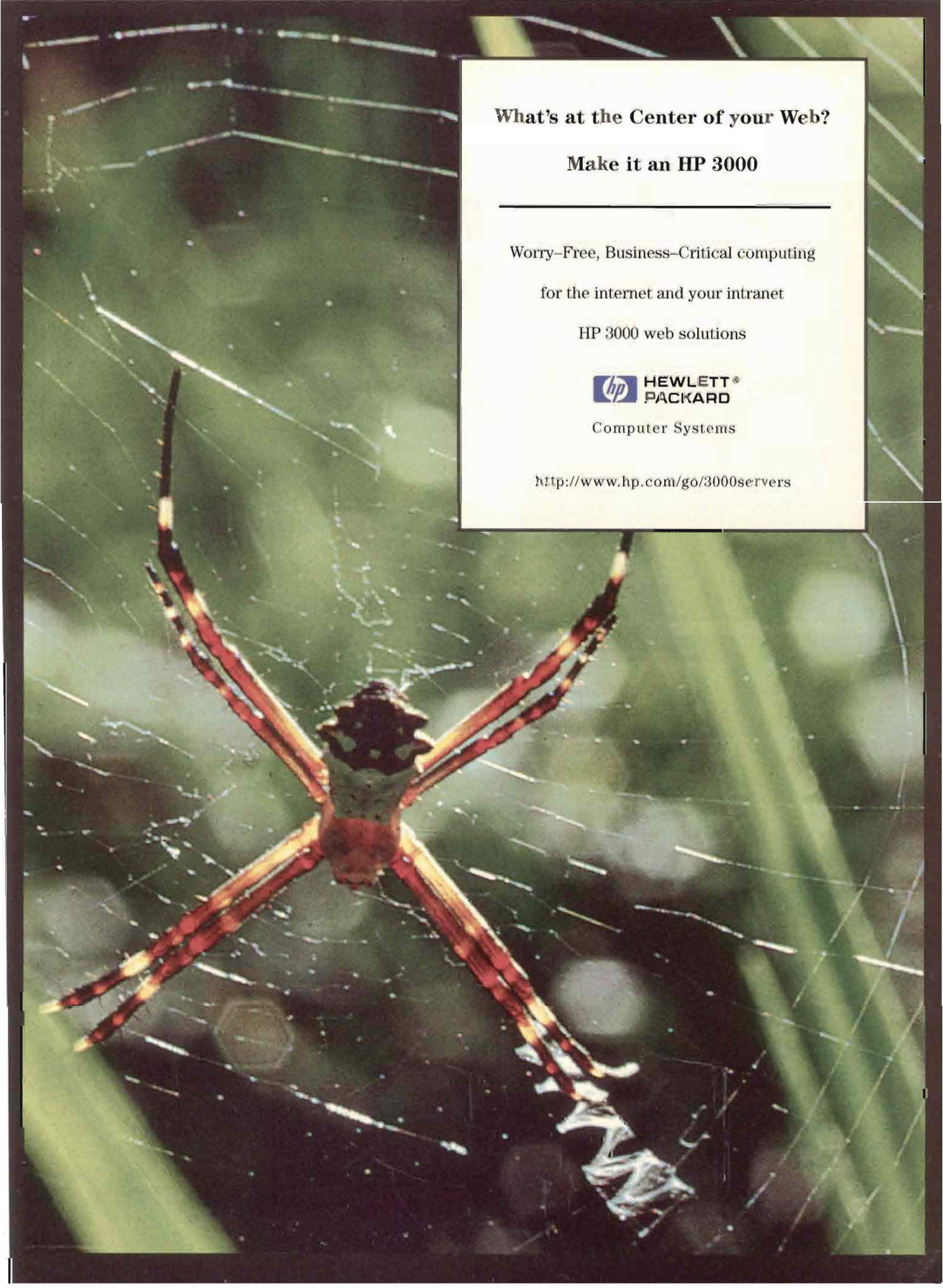
The 4512 comes with PCL5e emulation drivers for Windows 3.x, Windows 95, Windows NT 3.5, IBM OS/2 version 2.1 and OS/2 Warp. Drivers for Word 6.0 and WordPerfect 6.0 are available electronically. A PostScript Level 2 emulation option costs an additional $175, and comes with drivers for the aforementioned systems plus Macintosh System 6.x/7.x. A driver for UNIX (HP-UX, Sun 4.1x, SCO UNIX and IBM AIX 3.1) will be included. The 4512 version costs $1,485. The "N" model costs $1,795.

The 4232 has many of the same features as the 4512, but is meant to by used by 20 to 50 users with monthly volumes ranging from 25,000 to 230,000 prints. It offers 30 impressions per minute, a paper capacity of up to 1,800 sheets from five input sources, 600x600 dpi resolution with DP Tek TrueRes image enhancement and a standard 48MB. The image enhancement feature supports PostScript Level 2 and HP PCL5e emulation printing as part of its base configuration. The printer also supports HP's Page Description Language. The 4232's built-in network capabilities allow for integration into Digital, UNIX and PC LAN environments.

It also provides built-in support for systems such as Novell NetWare, Windows NT, UNIX TCP/IP LAN Server and Macintosh. Four active interfaces take multiple data streams through bi-directional parallel, serial Ethernet and Token Ring ports for automatic switching among applications. The 4232 costs $13,495.

Xerox is also including printer management software: CentreWare DP, which lets network administrators remotely install and manage Xerox printers on LANs and WANs, and supports the entire line of DocuPrint and XPrint machines. The initial release supports Novell NetWare 3.x and 4.1.

*—Steve Berlin, Contributing Author*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# When Backing Up Isn't Hard To Do

**SPECTRA 10000S**

- 10000S/20 and 10000S/40 manage 20 and 40 cartridges, respectively
- T10000S TapeFrame rack holds from two to eight 10000S libraries
- Compatible with HP-UX 9.x and 10.x, Digital UNIX and Sun SPARC Solaris 2.x

**Spectra Logic Corp.**

1700 N. 55th St.
Boulder, CO 80301
tel: (800) 833-1132
fax: (303) 939-8844
library@spectralogic.com
www.spectralogic.com

**CIRCLE 352 ON READER CARD**

One of the biggest issues database administrators face is backup: it has to be done and time is at a premium. For such pressing storage needs, Spectra Logic (Boulder, Colo.) introduces the Spectra 10000S family of automated tape libraries. Equipped with Sony's Advanced Intelligent Tape (AIT) 8mm drives, the 10000S/20 and 10000S/40 can manage 20 and 40 cartridges, respectively. Either model can house from one to four AIT tape drives. Rounding out the line is the T10000S TapeFrame, a compact rack that holds up to eight 10000S libraries.

But just like race car drivers, database personnel are first and foremost interested in speed. Each AIT drive has a native transfer rate of 3MBps. Using the ALDC compression ratio of 2.6:1, the maximum compressed transfer rate per drive is 7.8MBps. Each 10000S library can be custom configured with up to four drives, providing up to a 12MBps native transfer rate and 31.2MBps compressed transfer rate per library.

During "cold" backups, users must log out of the database for backup to occur, so the faster the transfer, the quicker you can make the database available again. "Hot" backups allow backup to occur at the same time as users accessing the data. But a static "picture" of the database is needed throughout the process. So as Greg Rinard, Spectra Logic's vice president of engineering, explains, "Once you start the backup, any update [made by a user] actually doesn't go into the database itself — it goes into a secondary database table. This means that the faster you back it up, the less overhead you'll need for the transactions that are occurring during the backup as well."

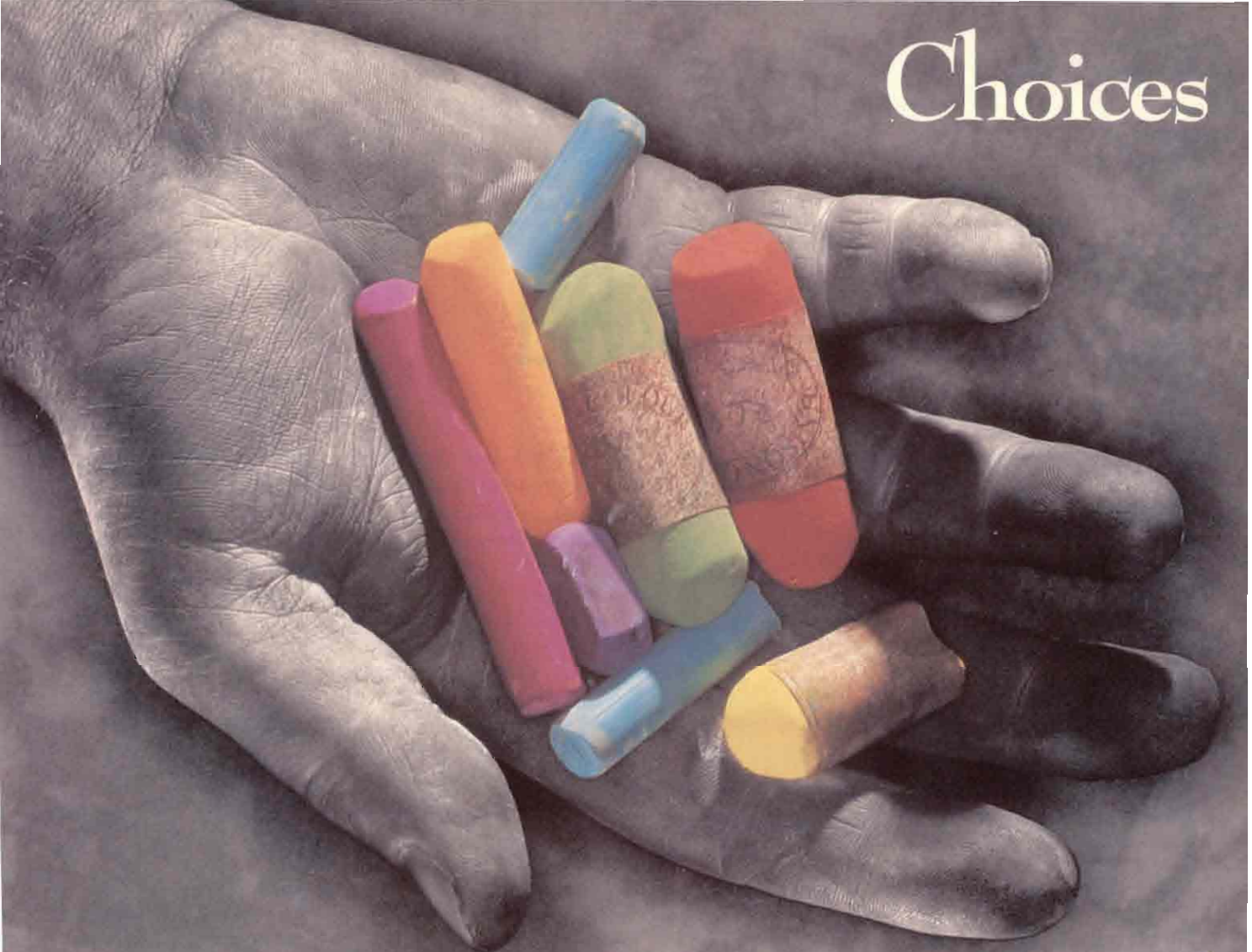
The T10000S TapeFrame rack holds from two to eight 10000S libraries — for a maximum of 32 AIT drives. At one time, says Rinard, "people couldn't even back up [large databases], because they were so big." And for a small company, which doesn't have a huge database, Rinard says the T10000S can grow as the business grows. "If you need to improve the performance of your [HP server] by adding processors," then you can do the same for your T10000S "by adding additional libraries, and it doesn't take more space."

The T10000S requires neither special power nor special cooling, and allows the SCSI buses to be split on each library module, eliminating SCSI bottlenecks. Prices vary depending on the number of 10000S libraries included.

Total capacity of the 10000S/20 with 20 cartridges is 1.3TB (500GB native). Total capacity of the 10000S/40 with 40 cartridges is 2.6TB (1.0TB native). Prices vary depending on the number of AIT drives.

Also, the 10000S/20 can be field upgraded to a 10000S/40. The 10000S and T10000S are fully compatible with HP-UX 9.x and 10.x, Digital UNIX and Sun SPARC Solaris 2.x.

*—David Acord, Contributing Author*

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| Cygnet | Philips LMS | DLT |
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And the best part is AMASS is so easy to use. The automated library is presented as a single UNIX file system under one mount point compatible with NFS. Your applications simply read and write files to the library as if it were a large magnetic disk. An on-line index tracks files, on media *in and out* of the library, for fast file system operations such as ls, cd, find... Optional multi-tier file migration and automatic file replication is also available.

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CIRCLE 296 ON READER CARD

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# Remotely Involved

**WINFRAME/ENTERPRISE**

- Connects through standard telephone lines, T1, T3, 56KB, X.25, ISDN, Frame Relay, ATM or the Internet.
- Integrates into NetWare, Windows NT, Novell and other PC networks
- $5,995 for 15 concurrent users

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www.citrix.com

**CIRCLE 353 ON READER CARD**

For Trevira's (Charlotte, N.C.) "heavy-travel" users with HP OmniBook computers, WinFrame/Enterprise from Citrix Systems Inc. (Coral Springs, Fla.) was the solution to their Windows NT access needs.

Trevira rolled out WinFrame/Enterprise for 500 dial-in users in nine locations in their southeastern region, which covers North Carolina, South Carolina, Virginia and New York City. And there are plans in place to put the Citrix product in all 30 worldwide locations, according to Rick Diak, project manager at Trevira. Each site has from eight to 48 ports for dial-in; Novell Groupwise e-mail; and legacy accounting applications, which are in the process of being replaced by SAP.

WinFrame/Enterprise is a multiuser Windows application server software for enterprise application deployment. It is based on a network-centric computing model, which includes Citrix's Intelligent Console Architecture (ICA)-based universal, thin-client software. Citrix has source and distribution licenses to Windows NT Server from Microsoft.

ICA Windows Presentation Services Protocol is conceptually similar to the X-Windows protocol. It allows an application's user interface to execute with minimal resource consumption on a client PC, while application logic executes on the WinFrame multiuser application server.

MultiWin Multi-User Architecture extends the Windows NT operating system into a true multiuser system. This means multiple users can execute applications on the same machine at the same time; Each user runs as a virtual session on the WinFrame/Access server.

Remote users have access to DOS, 16- and 32-bit Windows, or client-server programs. Remote users also have access to all local system resources such as notebook drives, remote printers and clipboards. And from a single desktop, remote users can run applications locally from the notebook PC or remotely from the WinFrame/Enterprise server.

WinFrame/Enterprise supports multiple concurrent users on a single processor. And symmetrical multiprocessing (SMP) hardware compatibility enables support of hundreds of concurrent users. All application upgrades and additions are made only once at the server and are instantly available to all remote users.

WinFrame/Enterprise clients install on Windows 3.1, Windows for Workgroups, Windows 95 and Windows NT. It connects users to the network through standard telephone lines, WAN links (T1, T3, 56KB, X.25), broadband connections (ISDN, Frame Relay, ATM) or the Internet.

WinFrame/Enterprise integrates into NetWare, Windows NT, Novell and other PC networks. And it incorporates Windows NT's C2-level security.

WinFrame/Enterprise costs $5,995 for 15 concurrent users. Additional users can be added in increments of five for $995 or in increments of 10 for $1,995.

*—Deborah Schwartz, Associate Editor*

# Every bit 64-bit.

## AS/400 Advanced Series

Only AS/400® Advanced Series gives you 64-bit hardware, 64-bit operating system, 64-bit database and over 25,000 applications that can actually run on it.

Right now.

The difference is in the architecture. With its advanced PowerPC™-based RISC technology, AS/400 Advanced Series is 64-bit through and through. Applications are already optimized for 64-bit speed and performance without the need for lengthy rewrites or time-consuming recompiles. (A claim that no other company can make.)

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CIRCLE 149 ON READER CARD

# Give It Some Color — *magicolor*

**QMS CX/40**

- CX/40 prints black-and-white, and color
- Memory upgrades in 4, 8, 16 and 32MB SIMMs.
- CX/40 costs $8,499

**QMS Inc.**

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fax: (334) 633-4300
info@qms.com
www.qms.com

CIRCLE 354 ON READER CARD

You've just finished a truly remarkable report: You've mended words together so elegantly that Shakespeare, let alone your boss, would be envious. But as it comes out of the printer and you contemplate a Pulitzer Prize, you realize something's missing — color! You don't have a color printer!

With the release of the magicolor CX/40, QMS Inc. (Mobile, Ala.) can help you remedy that situation."High resolution quality color output may not necessarily be what a user wants to print on for a day-to-day internal document basis, but is what they decide to buy the product for — knowing it has the ability to render such high level detailed images," says Pam Gray, product manager of color products at QMS.

"We originally launched the magicolor CX products in September 1995 and that was a 32Mb Ethernet-standard product," recalls Gray. "In January or February [1996] we launched the magicolor CX/8Mb configuration and 20Mb configuration that did not include Ethernet and had a lower resolution offering at a lower price. [Last June], at PC Expo, the magicolor CX/40 was launched with high resolution and Ethernet standard."

The printer has a black/white speed of 12 pages per minute (ppm) and a color speed of three to six ppm. With a standard RAM of 40MB, and a maximum RAM of 64MB, it comes with an internal hard disk, Ethernet or Token-Ring network interface, serverless printing software, SCSI interface and Energy Star compliance.

Mardawn Wendt, account executive with A&R Partners, says the CX/40 is based on QMS Crown and CrownNet technologies. "Crown multitasking technology delivers fast document throughput, software loadable upgradability, automatic compatibility with popular printing languages, and seamless connectivity to virtually any network environment."

QMS laser printers incorporate software loadable system technology for easy and cost-effective addition of system upgrades and enhancements via the network or host PC.

QMS CrownNet provides simultaneous network protocol support for multiple users, advanced remote printer management and accounting capabilities, and easy flash-loading of network operating system upgrades. Using the CrownNet Print Utility, the magicolor CX/40 can carry on the functions of print server and printer in the Windows printing environment, reducing network traffic and improving printer performance.

The CX/40 prints both black/white and color with a 1200 x 600 resolution. It costs $8,499 and owners of other QMS magicolor CX models can upgrade to the CX/40 with a software upgrade and RAM SIMMs. Software for that is priced at $129, while memory upgrades are available in 4, 8, 16 and 32MB SIMMs.

*— Matt Hengey, Contributing Author*

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# Extra Miles To Go Before They Sleep

**Polaris Service Inc. Provides Parts And Support Services For IT Self-Reliance**

"We under-promise and over-deliver."

**Thomas D. Wilson**
**President and CEO**
**Polaris Service Inc.**

"We under-promise and over-deliver," states Tom Wilson. Have you heard any corporate CEOs make that kind of statement lately? But it's exactly that kind of corporate culture that Wilson, president and CEO, has managed to build at Polaris Service Inc. (Marlboro, Mass.). And for privately-held Polaris, it's exactly that kind of service that many IS managers are seeking for their client-server networks.

But it's not just the "extra mile" attitude that makes Polaris successful. It's a numbers game too. "[We're focused] on lowering the total cost of ownership," says Karl Laubscher, Polaris' vice president of sales and marketing. "We discovered," he explains, "that if network managers had access to spare hardware parts and a little technical support, they could be a lot more efficient restoring failed equipment than they can by waiting for their computer vendors to send out a field engineer."

Good service that saves you money. It's the kind of simple idea upon which all successful businesses models are started. It also helps that Polaris is tapping into the growth of a little-known trend called self-maintenance. "Hardware fails less often [now]. And when it does fail, it's easier to fix by swapping a disk drive or maybe a circuit board. And as the price of hardware has declined, the economics of maintaining a service organization built on a large labor pool wasn't working any longer," says Laubscher.

In 1986, Polaris started providing services for users of Sun Microsystems systems. In the meantime, "Silicon Graphics and HP [among others] also began to look for ways to service other manufacturers equipment to keep the labor force busy" notes Laubscher. "But none were very successful at selling the contracts."

Now, he says, "our growth is faster in the HP market than in Sun and Silicon Graphics because HP is ill-equipped to provide support services for customers who want to take advantage of their own internal people."

For HP 9000 users, Polaris offers same-day and next-day onsite services, promising that experienced field engineers will be onsite within four or eight hours (respectively) after a service call has been placed. Diagnosing hardware problems and parts delivery are available for a monthly fee. Telephone Technical Advisory Support for HP-UX and Domain operating systems and emergency onsite repair are also provided by Polaris.

Polaris also provides what Laubscher calls partial outsourcing. "We can make experts available ad hoc — a pay-as-you-go plan. And we supply some of the same services to the big outsourcers [like EDS and Andersen] as a part of their total support solutions. That's about 25 percent of our total business."

The rest of the business comes from helping their UNIX enterprise customers become self-reliant. Nevertheless, although the bulk of the Polaris business is in the UNIX client-server enterprise, Polaris is preparing for an eventual NT future by migrating all their service programs to Windows NT.

But good reputations and good services can be useless, if your execution is poor, especially in the service sector. For Polaris, the proof is in a 50 percent growth rate for the last six years that has taken the company to $30 million in revenues, and an expected growth rate of 30 percent to 50 percent this year.

*—George A. Thompson, Senior Editor*

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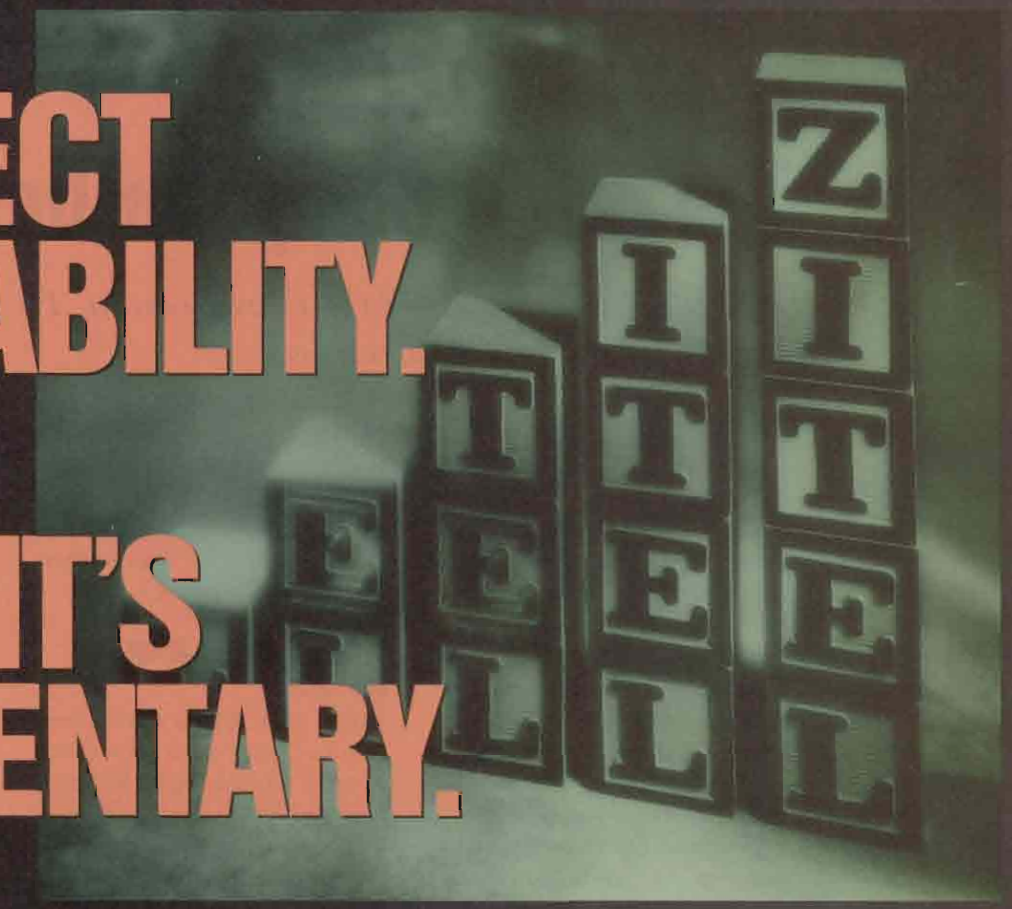


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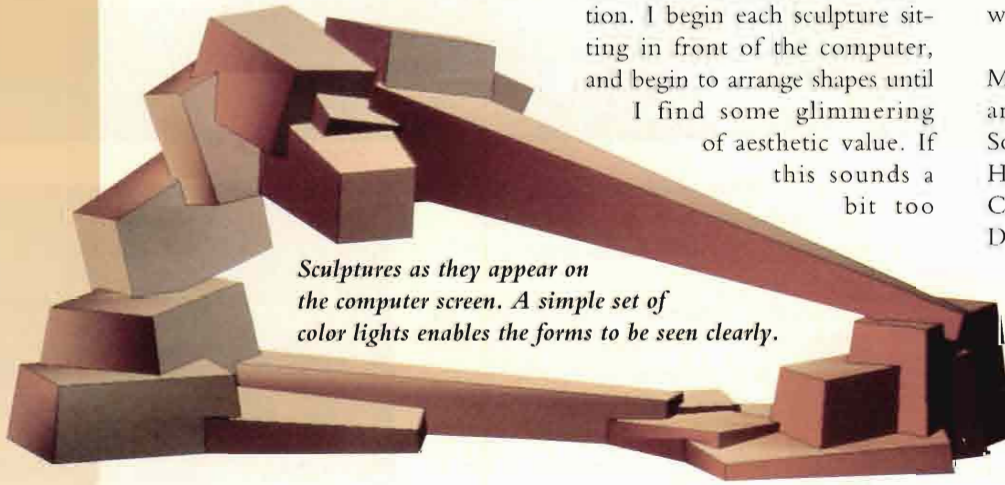
Case Study Solutions

# The Art Of Computer Design

*A Sculptor Uses An HP Workstation To Visualize And Create His Masterpieces*

*Bruce Beasley*

As a professional sculptor, I found myself interested in designing sculptures that involved the complex intersections of relatively simple shapes — much in the way crystals grow out of each other, creating surprising new forms. This was about 10 years ago. At first, I tried to create these shapes by imagining them and then making cardboard models, but found that I quickly got bogged down in the complexity of planes and angles. This was a dilemma, because I was excited by the compositions I was struggling to build. I realized that I would never be able to develop this type of composition due to the monumental tedium of forming them in cardboard by trial and error.



***Sculptures as they appear on the computer screen. A simple set of color lights enables the forms to be seen clearly.***

I wanted to be able to play with shapes encountering each other in space without the monotony of making endless cardboard models. What I needed was a fast and spontaneous way to see many possible combinations of these intersecting shapes, and to be able to view them from all sides. This is when I turned to computers.

## CLOSE ENCOUNTERS OF THE CAD KIND

Unlike most typical CAD users, I do not know what I am going to make when I begin. An engineer designing a mechanical part has an accurate idea of the general shape and size of the part due to the constraints of function. I begin each sculpture sitting in front of the computer, and begin to arrange shapes until I find some glimmering of aesthetic value. If this sounds a bit too ethereal, let me explain that most artists do not have a completely finished piece of artwork in their imagination and then simply create a physical manifestation. Whether a painter, poet or sculptor, the final artwork is the result of starting with only a glimmer of an idea, and then working through the jungle of possibilities — of words, colors, shapes, images or sounds — to find some expression that can stand on its own.

## A CELLINI WITH ELECTRONS

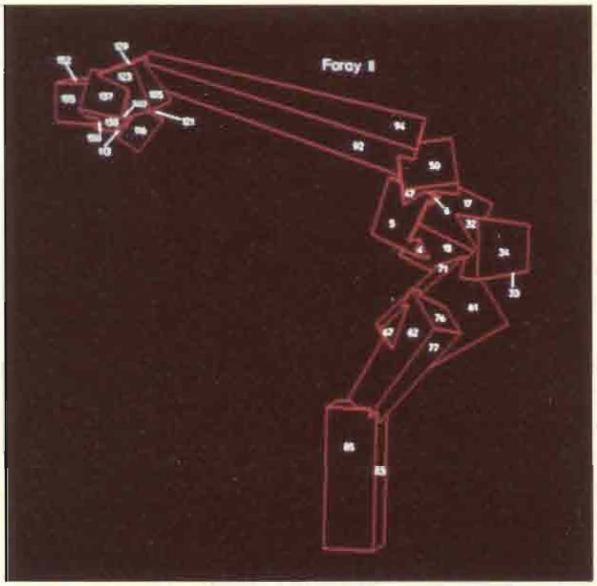
Therefore, I am grateful for all the help that I can get in this struggle. And the help that I need is the ability to easily manipulate, visualize and change very complex compositions of geometric form. And I want to be able to do all of this without having to cut, glue, weld or join material until I am certain that it is a composition that I want to build. In other words, the computer gives me the luxury of making my mistakes with electrons instead of with bronze, wood or cardboard.

In the past, I used HP's ME30 CAD program. Now, I am using the newer HP SolidDesigner product. ME30 is HP's long-standing high-end CAD program and SolidDesigner adds very complex freeform curve capacities to the already powerful solid and surface modeling capacities of the older ME30 program. SolidDesigner is a sophisticated and robust mechanical CAD program that competes with only a few other top end programs such as Unigraphics from EDS Unigraphics (Maryland Heights, Mo.).

I am running SolidDesigner on an HP 9000/735 workstation with advanced graphics capacity, and a dial box. This hardware and software combination gives me the ability to create, join, rotate and manipulate shapes with amazing speed and spontaneity. And in real time.

## PONDERING THE POSSIBILITIES

This computer system does much more than let me do my work faster or more efficiently; it lets me do work on a level of complexity and sophistication that would simply be impossible without this tool. I should add that the software system has been significantly customized for me by Visionary Design Systems (Sunnyvale, Calif.) to make it more spontaneous and productive for my particular use.




***A sculpture in "hidden line removal." This shows the sculpture with numbered faces, which are then printed and put into a model assemly book.***

My sculptures are made from bronze. I cast them if they are under six feet, and fabricate them from bronze plate if they are larger. The cast sculptures are made from Foam-Core, which is a sandwich of urethane foam with Kraft paper on each side. Often used to make architectural models, it is stiff, lightweight, and cuts and glues readily. The Foam-Core then burns out in the traditional lost wax casting process. Whether the sculpture will be cast or fabricated, it is important to obtain an accurate pattern of each side or plane of the sculpture. My use of the computer is not limited to the design. It is equally important in helping me make the sculptures in bronze.

The process involves the following steps: After the design is completed, SolidDesigner then unfolds the solid into its component sides. The sides are then rearranged to fit a plotting format and plotted with a flatbed plotter onto Foam-Core, or onto manila paper pattern stock if it is to be fabricated. For a cast sculpture, the Foam-Core sides are then cut and assembled to take to the foundry. If the sculpture is to be fabricated, each side is cut from bronze plate and the entire sculpture is welded together.

## ART MEETS TECHNOLOGY

The computer has become my core tool for making sculpture. I use it to conceive and create the original designs, to produce the patterns to make them in bronze, to understand and evaluate interior spaces in the sculpture to allow for interior supports, and to show a sculpture in a site location for a prospective client.

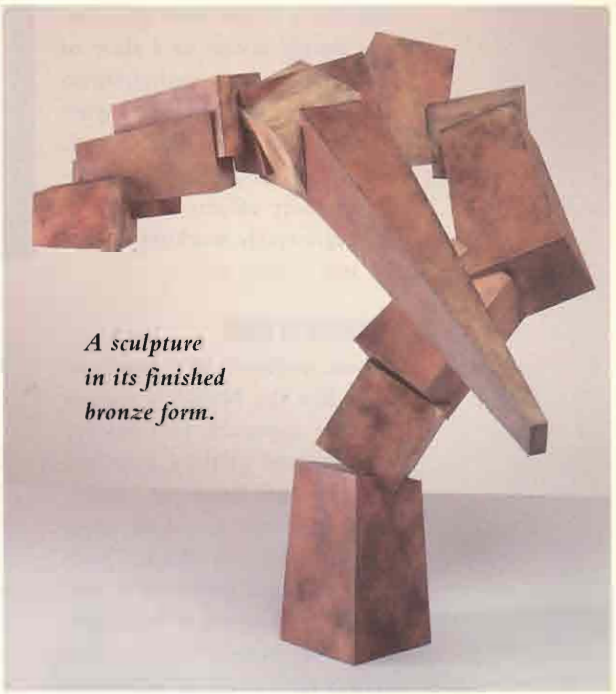
I have found the HP equipment to be superb and the software excellent in the capacities it has. However, I now think of all of the information about the sculpture as being within the computer, and I want to be able to do increasingly sophisticated visualizations of them on the computer prior to actually making them in bronze.

For example, I would like to be able to put textures on the sculptures, and to be able to create realistic environments with various light sources, import photographic backgrounds and then render these scenes to make fully realistic images of the sculptures before they have been built. The field of product design uses these capacities quite extensively, and they are standard functions on cheaper and full capacity CAD programs with which HP competes.

I think HP is making a mistake in abandoning the growing CAD market in product design. For example, it was necessary to export a sculpture shown in a picture with a building to a Macintosh program in order to render a picture of the sculpture in front of the building. Also, the HP DesignJet 650 printer runs fine from my Macintosh, but not from my HP workstation. A partial solution to this problem would be to fully incorporate a functional version of Windows NT onto the HP-UX workstations. While this would still require exporting the model into another program, it would dramatically expand the software available to the users of this hardware.

Visionary Design Systems can be reached at 2790 Walsh Ave., Santa Clara, CA 95051; (408) 490-8800; vds_all@vds.com; www.vds.com.

*—Bruce Beasley is a professional sculptor in Oakland, Calif. He has done large-scale sculpture commissions throughout the United States. His work is in the permanent collections of museums around the world including: The Museum of Modern Art, The Guggenheim Museum, the Museum of Modern Art in Paris, and the Museum of Art in Mannheim, Germany.*



***A sculpture in its finished bronze form.***

IN sites

Case Study Solutions

# In The Navy

*The Naval Surface Warfare Center Stays At Attention To Detail With SQL Software's Process Configuration Management Solution*

*Tani Haque*

"Saving taxpayer dollars, achieving 70 to 80 percent software reuse rates, and gaining a comfortable competitive edge in the marketplace are all benefits the Naval Surface Warfare Center (NSWC; Virginia Beach, Va.) has gained through the effective implementation of Process Configuration Management (CM) on HP-UX, Sun's Solaris, Digital's VAX/VMS and Windows [PC] platforms," says Ray Gluck, Library/Program Control Officer at the center.

Process CM works at the NSWC by integrating version management, change management and process management, while automating all the organizational and development processes related to these functions. As a result, managers can have timely access to a slew of metrics including configuration management reports and impact analysis. On the other hand, developers can go about coordinating their efforts seamlessly while effectively working in parallel and concurrently.

## SWIMMING IN CODE

Because sophisticated environments like the NSWC's require a formal approach to software development as they generate millions of lines of code, "NSWC is not alone in using Process CM," says Gluck. "Such a process-based approach is now a de facto standard in heterogeneous, distributed software engineering environments engrossed in producing complex applications on a mix of platforms." With teams of developers working concurrently and in parallel, if these changes are not properly retrofitted, merged, distributed and integrated into the final releases via Process CM, the software can be defective and cause breakdowns in the systems.

"For this reason, the traditional approach to configuration management, which only provides a point-to-point solution to version control, is not effective in managing mountains of changes," says Gluck. "Today, the only way to avoid unwanted surprises in parallel and concurrent software development is to rely on Process CM."

**Process CM helped in developing the Combat System Advanced Display Subsystem, which provides U.S. naval commanders with geographical and tactical data.**

## COMBAT-READY SOFTWARE

The NSWC, which actively manages changes implemented to 8 to 10 million lines of code on a daily basis, is fully cognizant of the potential risks associated with flawed software. "Many of the programs we manage are mission critical. The majority of them control all the weapons, the combat direction system, and the combat environment onboard U.S. ships. The performance of these systems is subordinated to the performance of the software," says Gluck.

"So, worst case scenarios can happen if there is a software glitch. For instance, a ship may not be able to detect an enemy aircraft in time and thus may become an easy target for an incoming missile. This can lead to devastating losses of lives and ships. To prevent such occurrences, our software is under the strict control of Process Configuration Management 100 percent of the time." In attending to this important task, the NSWC has emerged as the premier center for excellence for the Navy. It has now reached a Level 2 certification from the Software Engineering Institute and is working diligently toward achieving a Level 3. In so doing, the NSWC has

emerged as an industry leader in Process CM.

"Process CM is now making inroads into commercial sectors because many civilian companies bidding on federal contracts must achieve Level 2 and 3 certifications," says Gluck. "Such certifications require the implementation of defined and repeatable processes via effective Process CM. So, we find that the software engineering strides we have achieved at NSWC are not only of interest to defense environments, but also to civilian organizations and contractors as well," says Gluck.

The NSWC relies on PCMS Dimensions, a process configuration management solution from SQL Software (Vienna, Va.), to manage all facets of its intricate software development operation. This mainstream CM solution was first introduced into the NSWC environment in 1992 to accommodate the development needs of the organization on UNIX and VMS platforms. After conducting an in-depth evaluation of CM tools in the marketplace, the NSWC determined that SQL Software best matched its requirements. "We chose the tool because it can effectively support a level 3 organization because it allows the implementation of definable, repeatable and improvable processes," maintains Gluck.

"Our CM system has allowed our center to establish mission-critical software engineering processes, empowering software engineers to operate under the umbrella of a repeatable and improvable set of processes," says Gluck. "To achieve this, we have embedded our processes into the tool, so that software development can be repeated the same way across multiple projects without manual intervention. This approach, which reduces the likelihood of human errors, constitutes the foundation for the smooth development environment we have been able to institute at NSWC."

## A SHORE THING

Another major advantage of the NSWC's CM system is that it has allowed the center to considerably boost its software reuse rates and to replicate databases across projects. "This means we don't have to reinvent the wheel each time we develop code," says Gluck. "This is a time-saver and a productivity factor in our operations." Today, the NSWC's Process CM system is used to develop applications for several critical programs such as: the Combat System Advanced Display Sub-System, designed to provide ship commanders with geographical and tactical data by superimposing shore lines and airways data maps on top of the sensor information; and the Battle Force Tactical Trainer, a simulation and war game program that trains combat crews.

**Process CM has emerged as the philosophy supporting over 100 military ships and naval aircraft.**

"Our CM system also allows us to manage changes occurring in our Integrated System Engineering Environment, which provides support for software developers and their managers seeking to better utilize a group of software and hardware tools across different projects and platforms," says Gluck. "This way, we can create a standardized development environment, coordinate teamwork, derive real-time project status information and maintain measurements."

According to Gluck, the use of a CM system across these various projects allows the NSWC to: successfully manage the constant flux of software changes across platforms; define mission-critical software engineering processes, map them into the system and enhance them; act as a central repository of information; provide real-time project status information to project managers; and automate cost estimates. "The benefit of such an approach is that it enforces the processes of our organization while allowing us to easily move staff from project to project with minimal training," says Gluck.

In the future, the NSWC will begin using their CM system to manage work on the Common Display Kernel, developed by John Hopkins University's Applied Physics Laboratory, and managed by the NSWC. This new product is designed to be reused by multiple installations across the country as a display driver in real-time tactical programs. "Our CM system provides the software engineering team at NSWC with a reliable mechanism to produce quality application by managing software changes across the board, tracking workloads, achieving cost estimates, analyzing product variants and meeting deadlines," says Gluck. "As a result, we can be more efficient than ever before in all aspects of our concurrent and parallel work."

SQL Software can be reached at 8500 Leesburg Pike, Ste. 405, Vienna, VA 22182; (703) 760-0448; or at www.sql.com.

*—Tani Haque is CEO of SQL Software (Vienna, Va.).*

IN sites

Case Study Solutions

# When Credit Is Due

*Credit Unions Have A High Interest In Visimage*

*Mary M. Marks*

Southern New England Federal Credit Union (North Haven, Conn.) has 24,000 members with $167 million in assets. As they grew, more requests were coming in for reports that were not standard in their application. Like hundreds of credit unions nationwide, Southern New England relies on the HP 3000 business servers. "We needed to install a report writer product because the system resources that HP Query took up were no longer practical for us. In addition, we just couldn't do what we wanted to with Query due to the time it required to complete the report requests," says John Shea, technical service manager with Southern New England.

Summit Information Systems (Corvallis, Ore.) is a provider of data processing solutions for credit unions. While Summit's Spectrum software on the HP 3000 delivers the needed automation to the data processing departments of many credit unions across the nation, many customers augment that application with ad hoc reporting provided by Visimage from Vital Soft Inc. (Sunnyvale, Calif.).

Visimage creates and drives production reports on an HP 3000 from a Microsoft Windows interface. It allows any credit union user to access a wide variety of data on the HP 3000 host computers. In addition, reports can be run interactively or saved as batch jobs to run during off-peak hours.

"We were the first Summit credit union to use Visimage as a report writer solution," says Betty Ann Pinney, data coordinator with Southern New England, which started with the DOS system in early 1993 and are now using the Windows version.

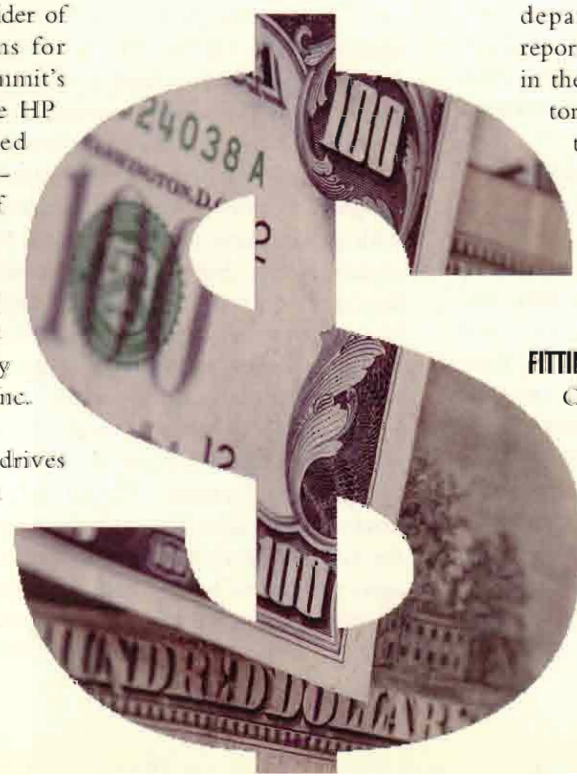
"The fact that Visimage was PC-based meant that it alleviated the strain on the HP 3000." adds Shea.

## TIME ON THEIR HANDS

Kitsap Federal Credit Union (Bremerton, Wash.) has 60,000 members and $275 million in assets. Over the years, Kitsap has opened up its membership to all federal employees and military employees stationed on military installations in Kitsap county.

After reviewing several report writers, Kitsap decided to purchase Visimage in 1993. "Once our users realized that we had the capability of some quick turn-around time on reports, we got bombarded with any and every type of report," says Colin Morrison, information system manager for Kitsap.

The reports that have made the biggest difference for Kitsap are the ones they run for the federal examiners and internal examiners who perform the annual audits. The auditors were impressed with the fact that Visimage could pump results right into a database or spreadsheet file. When the auditors come, the data processing department puts all of their reports and requests onto a disk in the Excel format. "The auditors then upload the information into their Excel spreadsheets and go to town," adds Morrison. Auditors don't have to re-key information into their Excel formats.



## FITTING THE BILL

One of the largest federal credit unions using the Spectrum software on an HP 3000 is Desert Schools Federal Credit Union (Phoenix, Ariz.). It has 162,000 members and $717 million in

assets. Desert Schools installed Visimage in October 1996. They switched from another report writer that required that the user have programming expertise and extensive knowledge of the Spectrum database, according to Eric Suleiman-Gauthier, computer operator with Desert Schools data processing department.

"Our emphasis was to have a report writer that was easy to use so upper management could write their own reports," says Roger Wade, data processing director for Desert Schools. "We are saving time. Reports that used to take an hour to write in Query take only five minutes."

"Another thing we like about Visimage versus our other report writer package is that we can pull up the report and display it to the screen on our PCs. If we like the format, we just select 'output to print' and it prints."

Desert Schools has 13 branches. When they purchased the Visimage report writer, they trained 10 people. Three were from the data processing department and seven were managers. One of Desert Schools' objectives is to have more of their managers trained in Visimage's functionality. "In fact, once the managers are trained with Visimage, I am looking for the branch managers to be more creative with the information they pull from the Spectrum database so that they may better support the members at each branch," concludes Wade.

**Reports that used to take an hour to write in Query take only five minutes.**

### IN THE NICK OF TIME

Sikorsky Federal Credit Union (Stratford, Conn.) services Sikorsky aircraft employees and retirees. They have 43,000 members with assets of $234 million. Sikorsky purchased Visimage in 1994.

Just prior to closing time one Friday evening, Sikorsky had the opportunity to rely on Visimage's speed and ease of use. The day before, Pauline Ostrosky, CIO for Sikorsky's data processing department, received two calls from members stating that they received a monthly charge on a Bill Payer service. This was unexpected because the members were not supposed to receive any service charges during the first six months using the Bill Payer service. Ostrosky checked her own Bill Payer statement and noticed that the system had inadvertently charged her a monthly fee.

"At 5:05 p.m. on Friday, I fired up Visimage to find out how many people had been billed inadvertently. In 10 minutes, Visimage identified 71 people out of a database of 2.5 million entries. I forwarded the report to the appropriate department head so the corrections could be taken care of first thing Monday morning, " says Ostrosky.

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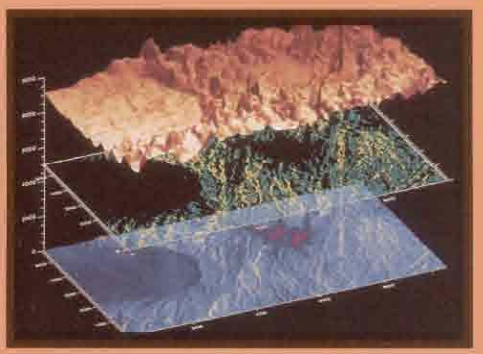
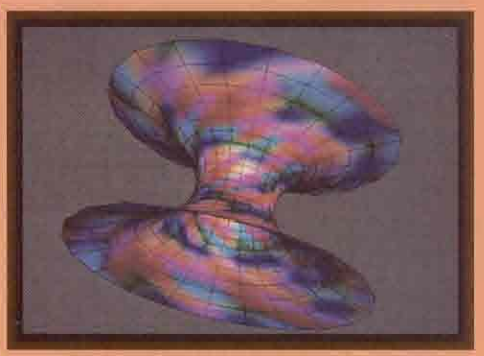
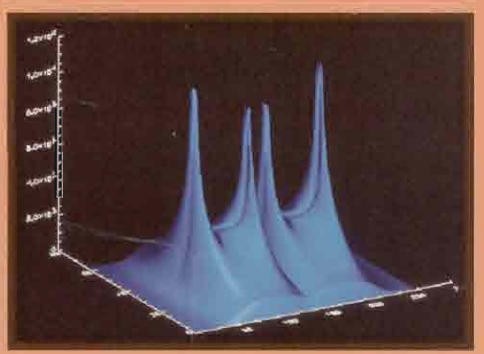
# Swimming UPSTREAM Against the NT Tide







A UNIX workstation using a RISC CPU is King of the Hill when it comes to desktop computers. Although they tried, PCs (before they became known as Wintel boxes) couldn't do the hard math, the complex calculations or the 3D modeling necessary for scientific and technical computing. But in 1997, Windows NT running on Intel Pentium-based PCs pose a serious threat to the once highly respected, untouchable workstation.

International Data Corp. (IDC; Framingham, Mass.) forecasts that the revenue for Windows NT workstations will grow by 44 percent per year through the year 2000 and that Windows NT workstations will outship UNIX workstations this year. The effects are being felt on the bottom line. In the year just past, although total workstation shipments rose 18 percent, total revenue declined by 1 percent.

Although that may be a curse for vendors, it adds up to a blessing for users. Since the beginning of 1997, vendors have been cutting prices and reinventing their strategies. HP, in particular, is moving toward what it's calling a "PC-like manufacturing cost structure" to help reduce expenditures — which means consolidating facilities and reducing overall expenses to stay competitive with PC workstations. That's why HP

George A. Thompson

*In 1996, HP Vectras were the best-selling Pentium Pro PCs in the U.S. reseller channel. And HP is outpacing its competitors, with a 44 % share in the Pentium Pro market vs. Compaq's 39 %.*

announced the transition of its Workstation Systems Division from its Chelmsford, Mass. headquarters to Fort Collins, Colo.

## Do You Get The Picture?!

But hardware is hardware, after all, with vendors regularly leapfrogging each other in terms of performance. So as Windows NT workstations begin to pop up on corporate desktops, vendors are taking UNIX workstations to higher ground (and higher margins). HP, Digital and other UNIX vendors are interested in getting you to appreciate the advantages of visualization. Only by demonstrating new capabilities in the 2D and 3D graphics market will UNIX vendors continue to be successful against the increasing competition from Windows NT workstations. For example, Compaq introduced the Professional Workstation Series — its first workstation wannabes — this past October.

Using one or two 200MHz Intel Pentium CPUs running Windows NT Workstation 4.0, Compaq is targeting mechanical computer-aided design (MCAD) users, who are creating their drawings in 2D and 3D with Matrox Millennium graphics boards. For high-end visualization and 3D animation and CAD/CAE applications, Compaq is hoping to attract users by using an ELSA GLoria-L graphics board.

Matrox's Millennium uses a 64-bit graphics processor, 2MB dual-ported Window RAM (upgradeable to 8MB) and a 220MHz RAMDAC, which maintains high system performance as you increase to maximum resolutions, color depths and refresh rates. Prices range from $4,300 to $5,300. The ELSA GLoria-L graphics controller uses a 3D graphics accelerator 8MB VRAM (frame buffer) and 8MB (upgradeable to 16MB) Z-buffer DRAM. Prices range from $8,200 to $10,200. Compaq also is collaborating with 2D and 3D software vendors like Autodesk (San Rafael, Calif.), Bentley Systems (Exton, Pa.), Parametric Technology Corp. (Waltham, Mass.), Structural Dynamic Resources Corp. (SDRC; Milford, Ohio) and EDS Unigraphics (Maryland Heights, Mo.).

## A Horse Of A Dithering Color

However, that still pales in comparison to HP's Visualize graphic subsystems which take advantage of HP's own engineering talent and expertise. For example, on its entry-level Visualize graphic subsystems, HP provides what it calls its Color Recovery Technology. It's a method, using compression and decompression algorithms with customized digital signal processing (DSP) capabilities, for producing millions of colors with an 8-bit frame buffer. It allows you to generate images on your display without the grainy or patterned effect of 8-bit dithering. According to HP, HP Color Recovery approaches the image quality of a 24-plane frame buffer. Note that many applications written to use true-color capabilities also allow for dithering to simulate true color when using an 8-plane device. For these applications, if you use an 8-plane device, HP Color Recovery will produce a significant improvement in the image.

As workstations go, so go their peripherals, which have also been keeping up with the market. New, faster CD-ROM drives for HP's PC line have moved over to the workstation market, as well as the continued popularity of the more traditional 4X CD drive.

Tape drives are a growing niche for workstations. Instead of using distrib-

## NEW HOME AND NEW GM FOR WORKSTATION SYSTEMS DIVISION

This past January, in addition to announcing new workstation and graphic subsystem prices, HP tapped Chris Christopher as general manager for the Workstation Systems Division, which is in the process of being transferred from Chelmsford, Mass. to Fort Collins, Colo.

As GM, Christopher replaces Mark Canepa, who left for a short stint with Compaq Computer and is now with Sun Microsystems. Christopher is responsible for HP's systems, graphics hardware and software technologies research, development and marketing, as well as technical workstation product marketing, and MDA and EDA product and program marketing. Christopher also will manage the consolidation of HP's Chelmsford operations into the Fort Collins site, where he will be based.

uted backups on a server, many companies are opting for DAT and QIC format tape drives directly connected to workstations for additional backup security. HP's DAT tape drives are still popular. And although a new model has not been added to the DAT drive lineup in a while, they continue to be the backup drive of choice for workstations. Smaller QIC units are appearing for PC machines through HP's Colorado Memory Systems division, and some of the high-capacity 4GB Travan TR4 cartridge systems can be run under HP-UX, offering a high-capacity tape backup for very little money. The primary drawback of this type of backup, speed, isn't a factor when automated backups can be performed overnight.

**Only by demonstrating new capabilities in the 2D and 3D graphics market will UNIX vendors continue to be successful against the increasing competition from Windows NT workstations.**

## Price Rules

For traditional UNIX workstation buyers, graphics capability will be one of the primary purchase guidelines. For example, while HP markets its Visualize graphics subsystems, Digital touts its PowerStorm graphics board that run on its Alpha/Digital UNIX and Intel/NT systems. With a "standard" Intel/ Windows platform, price will be the leading purchase criteria for potential buyers at the low-end. Call it the "Wintel effect."

It's not a passing phenomena. HP's 1996 workstation market share decline demonstrates the impact. According to IDC, HP's share slipped slightly from 22 percent to 19 percent in 1996. Sun Microsystems, on the strength of its new 64-bit Ultrastations, grabbed 41 percent of the market, a 3 percent increase from the preceding year. And Sun outshipped HP by more than 2 to 1.

So, as HP's and other vendor's UNIX workstations swim upstream, the low-end of the workstation market will be supplanted by Intel-based systems like those from Compaq. And Compaq is being chased by its competitors, namely Dell Computer (Austin, Texas) and Gateway 2000 (Sioux City, S.D.), offering similar systems at competitive prices.

But HP has something to say as well with its own Intel Pentium Pro-based systems. The single CPU Vectra VA and the dual CPU Vectra XA and Vectra XU, are part of HP's business desktop systems. Like the Compaq Professional Workstations, the Vectras also use the same Matrox Millennium graphics board. In fact, according to the market research firm of Audits and Surveys Worldwide, in 1996 HP Vectras were the best-selling Pentium Pro PCs in the U.S. reseller channel. And HP is outpacing its competitors, with a 44 percent share in the Pentium Pro market vs. Compaq's 39 percent, Dell's 7 percent and Gateway 2000's 3 percent market share. The report also noted that the HP Vectra XU PC was the best-selling Pentium Pro processor-based PC.

## Something Lost And Something Gained

Its formidable competition notwithstanding, HP is positioned well to supply both UNIX and PC workstation markets. As of January 1996, HP reduced the prices on its current workstations (see chart below). In February, HP continued to add value by bundling Netscape Navigator Gold on all of its workstations.

On the PC side, in mid-February, HP reduced the list price by up to 23 percent on its Vectra PCs (see Industry Watch, page 9). It's a testament to the new HP. A company not afraid to compete on cost. In the not-too-distant past, HP avoided pricing wars, charging a premium price for its hardware. But HP customers and potential HP buyers should not let the past affect their future buying decisions. What HP has lost in price, users can only gain in value.

*—Senior Editor George A. Thompson can be reached at* thompsonga@cardinal.com.

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## WORKSTATION PRICE REDUCTIONS

| Model | Graphics Subsystem | Previous List | New List | Reduction |
|---|---|---|---|---|
| B132L* | VISUALIZE-EG | $11,500 | $6,795 | 41% |
| B132L* | VISUALIZE-24 | $17,700 | $12,995 | 27% |
| C180* | VISUALIZE-EG | $33,000 | $20,995 | 36% |
| C180* | VISUALIZE-24 | $38,000 | $25,995 | 32% |
| C180* | VISUALIZE-48XP | $51,500 | $34,995 | 32% |
| J210XC* | VISUALIZE-EG (two-way) | $32,000 | $19,995 | 37% |

*all models include 64MB RAM, 2GB disk and a 20-inch color monitor; except B132L which includes a 17-inch color monitor

## BETTER COMPUTING THROUGH GRAPHICS

**It's a graphical world out there. And HP wants you to understand the vernacular. If you don't know the difference between an airplane and a graphics plane or a spaceball from a baseball, here's an abbreviated list of some of the more formidable technology terms to help you visulaize your world.**

### B-spline Curve
A mathematical representation of a curve. This representation allows curves to be stored as parameters, which reduces the amount of information necessary to describe a complex curve, and increases performance.

### Back Face Cull
The removal of those surfaces in the image that are facing away from the viewer. Performance is increased by avoiding unnecessary drawing of these facets.

### Combined Radiosity and Ray Tracing
A technique used to enhance realism, combining the effects of radiosity and ray tracing to create superior photorealistic view-independent images with sharply defined and soft shadows, color bleeding and reflection effects.

### Depth Cueing
A rendering technique that gives the viewer the perception of object depth by showing lines that are further away as dimmer than lines that are close to the viewer.

### Dithering
A shading technique where pixels of different colors are clumped together. The human eye will perceive some blended color, thereby increasing the apparent number of colors on the screen.

### Frame Buffer
Memory used for storing the pixel values used to refresh the raster scan display.

### Graphics Plane
Each set of bits in a frame buffer is referred to as a graphics plane, and is commonly used to display pictures.

### NURBS
NURBS (Non-Uniform Rational B-splines) are a special type of B-splines in which you can have weighted control points. This enables you to draw circles, ellipses and parabolas, as well as freeform curves.

### Overlay Planes
Frame buffer memory that stores pixel data which is independent of the image buffer. This is often used for menus, window borders and other user interface images.

### Phong Lighting Model
An empirically derived lighting model which accounts for the ambient, diffuse and specular reflections of light from a point on a surface.

### Primitives
The basic geometric shapes used to construct graphic pictures including vectors, polygons and text.

### Radiosity
An illumination model in which the visibility of any portion of a surface of an object is assessed (pre-processed) relative to every other surface and light source. Radiosity techniques can produce soft shadows, unlike ray tracing.

### Reflection, Diffuse
The scattering of light in all directions. This type of reflection occurs when the object has a dull, matte surface. The surface appears to have the same brightness from all viewing angles.

### Reflection, Specular
The type of reflection that occurs when light hits a shiny surface. It produces highlights on the object. It is seen when the light rays from the light source are reflected directly into the viewer's eye.

### Shading, Gouraud
A technique used to render three-dimensional objects by interpolating the color and intensity of each pixel based on the color values of the polygon vertices.

### Spaceball
A three-dimensional input device that enables the user to translate and rotate images in the X, Y and Z axes simultaneously. This is also referred to as six degrees of freedom.

### Texture Mapping
Texture mapping is a fast, effective technique for laying bitmapped images over solid models, like wrapping a package with patterned paper.

### Valuator
A device that returns a value corresponding to some movement of the device (for example, dials or knobs). It returns single floating point values, often in the range 0.0 to 1.0.

### Volumetric Rendering
Common in scientific visualization and medical applications, volumetric rendering involves the display of information from "real world" applications through direct conversion to pixel values without creating any geometric data.

### Wireframe
The drawing of a model by tracing features such as edges or contour lines without attempting to remove invisible or hidden parts, or to fill surfaces.

### Z-Buffer
The memory available to store the depth information of a pixel to be used for hidden-surface removal.

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***Source:*** http://hpcc997.external.hp.com:80/wsg/products/grfx/GraphicsPrimer/11_Glossary.html

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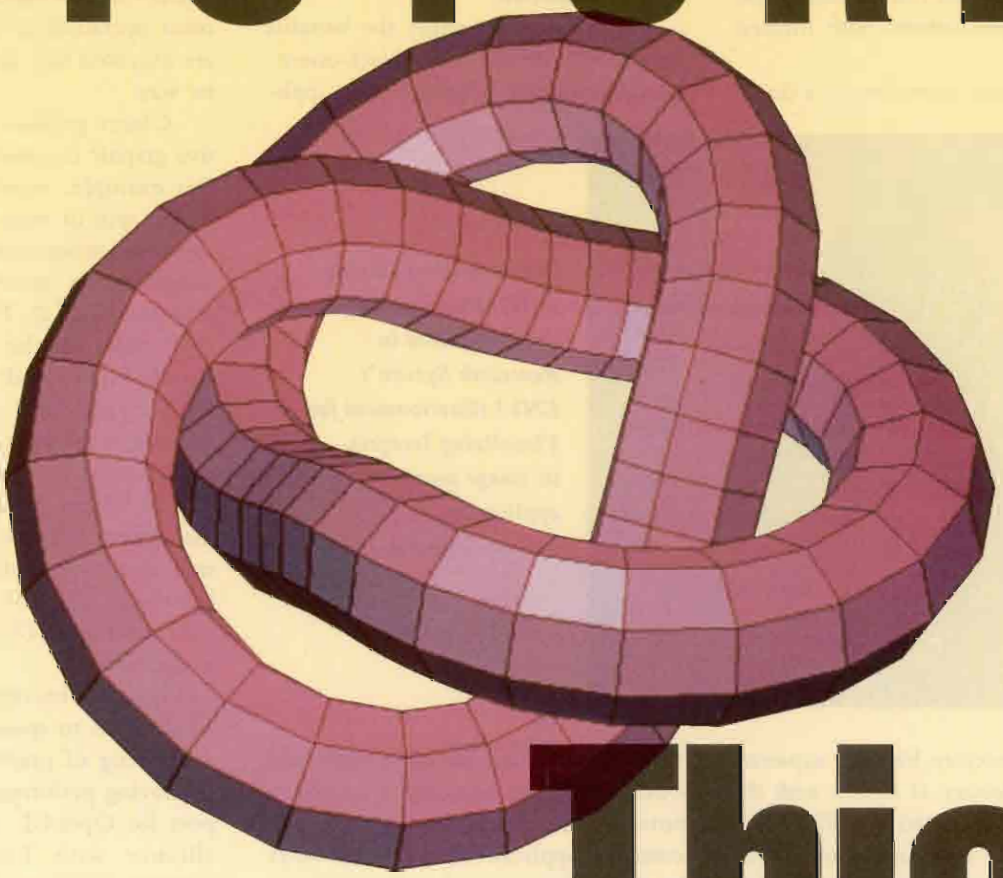

## Object Graphics Add Interactivity To Visualization

David M. Uhlir, Ph.D.

Remember when "computer graphics" referred to images rendered in text characters on line printers? Or maybe you remember the "ba-doop da-boop" of a Pong ball bouncing back and forth across a black-and-white screen? It was cutting-edge, state-of-art graphics technology at work. Since then, a major impediment to modernizing computer graphics has been the direct association between the visualization and the display device.

Even with today's advanced ultra-high resolution true-color monitors, most software uses graphics technology that harks back to the days of Pong, when pixels were drawn on a screen by a software program. Usually, once the program sends pixels to the screen, it "forgets" about them; Their content is no longer retained in the program's memory. When the image needs to change, a new set of pixels are displayed, then just as quickly forgotten.

Because the visualization goes directly to the display, and nowhere else, we can call this "direct graphics architecture." Direct graphics have merit for applications where data is displayed and then replaced with new, essentially unrelated data. For example, an application that processes and displays remote sensing images, as soon as they are acquired by a satellite, can be sensibly constructed with a direct graphics architecture

(see *Figure 1, below*). Because nothing about the previous display is retained in the computer's memory, programs using direct graphics run efficiently and can be used on systems with limited resources.

However, the limitations of a direct graphics architecture become apparent when it's necessary *to interact with the elements* in a visualization. While fast for the initial visualization, direct graphics introduce unwanted computational overhead when objects in a visualization are modified and re-displayed. If the user wants to change the perspective and magnification of a scene — for example, to zoom in on a three-dimensional rendering of the brain — with no retention of the initial visualization in the program's memory, the entire scene must be recalculated and redrawn. For complex visualizations, this process can take tens of seconds to several minutes, even on high-performance graphics workstations.

To allow rapid interactive visualization with complex scenes, information about the contents of the scene needs to be retained in the computer's memory. That's where object-oriented programming methods can provide a flexible and elegant means to "visualizing," so that it may be rapidly redrawn without being recalculated. In this "object graphics architecture," the visualization is made up of a series of graphics objects, described in terms of their geometry, along with attributes such as surface textures, color, shading and spatial orientation.

Object graphics enjoy the benefits associated with any true object-oriented programming approach. For application developers, the object-oriented code hierarchy imposes a common structure that simplifies the design of complex applications and contributes to their robustness and ease-of-maintenance, while facilitating the reuse of pre-existing code objects. This makes it easier to add new features and to document their functions for end users. Meanwhile, end users of object-oriented applications enjoy the consistency of program operations provided by the object-based structure, as well as the increased performance associated with the architecture.

*Figure 1.*

***Direct graphics display of 2D remote sensing data visualized in Reasearch System's ENVI (Environment for Visualizing Images), its image processing application.***

Once users master one aspect of an object-oriented application, performing other operations is simple because they are executed in a consistent and familiar way.

Object graphics add truly interactive graphic capabilities to applications. For example, users can interactively zoom, spin or even "fly through" the three-dimensional image draped over a model of the corresponding topography (see *Figure 2*). The graphics objects that make up the visualization are already known and "remembered" by the program, and simply need to be redrawn as the view changes.

For enhanced interactive performance, object graphics languages can incorporate OpenGL, the vendor-neutral, open application programming interface (API) for developing high-performance 2D and 3D graphics applications.

OpenGL incorporates hardware acceleration to speed the drawing and redrawing of graphics objects, thus improving performance. HP-UX support for OpenGL comes through an alliance with Template Graphics Software (TGS; San Diego, Calif.), formerly Portable Graphics Inc., which offers a hardware-accelerated implementation of OpenGL for the HP 9000 family of graphics workstations. Software-only solutions exist for workstations without OpenGL devices. For example, to accommodate users without OpenGL graphics hardware, or on

*Figure 2.* ***Object graphics 3D visualization of the image data in* Figure 1 *"draped" over a topographic terrain model.***

systems that do not yet support OpenGL, Research Systems (Boulder, Colo.), includes the Mesa3D graphics libraries with its Interactive Data Language (IDL), visualization and data analysis development environment.

Device-independence, or the ability to draw visualizations to any graphic device, is a common and useful attribute of object graphics architectures.

**Device-independence is a common and useful attribute of object graphics architectures.**

With device-independence, visualizations may be instantly sent to any output peripheral — to the screen, printer, plotter or file — without recalculation and at the highest resolution possible on that device. With device-independent graphics, WYSIWYG printing is easily incorporated into applications, without concern for the exact types of output devices available to the end-users.

Computers have come a long way since the days of Pong. The full promise of object graphics is just starting to be realized. With so many major benefits to end-users and programmers alike, object graphics clearly will play a significant role in the future of computer-based visualization.

*—David M. Uhlir is an IDL product manager at Research Systems Inc. (Boulder, Colo.). He can be reached at* uhlir@rsinc.com.

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# Journey To The Center Of Your File System

**Actually, it's more like centering your file system on a journal. The journaled file system that**

is, or JFS as you might call it. Or the Veritas file system. Or maybe VxFS (which is favored in HP documentation). All are correct. Developed by Veritas Software Corp. (Mountain View, Calif.), the Journaled File System (VxFS) was bundled with HP-UX 10.01; **vxfs** is required as an argument to many file system commands.

This release used version 2 of VxFS. At 10.01 and 10.1, you could not use a VxFS file system as the root file system. This changed at release 10.20, where VxFS version 3 is bundled, and you can use VxFS as a root volume. Only HP-UX 10.20 can mount version 3 VxFS file systems. So in cases where a disk might move to an older system, you might want to create version 2 file systems on 10.20, but that is rather rare. Loading either JFS product required a kernel rebuild, so remember to select it at install time.

## VxFS: WHAT IS IT?

VxFS is an extent-based journaled file system. The extent-based part means that data coming to and from the disk is based on "extents," which can be varied in size. This allows optimizing of both disk space efficiency and performance. An extent can be multiple disk blocks. So if you access large amounts of data, in large files, you can gain performance by using large extents (much like using large disk blocks on an HFS file system). VxFS logs pending file changes to the "intent log." This log is thought of as a journal, thus the name.

There are actually two parts to VxFS: *Base JFS* is bundled with the operating system. For a price ($995 to $8,000), you can buy the *Advanced JFS* capabilities. This is sold as the HP product called *Online JFS*, as it allows for many file system maintenance activities to be performed without unmounting the file system, an important issue in many environments; man pages usually refer to *Online JFS* as *Advanced JFS*.

## WHY VxFS?

Some of the reasons you might want to use the VxFS file system on a whole disk or a logical volume are as follows. VxFS file systems perform **fsck** incredibly fast. A 1.2GB disk took 11 seconds on my system. I missed it the first time, and had to pull the power plug a second time and watch closer. The speed of the **fsck** is determined by disk activity at crash time, rather than size of the file system. For that, you can thank the intent log. In case of a crash or improper dismount, **fsck** reads back the intent log to nullify, or complete any disk operations active when the crash occurred. The most important benefit (to me, at least) is that it provides guaranteed file system integrity after a crash.

Pending disk changes — depending on the situation — are either reverted or completed. The HFS file system does not guarantee file system integrity after a crash and **fsck**. Most of us have seen that in action, especially if you pull power plugs often. Full **fsck** (reads all data) can be performed when needed, like in the case of disk data errors. If you BUY THE *Online JFS* product, there are several more "high availability" and performance features. These include taking a read-only snapshot version of a file system. This allows a full backup to be performed from another disk (the one the snapshot was written to) without disrupting service. It also allows you to buy more disks, because you need to write the snapshot to a different disk.

You can resize mounted VxFS file systems, even safely making a file system smaller without harming data: **fsadm -b** ***new- size mountpoint***. You cannot reduce an hfs file system size safely. On a VxFS file system, the **fsadm** command will fail if the new file system size is not large enough to hold all the data. If you perform a defragmentation first, all the data will be contiguous, thus allowing accurate sizing of fixed-data file systems. Some very useful performance features in VxFS are defragmentation on mounted volumes and the file extent control. Defragmentation can be performed with the **fsadm** command, using either the **-e** (extent) or **-d** (directory) options.

HP documentation says that one way to see if you have the *Online JFS* product is to see if the **fsadm** command is on your system. Not at 10.20, which has this command even without *Online JFS*. Instead, use **swlist**.

File extent control allows you to allocate space to a file, even if it is not currently that large. This will make sure that the file is always contiguous, thus improving performance when accessing that file.

## WHY NOT VxFS

You can't use VxFS if you want to use ACLs on files in the file system or on a trusted system. Neither are supported on VxFS. There are some other reasons why you might not want to use VxFS — low memory systems, for example. VxFS takes up 400K of memory vs. 90K for hfs. HP calls this "a considerable amount more." A true statement if I ever heard one. VxFS also can cause a performance hit if extents are not sized properly for the data and usage. If you don't specify otherwise, the default size is 1K. When larger extent sizes are used, the amount of wasted disk space goes up if there are many smaller files mixed in with the big files that dictated the larger extents. This is due to no "block fragments" like hfs uses.

## DOWN AND DIRTY WITH VxFS

Most disk/file system commands understand VxFS, so all you need to do is supply the **-F vxfs** option. For example, the commands below make a VxFS file system on an unused logical volume.

Create the file system:

```
newfs -F vxfs /dev/vg01/rlvol4
```

Edit this line into **/etc/fstab** for future mounts:

```
/dev/vg01/lvol4 /data vxfs defaults 0 2
```

This command mounts the VxFS file system on to the existing empty directory /data:

```
mount -F vxfs /dev/vg01/lvol4 /data
```

The **-F vxfs** was not needed on the **mount** command, as it recognizes the file system type automatically.

You can use this command to find out what type of file system is on a device:

```
fstyp /dev/vg01/lvol4
```

You can get reports on fragmentation even without the *Online JFS* product using these commands.

Directory fragmentation report:

```
fsadm -F vxfs -D /home
```

File Extent fragmentation report:

```
fsadm -F vxfs -E /home
```

To convert an existing HFS file system to VxFS, there's no easy way out:

1. Backup all data.
2. Unmount the device (whole disk or logical volume).
3. Make the VxFS file system.
4. Mount the file system.
5. Restore all the data.

To make a root VxFS file system, just answer the question properly in the cold boot procedure.

You should know that there are some new commands specifically for VxFS file systems. But I am out of room in this column. For more details, enroll in my *HP-UX 10 Administration* class. Or, you can read the *HP-UX System Administration Tasks* document, available on a LaserROM near you. However, if you choose to read the book which does such a good job, you may see me wandering around the highways holding a cardboard sign that reads "Hungry! Will teach UNIX Admin for food."

*—Fred was last seen cutting cardboard squares from HP workstation shipping boxes. Help him feel even more frustrated by sending your e-mail inquiries to* frederm@aol.com.

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Mark McFadden

# It's All In The Numbers

**Batting averages. Nielsen ratings. Top 10 lists. Stock market indexes. We are obsessed with numbers.**

It's no different with the Internet. We talk about the number of computers and networks connected, the number of Web pages indexed by our favorite search engine and the number we call when our Internet connection unexpectedly fails. However, one Internet number stands out from the rest: the IP host address.

## NINE-TENTHS OF THE LAW

Possession of an IP address is the fundamental requirement for insuring Internet connectivity. And it's not good enough to have just any address. A duplicate address that is being used elsewhere in the Internet creates havoc. When a network expands or changes, the pool of available IP addresses may change as well. Network managers are faced with the arduous task of network renumbering because each computer is routinely assigned its own IP address. Renumbering is hard to avoid in these days of interconnected workstations and PCs.

One possible way to avoid renumbering is to not give each device its own IP address. Can that be possible? Imagine a server that doled out unique IP addresses "on loan" to workstations. When the workstation was shut off or disconnected, the IP address would be returned to the pool of available addresses. The server could ensure that each of the IP addresses was unique. If this kind of server was available, it could also configure many other client TCP/IP options. Hey! Such a client-server protocol exists today. And it's called Dynamic Host Configuration Protocol (DHCP).

DHCP stores a network's IP address inventory, gateway and subnet information in a central repository; assigning addresses "on the fly."

DHCP also provides some astonishing savings in administrative overhead. The key advantage, like other centrally administered services, is that DHCP allows you to reduce problems associated with misconfigured workstations. Because the configuration is stored at a central server, there is a single place to look for problems. Once a problem is solved for a single host, it's solved for all the workstations that use the server.

When a DHCP-enabled workstation is turned on, it uses a temporary IP address of 0.0.0.0 to continue its startup tasks. Using this preliminary address, it sends a broadcast over the network in an attempt to find a local DHCP server. Every DHCP server on the local network receives this request for service and each offers a TCP/IP packet containing a valid IP address for the workstation and related network information that the client can use.

The DHCP client selects one of the servers and then tells the server that it accepts the offer of temporary IP address and associated information. The client also can request other information along with the address acceptance. The server responds with a reminder that the address assignment has a time limit (called a lease period). Now the workstation can become a functional computer on the Internet.

## NO STATIC AT ALL

Once clients are set up for DHCP, they never have to be concerned with a "static" IP address again. The key is to have a machine available for serving up IP addresses and related information to clients thirsty for IP access. For the HP 9000 family, HP-UX has had built-in support for DHCP since version 10.10. With version 10.20, HP now boasts full DHCP server functionality. HP also supports DHCP on its recent JetDirect print servers, allowing them to obtain their configuration parameters from a central DHCP server.

Any computer workstation can now move within the office environment and reconnect quickly. DHCP avoids the reconfiguration and network access delays that come with having specific ports in a network associated with particular Internet addresses. This is especially convenient for mobile and laptop users.

Once again, we turn to the numbers: How many hours would it take to propagate a change to Internet administration information by visiting every computer in a network versus doing it just once?

*What items number high on your lists? Let Mark know at* 73740.1101@compuserve.com.

Would you like to continue to see articles on this topic?
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# new Products

## SOFTWARE

### Diamond Optimum Enhances StarGate

Diamond Optimum Systems announces release 1.4 of StarGate, a Windows GUI for MPE and UNIX operating systems. The new release supports MPE file labels and allows users to edit any file located on an MPE or UNIX server via a text editor running under Windows. Also, a user can change file, group and account attributes, and copy files between heterogeneous servers by using the GUI's point-and-click and drag-and-drop functionality.

Contact Diamond Optimum Systems, 22801 Ventura Blvd., Ste. 105, Woodland Hills, CA 91364; (818) 224-2010; diamondos@aol.com;www.diamondos.com.

*Circle 400 on reader card*

### DataWorks Corp. Adds FaxLink

DataWorks Corp. introduced FaxLink, which allows customers to fax reports directly from their DataWorks Enterprise Resource Planning (ERP) system to regional sales and other locations.

The FaxLink Enterprise Server is connected to the UNIX or Windows NT system via a printer port. Multiple fax boards may be installed in the server, depending upon volume requirements.

Contact DataWorks Corp., 5910 Pacific Center Blvd., Ste. 300, San Diego, CA 92121; (619) 546-9600; info@dataworks.com; www.dataworks.com.

*Circle 399 on reader card*

### LabWindows/CVI Available For HP-UX

National Instruments announced HP-UX run-time libraries for its LabWindows/CVI visual development software for virtual instrumentation. With the LabWindows/CVI Version 4.0 Run-Time Libraries for HP-UX, users can port code developed on Windows NT-, Windows 95- and Windows 3.1-based PCs and Sun SPARCstations to HP workstations. Users can then compile these applications using standard compilers for HP workstations.

Contact National Instruments, 6504 Bridge Point Pkwy., Austin, TX 78730; (800) 433-3488; info@natinst.com; www.natinst.com.

*Circle 398 on reader card*

### Informative Graphics Allies With Mainsoft

Informative Graphics Corp. announced an agreement with Mainsoft to port Myriad 3.1 to various UNIX platforms, including HP-UX and Solaris. By re-engineering the Myriad product as a C++ product using Microsoft Foundation Classes (MFC), Informative Graphics is able to use almost 99 percent common source code for UNIX and Windows platforms. Additionally, Mainsoft's MainWin Studio is a complete set of cross-platform development tools that enabled Informative Graphics to extend Myriad written to the Windows API onto all major UNIX.

Contact Informative Graphics, 706 E. Bell Rd., Ste. 207, Phoenix, AZ 85022; (602) 971-6061; info@infograph.com; www.infograph.com.

*Circle 397 on reader card*

### Prism Solutions Offers Prism Warehouse Directory

Prism Solutions Inc. opened its meta data directory to exchange data with repositories from Platinum Technology Inc., R&O, and with HP Intelligent Warehouse. Prism Warehouse Directory serves as the foundation for the storage and management of meta data for all of Prism's data mart, enterprise and data warehousing solutions.

HP Intelligent Warehouse is integrated with the Prism Warehouse Directory through Prism's MetaLinks. This enables HP's Intelligent Warehouse and DataMart Manager customers who manage heterogeneous access environments to have full access to the meta data stored in the Prism Warehouse Directory.

Contact Prism Solutions Inc., 1000 Hamlin Ct., Sunnyvale, CA 94089; (408) 752-1888; info@prismsolutions.com; www.prismsolutions.com.

*Circle 396 on reader card*

### Legato Systems Unveils Power Edition

Legato Systems Inc. announced a storage management product line — NetWorker Power Edition. Power Edition is dedicated to the specialized storage management requirements of very large database (VLDB) and large file system applications.

It is available for HP-UX and Solaris. Both versions support Oracle, Informix and SAP R/3 on Oracle.

Contact Legato Systems Inc., 3210 Porter Dr., Palo Alto, CA 94303; (415) 812-6000; sales@legato.com; www.legato.com.

*Circle 395 on reader card*

### Datalytics Inc. Introduces Blaze

Datalytics Inc. announced the availability of the Blaze Web Performance Pack beta. Blaze is a browser accelerator that collaborates with an xSpeed server component and delivers an increase in speed by improving efficiency. Also included in the Blaze Web Performance Pack are features for Web searching, locating and organizing.

Contact Datalytics Inc., 33 W. First St., Dayton, OH 45402; (937) 226-7700; info@datalytics.com; www.datalytics.com.

*Circle 394 on reader card*

### Parker Software Offers SNA Client For UNIX

Parker Software announced the SNA Client for UNIX is now available for downloading. SNA Client (developed under license from Microsoft) allows a UNIX system to use Microsoft's SNA Server as a gateway to IBM host systems, eliminating the need for UNIX-based SNA stacks. Versions are available for 10 different UNIX platforms including HP-UX, Solaris, AIX, SCO, NCR, UnixWare and Digital UNIX. Price is $1,495.

Contact Parker Software Inc., 108 E. 31st St., New York, NY 10016; (212) 843-0140; sales@parkersoftware.com; www.parkersoftware.com.

*Circle 393 on reader card*

## SMG Announces DBridge 1.0

Stanford Management Group Inc. (SMG) released DBridge 1.0, which guides and manages the design, implementation and documentation of data migration projects by providing a graphical data migration bridge development environment.

DBridge is a native Win32 product available for Windows 95 and Windows NT. Source and target databases supported by DBridge include binary flat files, text-delimited flat files and ODBC-compliant relational databases such as Oracle, Sybase, NT SQL Server and Redbrick.

Contact Stanford Management Group, 650 Castro St., Ste. 270, Mountain View, CA 94041; (415) 903-9591; info@stanford.com; www.stanford.com.

*Circle 391 on reader card*

## Insignia Solutions Showcases Keoke Technology

Insignia Solutions announced its Keoke technology, which allows Java desktops to access and run Windows applications, with a beta version of its NTRIGUE Client for Java now available on the Web. Based on the company's open and portable Keoke technology, the NTRIGUE Client for Java allows all Java-supported platforms and browsers to run actual Windows applications.

Insignia's Keoke technology is essentially a "thin" version of the standard X Window System graphics protocol, which was designed and optimized for distributing graphics over a network. Keoke employs a subset of the X protocol and is optimized for distributing graphics over a LAN/intranet to Java desktops. The NTRIGUE Client for Java is a Java applet that can be transparently downloaded from an NTRIGUE server to any Java desktop.

Contact Insignia Solutions Inc., 2200 Lawson Lane, Santa Clara, CA 95054; (800) 848-7677; ntrigue@isinc.insignia.com; www.insignia.com.

*Circle 389 on reader card*

## Cambar Adds Bilingual Capabilities

Cambar Software announced the addition of foreign language functionality to their top-tier Client/Server Warehousing (CSW) software system. The first version is designed specifically for the French and Canadian markets.

With the new language enhancement, CSW enables warehouse employees to obtain information in an English or French format.

CSW is offered in multiple configurations with HP 9000, RS/6000, Digital Alpha, Sun Solaris, AS/400 or PC platforms functioning as the database server. PCs or RF devices can serve as clients. CSW can be configured for UNIX, Windows NT and OS/2 on the server platform. Databases supported include Oracle, IBM's DB/2 software line and Microsoft's SQL Server. Pricing starts at $150,000 and varies based on configuration.

Contact Cambar Software, 4975 LaCross Rd., Charleston, SC 29406; (803) 747-4900; cambar@awod.com; www.cambarco.com.

*Circle 388 on reader card*

## VirtuFlex Launches Application Template-Paks

VirtuFlex Software Corp. announced ready made templates which are available with VirtuFlex 1.1. Web developers can customize and combine the pre-built Template-Paks to create sophisticated Web applications. The available templates bundled with VirtuFlex 1.1 are: Product Database, Shopping Cart, Threaded Discussion Group, Survey and Voting,


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VirtuFlex runs on standard UNIX workstations with 8MB RAM minimum, 16MB recommended.

Contact VirtuFlex Software Corp., 930 Mass. Ave., Cambridge, MA 02139; (617) 497-8006; comments@virtuflex.com; www.virtuflex.com.

*Circle 390 on reader card*

## HP Certifies VisualWave 2.0

ParcPlace-Digitalk Inc. announced HP certification of VisualWave 2.0 for use with HP's VirtualVault software. Used together, VisualWave and VirtualVault provide corporations with rapid Web application deployment and security for Web transactions.

VisualWave 2.0 supports JavaScript, Java, ActiveX and VRML. It also features support for smartHTML (including HTML framesets), delivering dynamic HTML generation that provides users with browser independence.

Contact ParcPlace-Digitalk Inc., 999 E. Arques Ave., Sunnyvale, CA 94086; (408) 481-9090; info@parcplace.com; www.parcplace.com.

*Circle 384 on reader card*

## Bluecurve Ships Dynameasure 1.5

Bluecurve Inc. shipped its Dynameasure 1.5 product family.

Dynameasure for File Services offers over 50 tunable file tests based on file work that users typically perform. Dynameasure for File Services is $2,495, which includes 25 File Service Test Client Motors.

Dynameasure for SQL offers tunable OLTP, SQL tests with support for Oracle7 Server and Microsoft SQL Server. Dynameasure for SQL is $4,995, which includes 25 SQL Test Client Motors and one Dataset.

Dynameasure Enterprise supports concurrent testing of multiple Windows NT services. It allows emulation of concurrent stress scenarios for SQL and file service workloads across multiple Windows NT servers. A Dynameasure Enterprise license is $29,995, which includes licenses for one Manager to manage and monitor tests, 100 Test Client Motors each for SQL and File Services, one Dataset for SQL requests, and one Dataset for File requests.

Contact Bluecurve Inc., 2101 Webster St., Ste. 1690, Oakland, CA 94612; (510) 267-1500; sales@bluecurve.com; www.bluecurve.com.

*Circle 385 on reader card*

## Masterpack Int'l. Extends MasterNotes Gateway

Masterpack International announced MasterNotes Gateway, a toolset that enables integration between Lotus Notes, core back-end business systems and the Internet.

MasterNotes Gateway provides seamless information exchange between back-end transactional business application systems, such as Masterpack Business Solutions, and Lotus Notes, allowing data to be read, written or deleted in either direction, without the need to "normalize" or translate the data.

MasterNotes Gateway is available for any uniVerse or Unidata system, and is priced at $30,000 plus maintenance for one Notes (Windows NT) Server.

Contact Masterpack International Inc., 5901-A Peachtree Dunwoody Rd., Ste. 275, Bldg. A, Atlanta, GA 30328; (770) 671-8690; www.masterpack.com.

*Circle 387 on reader card*

## Integration Services For HP's MC/ServiceGuard

CLAM Associates announced systems design and implementation services for HP MC/ServiceGuard high availability business application environment.

MC/ServiceGuard organizes multiple nodes or systems into an enterprise cluster to deliver highly available application services to LAN-attached clients. Enterprise clusters provide high availability, flexibility of configurations, workload balancing and data integrity protection, but designing and implementing such environments often require skills and expertise that is not always available in-house.

Under CLAM Integration Services for MC/ServiceGuard, specialists from CLAM Associates conduct a planning session to develop a detailed operational assessment of specific customer requirements. Following this planning session, where response plans are identified for each possible system failure, a functional specification and testing plan are developed. A test cluster incorporating the MC/ServiceGuard software is assembled and used as a platform for developing and testing the operating environment proposed in the functional specification. The use of this "staging" cluster minimizes the development and test time required on the customer's systems. CLAM Associates can further assist the customer with the periodic evaluation of the integrity of the cluster and provide change management recommendations.

Contact CLAM Associates, 101 Main St., Cambridge, MA 02142; (617) 621-2542; marketing@clam.com; www.clam.com.

*Circle 371 on reader card*

# HARDWARE

## ODS Delivers InfiniteSwitch Family

Optical Data Systems (ODS) Inc. announced the InfiniteSwitch series, designed to provide full featured switched Ethernet and Fast Ethernet solutions, connected through a variety of ATM, FDDI and Fast Ethernet options.

The InfiniteSwitch provides universal switched connectivity to all devices and segments in the network. The switch is built around a series of ASICs that allow wire speed bandwidth to be delivered to every port without the need for a central processor or shared memory module.

Contact Optical Data Systems Inc., 101 E. Arapahoe Rd., Richardson, TX 75081; (888) ODS-7770; dang@ods.com; www.ods.com.

*Circle 383 on reader card*

## Extended Systems Releases ExtendNet MIO

Extended Systems announced a multiprotocol, internal print server for Token Ring networks. ExtendNet MIO provides a direct Token Ring network connection for an HP MIO printer plus an additional parallel printer. The product slides into the MIO slot of an HP LaserJet printer and allows customers to attach an additional parallel printer. ExtendNet MIO ESI-2826 costs $549.

Contact Extended Systems Inc., 5777 N. Meeker Ave., Boise, ID 83713; (800) 235-7576; info@extendsys.com; www.extendsys.com.

*Circle 382 on reader card*

## Interface Systems Releases 9400 Line Matrix Printers

Interface Systems Inc. announced the 9400 Line Matrix Printer Family, which prints from 475 and 800 lpm on the pedestal models to 475, 800 and 1200 lpm on the

cabinet models. Optional packages give a choice of PGL, VGL and IPDS graphics languages, as well as an ANSI 3.64 Enhanced emulation.

Contact Interface Systems Inc., 5855 Interface Dr., Ann Arbor, MI 48103; (800) 544-4072; sales@intface.com; www.intface.com

*Circle 381 on reader card*

## MicroTech Adds Freud

MicroTech Conversion Systems announced Freud, an eight-speed media analyzer/tester that is fully integrated with its ImageMaker CD-R duplication system.

With Freud, data on CDs can be verified and analyzed on the same drive, providing a log of block error rates for correctables and uncorrectables. Up to eight Freud drives can be added to the standard ImageMaker CD-R system. For one drive, with attendant software, PC board and cabling, Freud costs $5,000. Additional drives are $3,000 each.

Contact MicroTech Conversion Systems, 2 Davis Dr., Belmont, CA 94002; (415) 596-1900; info@microtech.com; www.microtech.com.

*Circle 376 on reader card*

## Axis Communications Offers MIO Print Server

Axis Communications announced two new products within its network print server family — the AXIS 570 and AXIS 670 MIO print servers (internal cards) for Ethernet and Token Ring, respectively. Based on the external AXIS 570 and AXIS 670 print server, the high-end MIO print server plugs directly into HP printers and adds functionality to HP printers beyond normal operations of MIO print serves.

The AXIS 570 MIO print server for Ethernet costs $699, and the AXIS 670 MIO print server for Token Ring costs $799.

Contact Axis Communications, 4 Constitution Way, Woburn, MA 01801; (800) 444-AXIS; info@axis.com; www.axis.com.

*Circle 380 on reader card*

## Texas ISA Produces Intelligent Hub 7500

Texas ISA, a division of ISA Co. Ltd., announced a new Intelligent Hub 7500 Series which provides complete power control, power protection and 10BaseT hub support in a single compact unit.

Features: controls up to nine systems individually with optional Expansion Unit; graceful server shutdowns and reboots; power control for peripherals such as routers and disks; UPS support; SNMP management support; password security; eight port 10BaseT hub; and TCP/IP (remote shell) protocol.

Contact Texas ISA Inc. 14825 St. Mary's Lane, Ste. 250, Houston, TX 77079; (713) 493-9925; info@texasisa.com; www.texasisa.com.

*Circle 375 on reader card*

## HT Communications Updates LineMinder

HT Communications announced a new LineMinder CSU/DSU for connecting SNMP-managed LANs to WAN facilities. The unit features a built-in 10BaseT Ethernet port through which network administrators can access its embedded SNMP agent over the LAN to bring the wide area links under SNMP control as well.

LineMinder operates on 56 or 64Kbps clear channel leased lines. Price is $795.

Contact HT Communications, 4480 Shopping Lane, Simi Valley, CA 93063; (805) 579-1700; sales@htcomm.com; www.htcomm.com.

*Circle 374 on reader card*

## Mosaic Announces Golden Gate

Mosaic Technology Corp. announced the Golden Gate family of tape backup and recovery systems. It supports Quantum DLT tape technology, Exabyte 8mm (including the Mammoth tape transport), 4mm DAT technology and 3490E 1/2-inch 36-track tape technology. It can be used on HP, IBM AS/400 and RS/6000, Sun, Digital, SGI, Novell and Windows NT.

Contact Mosaic Technology Corp., 8A Industrial Way, Unit 3, Salem, NH 03079; (603) 898-5966; tjdmt@ibm.net.

*Circle 378 on reader card*

## Printek Offers Tri-Trak Printer

Printek announced the availability of a high-speed forms printer that permits three continuous forms to be loaded at all times,


**New From HP**

**Enhancements to High-Availability Products and Services —** HP enhanced its MC/ServiceGuard UNIX system clustering product. MC/ServiceGuard has been coupled with HP Domain Enterprise Server and HP Domain Enterprise Server XE. The latter includes integrated Web technology from Informix Software Inc. and Netscape Communications Corp. HP Domain Enterprise Server is available today. Prices start at $7,995.

HP Network Connection Policy Manager joined HP's suite of cluster management tools. The policy manager allows balancing of client connections within a cluster. It starts at $1,000.

HP also announced upcoming features to its high-availability solution set. HP's enterprise clusters, MC/ServiceGuard and MC/LockManager are slated to support special "campus cluster" configurations. Campus clusters are special long-distance clusters using Fibre Channel technology within an enterprise cluster environment. MC/ServiceGuard campus cluster solution starts at $6,000.

In addition to the newly delivered Network Connection Policy Manager, HP intends to extend its cluster-management leadership with the introduction of a new version of HP ClusterView. HP ClusterView directly detects and monitors key cluster components, providing a single point of control for distributed clusters via the industry's only map-based interface. The enhanced version of HP ClusterView starts at $1,500.

**1000CX Palmtop PC Upgrades —** HP introduced a 2MB model of the HP 1000CX palmtop PC, enhancing the capabilities that allow users greater power for memory-intensive applications.

The upgraded palmtop PC comes with MS-DOS 5.0. In addition, the HP 1000CX palmtop PC includes LapLink Remote, which allows for migration of existing MS-DOS applications on a desktop or laptop computer to a palmtop PC.

The new model with the 2MB upgrade allows users to run memory-intensive applications to meet the demands of users who require that these applications reside on their palmtop PCs. The increased memory allows users to release the expansion slot of the palmtop PC for communication purposes.

The HP 1000CX palmtop PC is $499.

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

# PRODUCTshowcase

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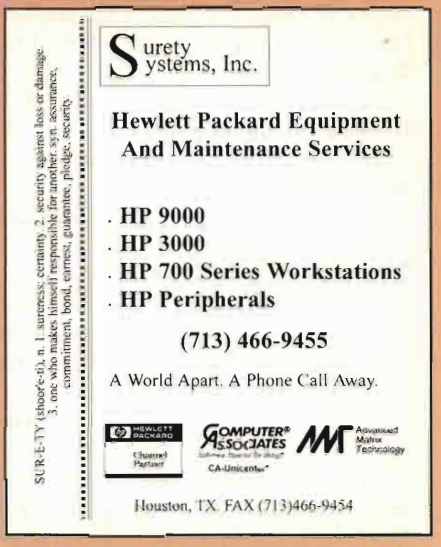
CIRCLE 233 ON READER CARD




CIRCLE 226 ON READER CARD


## new products

allowing the replacement of three dedicated printers with just one printer.

The Tri-Trak printer is compatible with Windows 3.1, Windows 95, Windows NT, AS/400 and LAN systems. Out-of-the-box bar coding is standard with Printek printers and IPDS with Advanced Function Printing (AFP) is available. The Tri-Trak printer also offers autoport switching between the Twinax/Coax and Parallel ports.

Contact Printek, 1517 Townline Rd., Benton Harbor, MI 49022; (800) 368-4636; info@printek.com.

*Circle 373 on reader card*

### Procom Unveils LANForce Millennium

Procom Technology introduced the LANForce Millennium, a new RAID subsystem featuring Internet-based storage management capabilities that enable it to collect data from throughout the enterprise over a direct-to-subsystem TCP/IP Ethernet connection. It combines Procom's RAID technology with a complete suite of Internet protocols, including a Web http server, SNMP agent, Telnet server, SMTP e-mail and TCP/IP stack.

It is available in either tower or rack-mount configurations. Prices start at $5,995.

Contact Procom Technology, 2181 Dupont Dr., Irvine, CA 92715; (714) 852-1000; info@procom.com; www.procom.com.

*Circle 377 on reader card*

CIRCLE 283 ON READER CARD

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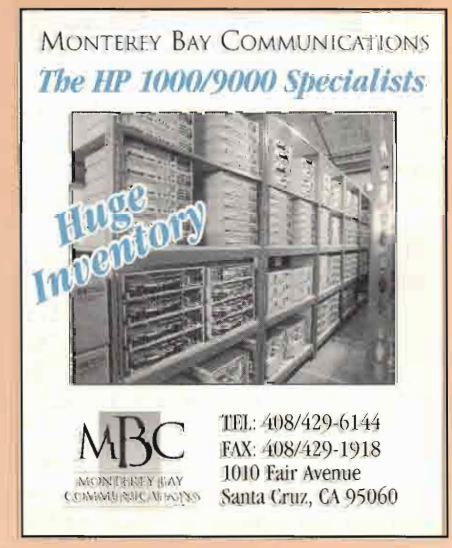


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# Alas, Poor Robert!

**John Cleese**
Actor, Director
and Author

Dealing with a truly awful employee really isn't as difficult as you might imagine. Assuming the offending individual is not a blood relative of either your boss or your spouse, you simply implement a workforce deployment readjustment. You know, create an indefinite noncompensation agreement? Insert an End Of File character in their employee database record? OK then, in plain English — you give 'em the boot!

But what if, like the subject of a Shakespearean tragedy, the employee has much to contribute but suffers from a single Fatal Flaw. I'm not sure even the most skillful executive could have saved Hamlet or Macbeth, though it could be argued that Lear suffered a predictable outcome when the generational transition of a family business is poorly managed. However, if the flawed individual is neither prince nor king but, let's say, young Robert from the IT department, then you can do much to remedy the situation before resorting to a quick poke with a poisoned sword.

There is an underlying principle at work here — your employee's behavior is a response to your behavior. By changing your approach, you force the employee to adjust his or her response patterns. Take the aforementioned Robert. He's a bright young man who delivers outstanding work — when he delivers, that is. You see, Robert is chronically late meeting deadlines. He takes on a great deal, absolutely commits to doing it all and then falls grievously short of the mark. What constructive steps can you take in this situation? Begin by considering whether you are giving Robert too much to do in the first place. When a forceful manager orders an employee to double, double his toil and trouble, it's difficult indeed for the employee to shout, "Nay, you shag-hair'd villian."

Often the most important part of management isn't telling someone to do something, but making sure he or she is able to do it. In dealing with Robert, encourage realism rather than optimism in discussing assignments. Show him it isn't a sign of weakness to accept a reasonable workload. While you're at it, explain the reasons behind the tasks you're assigning. This will provide an incentive for him to take on only what is really going to get done, and to deliver on those tasks. In dealing with Robert, you need to set deadlines. And those deadlines must be specific and mutually understood. In fact, it's best to have witnesses to your deadline agreement. Perhaps you should put it in writing in a memo.

## TAKING ON TRAGIC PROPORTIONS

Finally, on long-range projects, agree to review his progress at regular intervals. By establishing interim deadlines to discuss his progress, you keep him to the agreed-upon schedule and make sure any problems that do arise are brought to your attention in a timely manner. If you don't keep on top of Robert's work, problems can mushroom out of control and before you know it Polonius has taken a dagger through the boardroom curtain, Ophelia is tripping through the typing pool strewing daisy petals all over the laser printers, and neither Rosencrantz nor Guildenstern returns your calls.

Perhaps you would like to reach in between an employee's ears and rewire their personalities, but synapses and neurons are even trickier to work with than fiber-optic cable. And most organizations frown on having managers fingering employee brains. Let's agree that changing personality is next to impossible, and focus our attentions instead on changing behavior. That is a realistic goal, achieved by looking at your own behavior, identifying the elements that encourage your employee's weaknesses, and changing your approach to encourage their strengths instead.

*—John Cleese, is a founder of London- and Chicago-based Video Arts (800-553-0091), a provider of business video titles such as "Managing Problem People" and self-study CD-ROM-based business training programs.*

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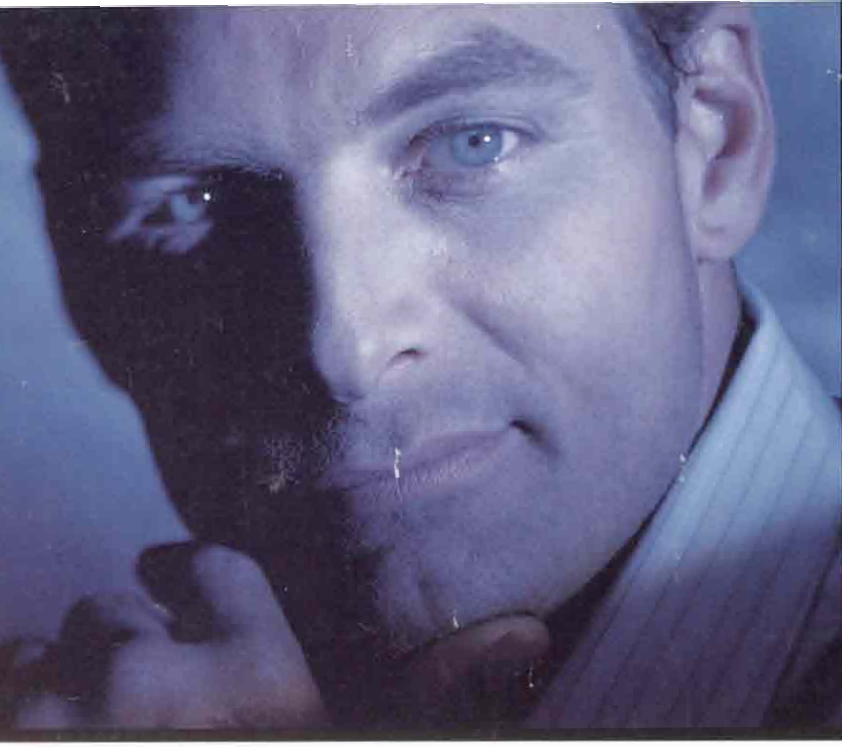

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