

HP Professional

THE INDEPENDENT MAGAZINE FOR NEWWAVE COMPUTING ▲ VOL.5 NO.12

▲ DECEMBER 1991 ▲

NEW WAVE

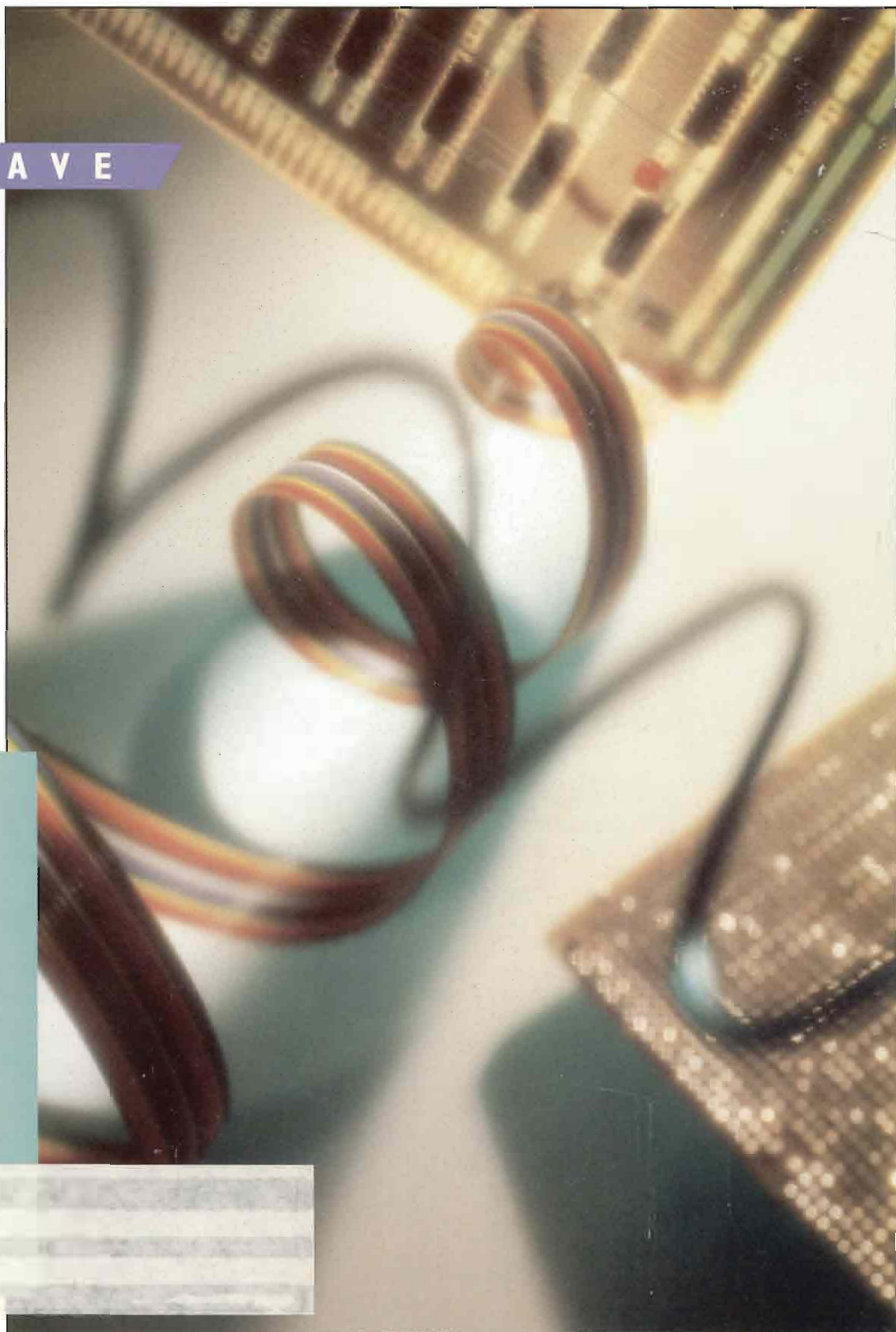
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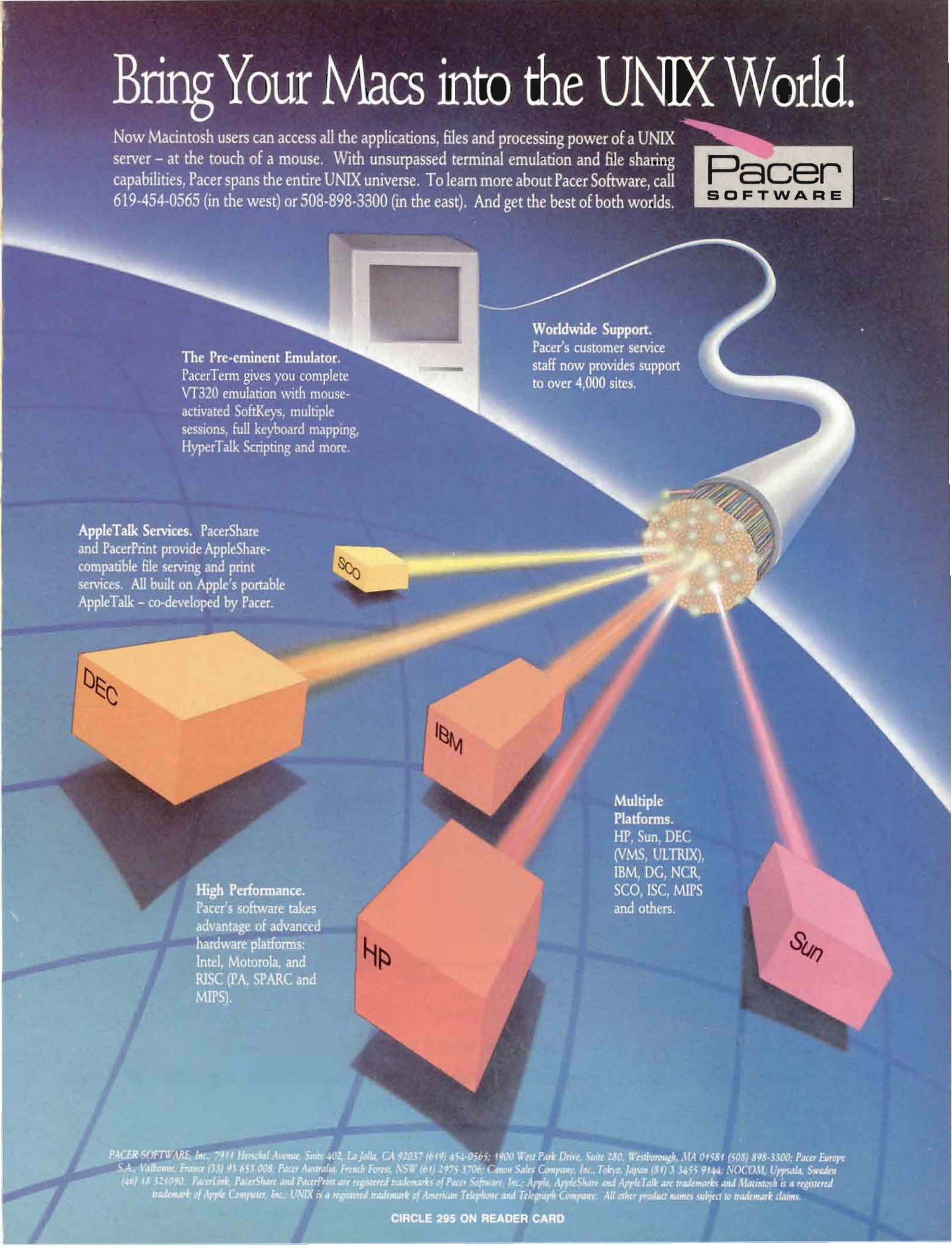
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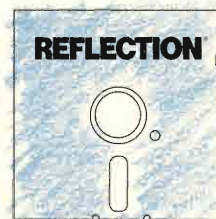
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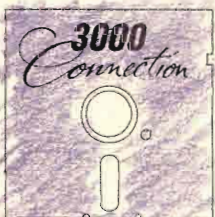
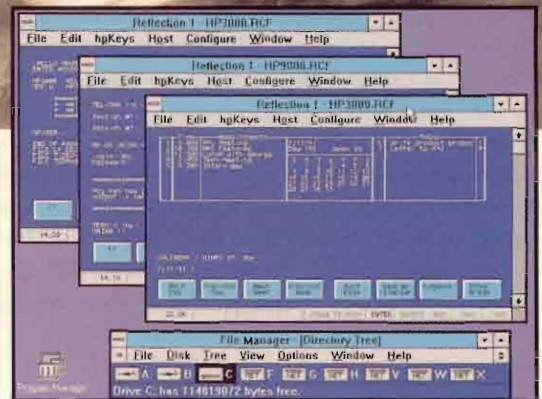
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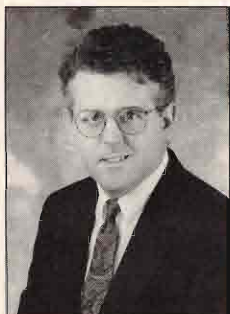
From

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"Making your PC connections count"

CIRCLE 127 ON READER CARD

The Baton Passes



By Grant Evans

As I write, I am just 24 hours away from my official indoctrination in the HP market. The folks in Cupertino and Mountain View have been kind enough to open their doors for a few days to bring me up to speed with the latest developments in commercial UNIX, HP-UX, mainframe downsizing, support, and strategies for the HP 3000 and 9000 product lines. It should be a real eye-opener for someone with my background.

You see, before succeeding Don Marks as managing editor of *HP Professional* in mid-October, I spent three years as a news editor with another Professional Press publication, *MIDRANGE Systems*, a biweekly covering the IBM Systems/3X, AS/400 and RS/6000 markets. I joined the *MIDRANGE Systems* staff shortly after the introduction of the AS/400, which has since propelled IBM's Application Business Systems (ABS) division into a \$14 billion-a-year proprietary orbit. If it stood alone, ABS would be the world's second-largest computer company — second to only IBM itself.

Now I'm embarking on a trek through a market where the concepts are a bit different — object-oriented programming, client-server computing, UNIX, HP-UX, multivendor connectivity — many of which sound like Latin to true-blue IBMers. I've been lucky enough, however, to cover HP from time to time in my previous position, and so these concepts aren't so foreign to me. Still, there will be lots to learn on the West Coast trip.

Anyone covering or analyzing IBM these days can't help but pay a lot of attention to HP. Aside from making serious inroads into IBM mainframe shops, HP systems have stolen a bit of IBM's RISC thunder with new levels of price/performance in the commercial UNIX arena. Earlier this year at the AIX Expo in Santa Clara, IBM finally admitted that its popular RS/6000 line of workstations and servers is targeting commercial sites. HP's leadership position in the commercial UNIX market and introduction of the 700 Series systems are partly responsible for this admission. After all, you won't sell many commercial UNIX systems if you keep calling them engineering workstations.

It's an exciting time to be covering the HP market. During the first weeks of my tenure with *HP Professional*, Hewlett-Packard has made several major announcements which should set the pace for the coming year. First was HP OpenODB, an

advanced, commercial object-oriented DBMS for large, multiuser environments. Next there was the landmark alliance with Computer Associates, which will bring mainframe-class systems management software to commercial UNIX users. And most recently, HP introduced its Open Software Environment, a non-vendor oriented consulting program designed to help customers develop a "road map" to open systems. (See *News & Trends* for more on all of these developments.)

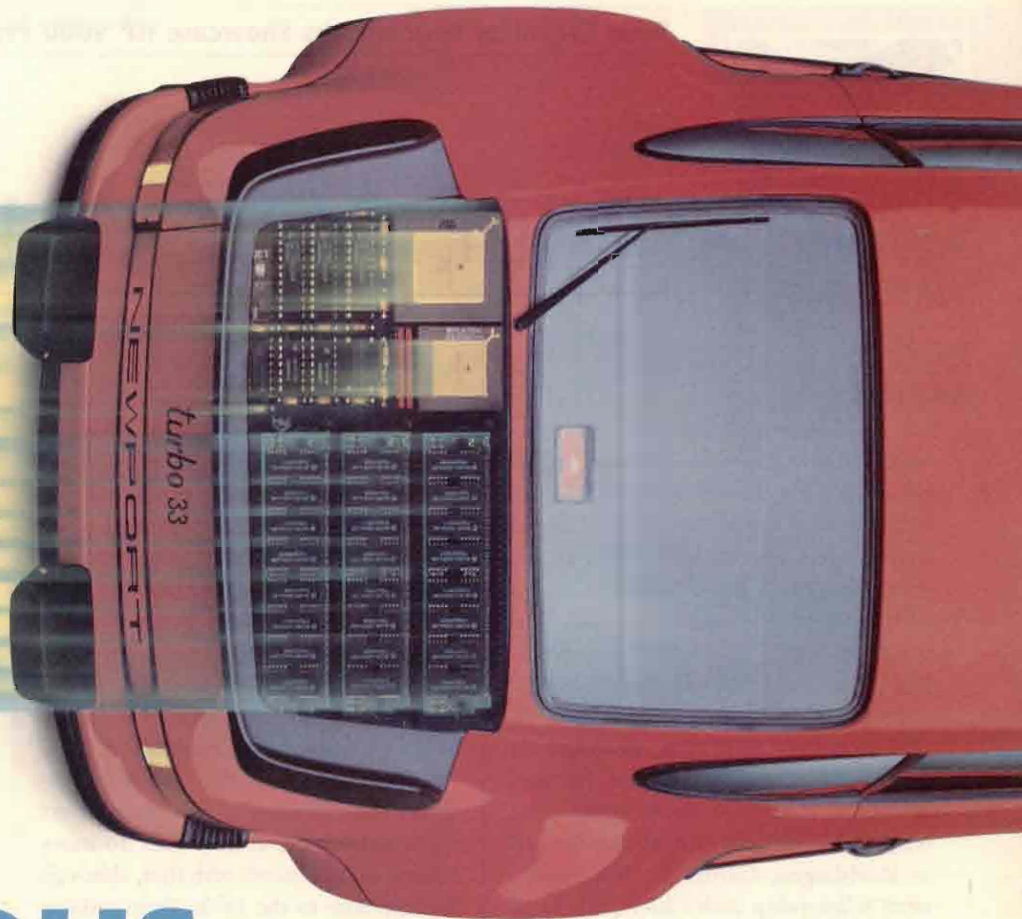
And from what we're told, there's more to come — plenty more. It's been a banner year for HP, and they're bringing it to an end with a flurry of announcements covering hardware, software, peripherals and support services. We will bring you these developments as they unfold.

We will work hard to present you with timely analysis of the issues that matter most in this market, while maintaining the level of editorial excellence you've come to expect from *HP Professional*. In 1992, we will publish quarterly supplements covering such areas as workstations (in this issue), downsizing, and a variety of strategic topics. So it ought to be a good year for *HP Professional* as well.

In the mean time, I encourage you to keep in contact with us. Let us know when we're hitting the right buttons, and when we're not. After all, you are the buyers and users of these systems; and while we may have a nice vantage point from which to survey the market, we need your valuable, hands-on insight to set things into perspective.

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CIRCLE 246 ON READER CARD



**INDUSTRY
WATCH/EUROPE**

**By Marsha
Johnston**

With Flying Colors

In runs of a suite of four production code benchmarks from CERN, the European center for particle physics research, the HP 9000 Models 720 and 750 achieved higher average performance ratios than all the competing machines except the Cray Y-MP, Amdahl 5990 and NEC SX-2. The machines bested by the 9000 include the VAX 9000, IBM 3090-400 and IBM RS/6000 Model 550.

The battery of 12 tests was originally run on the 720 in February by Michael Wenig, a consultant in HP's European Marketing Center for Computer Systems in Boeblingen, Germany. "We have a close relationship with CERN, due to all of the [Apollo DN]10000 boxes they have, and they were curious to see how the new [9000] machines would perform with their benchmark," says Wenig of the test that was arranged through HP in Geneva, where CERN is located.

A Better Yardstick

The average performance ratio, geometric mean, was calculated using the results of four of the tests—CRN3, CRN4, CRN5 and CRN12. The first two are Monte Carlo event simulations and the last two event processing programs. "The four production tests are almost entirely scalar, since we feel that scalar performance is of prime importance," says Eric McIntosh, Cray and Ultrix support manager in CERN's computing and network division. "Scalar speed is bottom line. Even if you vectorize 90 percent, you still have 10 percent that drives execution speed. Scalar speed determines running time. The other tests are used to probe for strengths and weaknesses of a particular system, and CRN7 is used to get an

idea about vectorization and vector performance."

The four test applications, says McIntosh, are not easily optimized. "Unlike a lot of scientific applications, they are not 99 percent floating point, for example. They tend to be floating point intensive over large arrays. They are data intensive, with lots of data manipulation, IFTHENS. The tests spend only about 15 percent of the time on floating point operations, with the rest on scalar memory references and branching. There's a lot of pattern recognition, too."

One thing about the CERN benchmarks, says Wenig, is that they reflect applications more closely than do many other tests. McIntosh adds that, although the tests date to the 1970s, their makeup still characterizes the work scientists are doing today at CERN. "That's why the benchmarks are meaningful to us," he says.

When McIntosh arrived at CERN in the '70s, the benchmark used an IBM 370/168 as the base level unit of computing. "[Since] you couldn't find one [IBM 370/168] anywhere in the world, we made the test more portable and redefined one unit as for the VAX 8600, and the results were almost identical with IBM," he says.

Using the results for the VAX 8600 as the base level for the benchmark is one thing that needs to be changed, says McIntosh. One reason is that the VAX price/performance is relatively poor, he says. The other reason has to do with the realities of the modern computing environment. "In the past it never was a big problem because the results of the test didn't vary; one number would categorize a machine's performance over a wide range of applications," he explains. "But we're beginning to see a much bigger variance on the test times, more appli-

cation dependent performance. The other complication is that the applications date way back; today the events are much more complicated."

If McIntosh's group updated the tests, he notes, the results "probably would look a bit slower. We're probably overestimating the performance of our machines on the applications."

The Results

Overestimation or not, McIntosh says of the 720's run of the benchmark: "As far as we're concerned, it's a new level of price/performance on the 720; never mind the 730, the 720 is already there."

HP's Wenig used the 720 because in February it represented the high end of the 9000 line. Running HP-UX Release 8.01 and the FORTRAN 77 compiler, the Model 720 posted the following results (For each test, the two numbers show running time in cpu seconds and the ratio of how much faster or slower it was than the VAX 8600):

```
CRN3...82.7/9.3
CRN4...5.9/8.3
CRN5...61.6/9.3
CRN12...47/13
Geometric Mean=9.8.
```

The IBM RS/6000 Model 550, running AIX and the xlf compiler, had the following results:

```
CRN3...59.6/12.8
CRN4...5.8/8.45
CRN5...73.9/7.73
CRN12...48.5/12.8
Geometric Mean=10.2.
```

Says McIntosh, "HP looks like a good machine to have around for the kind of events processing we're doing. There's not too much [software] history there; it runs OSF UNIX." He adds that since the HP 9000 Model 720 costs much less than the RS/6000, an IS organization could

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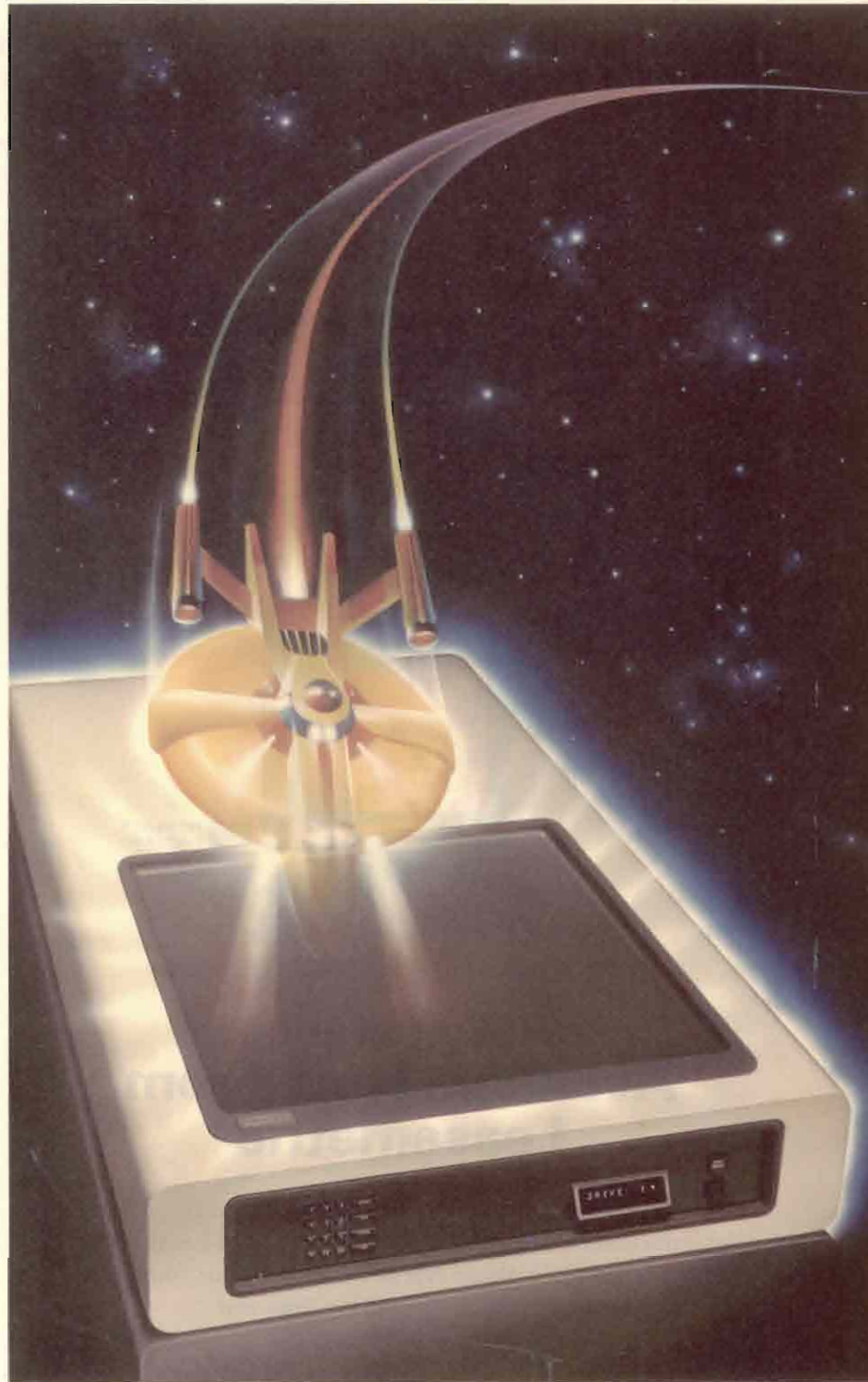
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CIRCLE 162 ON READER CARD

"buy one IBM for the guy that wants to do matrices, and everybody else can be perfectly happy running HPs."

He cautions, however, that the HP has a relatively large difference between the best result and the worst result. "I'd say it's a 10.5 system, but a user could see

and eight or a 13, depending on the application," he says.

One More Time

In a rerun of the four tests on an HP 9000 Model 750, which Wenig undertook specifically for *HP Professional*, the range

was even wider, but the average performance ratio was about one-third higher. Running HP-UX Release 8.05 with HP's latest FORTRAN compilers, the Model 750 got the following results:

```
CRN3...41.8/18.3
CRN4...4.5/10.9
CRN5...47.9/11.9
CRN12...37.4/16.6
Geometric Mean = 14.1.
```

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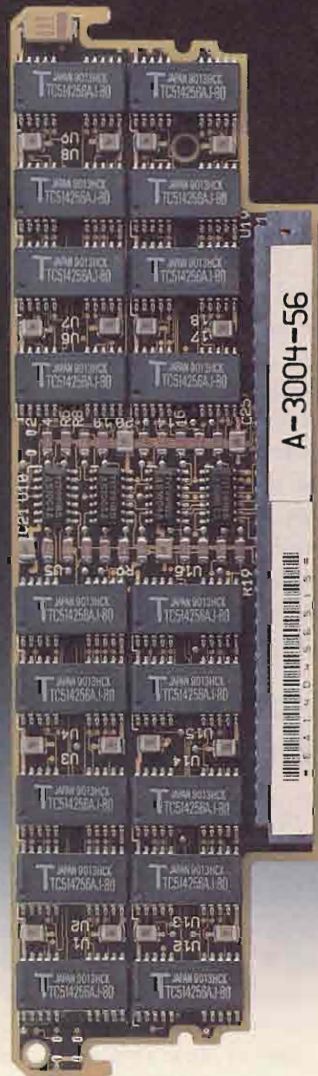
On the second run of the benchmark, Wenig says the Model 750's linear speed increase of greater than one-third could not be attributed solely to its higher clock rate (66 MHz versus 50 MHz on the Model 720). Some of the speed must be due to improvements in the FORTRAN compiler technology, he says.

Two of the 12 tests required changes to the source code due to extensions to the ANSI FORTRAN 77 standard that were provided in the compilers used by CERN in development. "The CERN benchmarks came from the Apollo Domain environment, where the compiler had additional extensions to the ANSI FORTRAN 77 standard, which the HP-UX compiler didn't have. It was something that was inherent in the code, file handling," Wenig says.

So, in the second run of the benchmark on the 750, Wenig says, he changed the source code files for those two tests. "It's a really minor thing," he explains. "It has to do with where you place certain statements in the source code and whether, if you are doing unformatted and formatted I/O on the same file, you have to do a close and reopen again or not." On CRN8, for example, a real code before the implicit real statement, something that is non-standard and that the HP compiler does not like.

"Some compilers are more generous, others more strict," he says, adding that the machine on which CERN did the original development allowed those kinds of things. Recognizing them as posing potential compatibility problems on other machines, Wenig says, CERN provided instructions on how to change the source code, which was not a difficult task. ■

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HP Takes To The Open Road With OSE

New Program Helps Customers Draw "Roadmap" To Open Systems

HP last month introduced its Open Software Environment (OSE), a new program of consulting services designed to help customers develop a customized plan — or roadmap — for implementing open systems. The program includes a framework for developing an open software architecture, customer-specific design guides, and guidelines for selecting both standards and products.

"OSE's about planning, and planning it right," says HP's Julie Dunlap, marketing manager for the program. "Therefore, it provides more value to the customer than a hurried, outright selection."

Through the OSE program, top consultants from HP's recently formed Professional Services Division (PSD) assist customers in drawing roadmaps tailored to meet their specific business needs and enhance their competitive stance. The program addresses typical obstacles encountered in such moves, such as leveraging existing hardware and software; selecting appropriate standards and products; integrating software; establishing vendor in-

dependence; and incorporating new technologies as needed.

HP stresses the major difference between the OSE approach and vendor-specific directives offered by its major competitors.

"It's a totally open approach," says Laura Cory, director of marketing for HP's networked systems group. Cory characterizes the OSE program as pragmatic when compared to DEC's NAS and IBM's SAA, where there are often considerable time lags between a stated direction and the availability of products to support them.

Cory notes that the implementation of open systems is becoming an increasingly complex and expensive undertaking. While open systems implies independence from a particular platform, many IS managers are finding themselves stuck with a single vendor and, in turn, locked in a vendor-dependent environment that cannot deliver the benefits of truly open systems.

In contrast, the OSE program allows customers to select and implement the stan-

dards and products that best fit their business needs — regardless of whether those products are from HP or not. The program provides for open systems solutions on all HP and non-HP platforms that support open standards and products. On the HP side, both the HP 9000 and HP 3000 are supported.

According to Cory, the

target customers for the program are those Fortune 500 companies who want to make the move to open systems, and need someone to help them make the move. Such organizations will typically operate in a multivendor environment, with emphasis placed on application development. — *Grant Evans, Managing Editor*

Computer Associates Throws Its First UNIX Punch

HP-CA Alliance Brings Coveted Systems Management, Development Tools To UNIX

Computer Associates (CA), which in January announced its intention to enter the UNIX-based software market, chose this year's UNIX Expo in New York to introduce its first major UNIX products.

The highly-hyped rollout featured a dozen products including systems management, database and information management, and business applications for several hardware platforms. All of the products run under HP-UX, as part of the alliance between HP and CA.

Perhaps most significant among the products announced by CA was CA-UNICENTER for UNIX, the fulfillment of the cooperative development agreement with HP announced in January. CA-UNICENTER brings CA's considerable systems management prowess to commercial UNIX environments — providing enhanced automation, cost control and data integrity.

"There has been a obvious lack of systems management products in commercial UNIX environments," says

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HP's Steve Crimi, value added business manager, general systems division. "Bringing CA-UNICENTER to HP-UX not only provides HP customers with the leading systems management solution, but gives Computer Associates access to the rapidly growing UNIX market."

HP is counting on the in-

troduction of CA-UNICENTER for UNIX to help the company extend its lead in the commercial UNIX market. CA-UNICENTER for UNIX will be available in the first quarter of 1992.

CA-UNICENTER for UNIX addresses fundamental requirements of systems management, including auto-

mated storage management; automated production control; security control and audit; data center automation; and performance measurement and accounting.

CA also introduced a set of application development and client-server tools built around CA-DB for UNIX-based platforms, including

HP-UX.

To round out the suite of UNIX offerings, CA introduced a set of human resource applications. Personnel, payroll and flexcomp modules will be available for HP-UX, NCR/3000, IBM RS/6000 and RISC Ultrix systems by the end of the year. — *Grant Evans, Managing Editor*

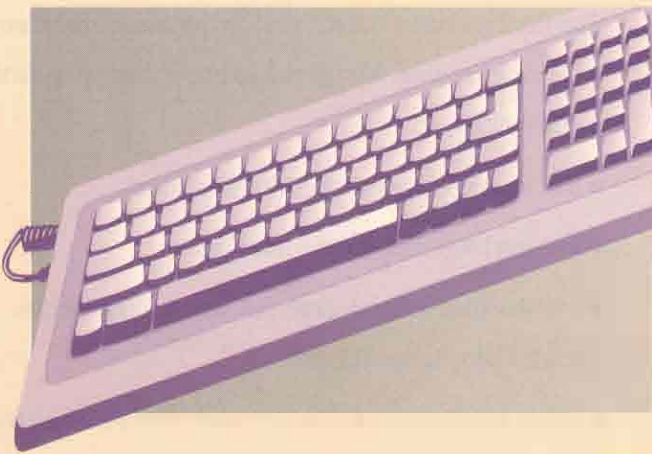
HP Unveils Industry's First Object-Oriented Database

Large Installations Benefit From Simpler And Less Costly Application Development

This month HP becomes the first major computer vendor to ship an object-oriented database management system (ODBMS). The product is intended for large, (500-plus user) client-server customers who will develop their own applications on the database.

Object-oriented databases offer significant advantages to users with very large and complex applications. HP's OpenODB promises to make development of such applications much simpler and less costly to design and maintain. Also noteworthy is that this announcement comes from a major systems vendor. Other introductions of ODBMS systems to date have been from smaller firms.

Doug Dedo, marketing manager for HP's network and object-oriented database programs, says OpenODB consists of a complete object shell that envelops the relational database serving as its data storage device. By creating a complete object-oriented shell rather than object extensions to a relational database, HP has managed to produce a product that is for



all intents and purposes a full ODBMS for very large installations, something that might have taken much longer to deliver to the marketplace using other methods.

Comparing relational systems using object extensions with an ODBMS, Dedo says object extensions are "Rather like putting a Rolls Royce front end on a VW bug and trying to pass it off as a hand-made, \$100,000 car." Dedo predicts major licensing announcements concerning OpenODB over "the next several months." Several customers are excited about the product, including: a large firm with some 50 sites

worldwide looking for an ODBMS to link them together, and according to Dedo, the "largest health care provider in the U.S."

Part of the HP OpenODB product is an object-oriented structured query language (OSQL), which allows easy porting of the product to platforms other than HP's, and allows programmers to build applications using standard third-generation languages such as C, COBOL, PASCAL, FORTRAN and C++.

While the market for ODBMS remains small, perhaps as small as \$10 million, the entry of large vendors

such as HP and DEC (working with objectivity on an ODBMS of its own) serves to legitimize the market and should fuel growth.

The size of the market itself remains unclear, perhaps because the most appropriate applications for ODBMS are being redefined even while markets such as multimedia emerge as potentially huge application areas for object-oriented databases.

A major part of the appeal in implementing HP OpenODB is the promise that the product can locate and retrieve information stored in applications other than OpenODB, applications that are not object oriented. This will ease the integration of HP's product with existing user installations. HP says the product will sit atop a relational database such as HP ALLBASE, and allow user applications to continue in their current non-object form.

A developer's version of HP OpenODB will cost \$100,000 with a license for one to eight users, training, phone support and five days of on-site consulting. — *Bill Sharp, Technical Editor*

How Kelly unleashes HP performance.

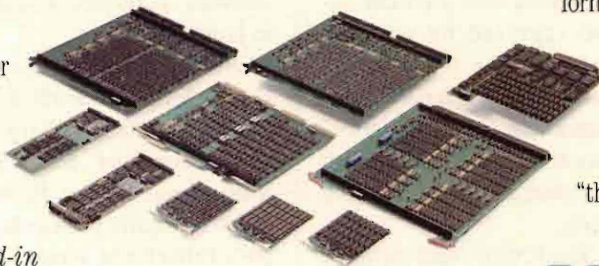
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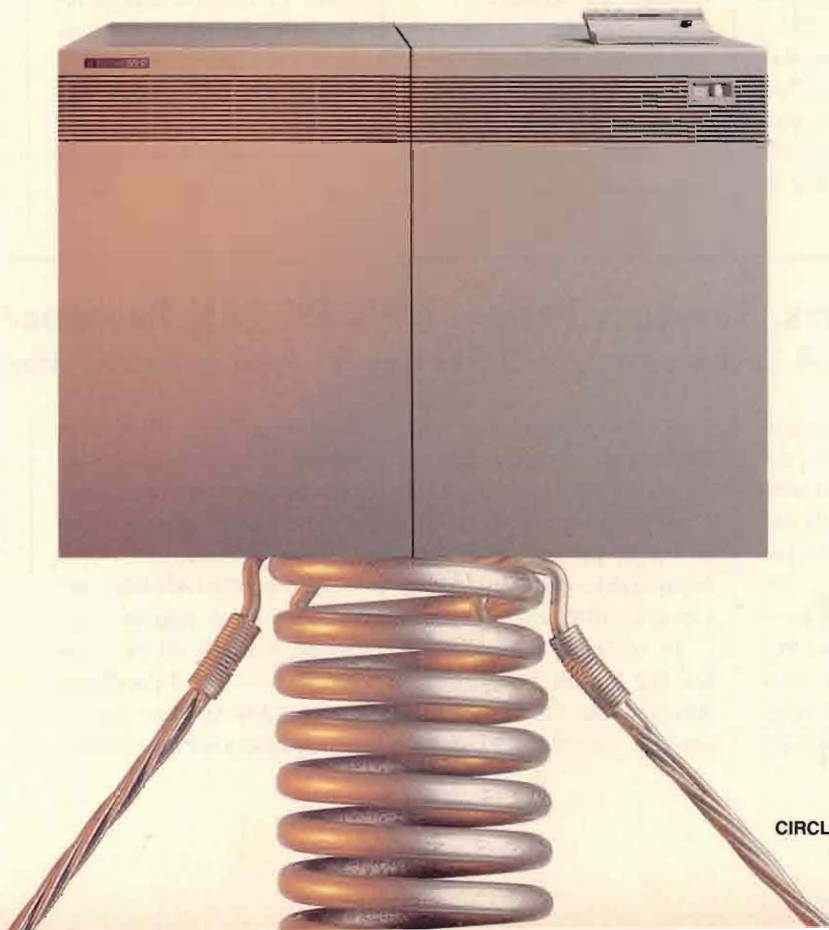
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HP Shows Its Stuff At Interop '91

No Shortage Of Networking Products (Or Acronyms!)

Demonstrating its commitment to full buzzword-compliance, HP rolled out a raft of products supporting FDDI, SNMP, Frame Relay and SMDS at the recent Interop '91 conference held in San Jose, CA in October.

At the show, HP demonstrated a Fiber Distributed Data Interface (FDDI) network controller board for its HP Apollo 9000 Series 700 PA-RISC workstations. The new EISA bus controller provides a single-attach station (SAS) interface to 100 mbit/second FDDI rings and is compliant with ANSI X3T9.5 and Station Management (SMT) version 6.2 specifications. The card is priced at \$5,995 and will be available November 1, 1991.

An NIO bus SAS FDDI card for HP-UX RISC multiuser systems is expected to be available in mid-1992.

In support of the new Remote Monitoring (RMON) SNMP Management Information Base (MIB) standard, HP introduced firmware for its

HP4991A LanProbe segment monitor and HP Open-View Probe Manager.

Developed the Internet Engineering Task Force (IETF) to extend the capabilities of currently defined MIBs and standardize the information captured by network monitors, the RMON MIB provides fault-diagnosis capabilities and network performance statistics for network planning and performance tuning.

The RMON MIB includes: packet error counters, historical statistics, traffic matrix, alarms, SNMP traps and packet filtering.

The RMON MIB allows multiple network management stations to retrieve data from any monitor and allows a monitor to send SNMP trap packets to any number of management stations.

Previously, network monitoring MIBs had to be implemented as extensions to the standard MIBs and were proprietary in their implementation. The new stan-

dards provide for greater interoperability between different vendors' diagnostic equipment.

The new RMON MIB-equipped LanProbe and OpenView Probe Manager Software should be available in January 1992.

Also announced were Open Shortest Path First (OSPF) routing and future availability of Switched Multimegabit Data Service (SMDS) routing protocols for HP's EtherTwist Router ER equipment.

The OSPF-capable router now is available. The SMDS router is currently a prototype, and availability is planned by 1993 as SMDS services become available.

On the instrumentation front, HP announced its HP PT502 LAN interconnection tester for SMDS and frame relay links. Designed for real-time troubleshooting of full-bandwidth and fractional T1/E1 data lines and H0, H11 and H12 rate SMDS links operating at speeds up to 2 mbit/second.

The HP PT502 is available in single- or multiport configurations, and can be used to monitor protocols, build simulation scripts or send test traffic in real-time. Claimed by HP to be the first product of its kind, the HP PT502 is targeted primarily at network equipment manufacturers and service providers for testing protocol implementations and customer premises equipment.

HP also announced availability of a wide-area network (WAN) interface for its HP498x family of Ethernet and Token-Ring LAN network advisors. The new HP J2208A WAN interface module allows network performance testing of X.25, SNA and ISDN links.

The new interface is priced at \$4,950 and is now available. Optional software for remote operation is available for \$990. HP 498x network advisors range in price from \$20,300 to \$26,600. — *Gordon McLachlan, Contributing Editor*

New Products, Services Propel HP's PC LAN Presence

LAN Products And Enhancements To Reseller Program Address Growing Market

HP went to great lengths to bolster its presence in the PC-LAN market this fall with a range of new products and enhancements to its reseller program.

HP introduced two low-priced, high-performance PCs with integral 10Base-T LAN interfaces that are preconfigured for instant network ac-

cess. HP claims that the workstations, with a starting price of \$1,749, can perform common office applications five to 20 percent faster than comparable products from Compaq, IBM and AST.

In addition, HP unveiled the HP Vectra 486s/20 PC, which marks the company's entrance into the Intel 486SX

market. The 20-MHz EISA system comes in five configurations for midrange LAN server, advanced office and CAD applications.

Also on the LAN front, HP rolled out an aggressively-priced, entry-level PC LAN product — HP EtherTwist 10:10 LAN Bridge LB — which links multiple 10Base-

T LANs into a single, integrated system. It can also segment larger LANs to improve performance by reducing traffic. Another product, EtherTwist Hub/8, provides plug-and-play 10Base-T connections for up to eight LAN workstations. EtherTwist PC allow ISA, EISA and Micro Channel client and server PCs

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to connect easily to 10Base-T LANs.

HP also beefed up the HP Storage System by adding support for SCSI-2 hard disks ranging from 673 MB to 1.3 GB in capacity, several 3 1/2-inch hard disks, a 2 GB DAT

drive, and a 600-MB CD-ROM drive.

In addition, HP announced the HP DAT PC Backup Solution, a 2-GB, high-performance DAT backup system. It incorporates the latest 4mm DAT technology

with a SCSI-2 interface, host bus adapter, software, and Digital Data Storage (DDS) media.

On the support front, HP added three components to the HP Dealer Premier Support program. These en-

hancements to existing LAN and hardware support services are designed to provide customers services that cover the lifecycle of their PC LANs more completely while stimulating dealer profits.

SCO Furthers Standards Adherence

Announces NIST Certification And Endorses OSF DCE Technology

The Santa Cruz Operation (SCO) announced that SCO UNIX System V/386 has received POSIX certification from the National Institute of Standards and Technology (NIST).

Additional standards-adherence was certified by the X/Open standards organization when SCO UNIX System V, running on Intel-based 386 and 486 computers,



complied with XPG3 specifications for open systems. The X/Open XPG3 standard defines operating system commands and utilities, as well as

network and system interfaces.

In a related announcement at the Open Software Foundation's Distributed Computing Environment (OSF/DCE) press event, SCO endorsed the new OSF/DCE technology. SCO's graphical operating system, SCO Open Desktop, is already compatible with many of the components of the OSF/DCE

through its support of TCP/IP, NFS, the X Window System Version 11 (X11), OSF/Motif, and Microsoft LAN Manager client protocols. SCO also offers a line of OSI products that are compatible with DCE.

Contact The Santa Cruz Operation, 400 Encinal St., P.O. Box 1900, Santa Cruz, CA 95061; (408) 458-4227.

Circle 378 on reader card

Revere Technology Offers Conversion Credits

Upgrade Program Provides 25 To 40 Percent Toward License Fee

Revere Technology, an HP Premiere Solution Provider, announced a conversion credit program

The Revere Dynamic System of Maintenance, which is a computerized maintenance management system available for use on the HP 3000 and IBM AS/400.

The program is designed to encourage conversion from competitive or in-house computerized maintenance management systems. The up-grade program provides credits of 25 to 40 percent to-

wards the license fee for Revere's solution. The program is available through March 31, 1992 to anyone currently operating on the HP 3000 that wants to convert from their present computerized maintenance management system.

Contact Revere Technology, One Perimeter Park South, Suite 425 North, Birmingham, AL 35243; (800) 466-1220.

Circle 377 on reader card

HP 700/RX X Stations Run VxWorks

WRS's VxWorks To Provide Real-Time Performance For HP 700/RX X Stations

HP selected Wind River Systems Inc. to provide real-time performance to the new RISC-based X Stations. The HP 700/RS will run VxWorks on the Intel 1960 microprocessor.

Set up in clusters of up to 10 stations sharing cpu and disk capabilities, X stations currently don't run real-time operating systems, but HP has embedded RTOS in its new family of X stations to allow for future advanced functionality. Based on cross development with UNIX, VxWorks

is an open-architecture real-time operating system with integrated networking facilities, real-time performance and a complete software development environment.

Major components include the Wind real-time kernel, connectivity features supporting industry-standard networking and communications protocols, and a full-featured development environment including UNIX compatibility, system utilities, and symbolic and source-level debugging.

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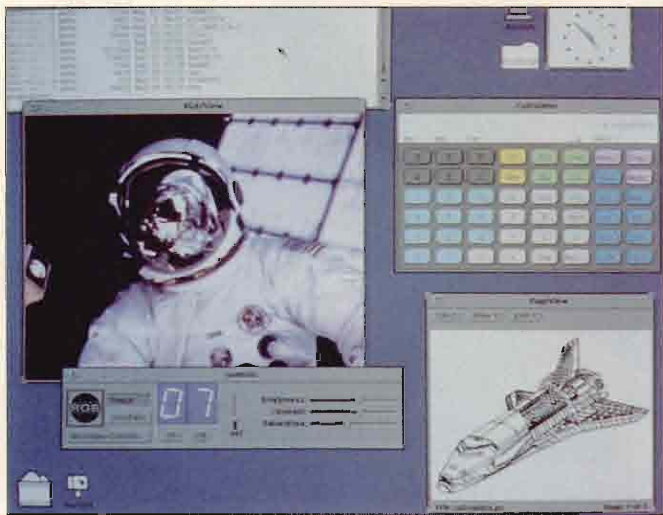
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Video Synchronicity



RGB Spectrum's Windowing 2050 System Delivers A Screen With A View

Usually when two great ideas come together, either by accident or plan, the results tend to be an improvement; just ask anyone who's ever eaten a Reese's peanut butter cup.

RGB Spectrum (Berkeley, CA) brought the combination concept to computing by merging two video sources. With its View Video Windowing 2050 system, RGB provides a hardware and software package that integrates computer text and graphics with full motion video without putting an additional burden on your computer processing, nor does it impact the host's bus resources.

RGB View 2050 offers a multimedia application that delivers a real-time video display on any high-resolution monitor. RGB View is host independent, connecting to and operating on numerous UNIX platforms including all HP Apollo workstations.

RGB View 2050 displays a live television or other video image, and accepts NTSC or PAL signals from a camera, tape recorder, television broadcast, video disk or video teleconferencing system.

The received video signals are digitized in real-time and displayed as a full screen image or scalable window on a workstation screen. The high resolution input is formatted at 22 to 45 kHz interlaced and supports 30 to 85 kHz non-interlaced, with a 640 by 400 to 1280 by 1024 pixel resolution.

The windows can be scaled to 1/4, 1/16 and 1/64 of a screen, and support clipping for arbitrary size and shape. RGB View 2050 can be fully integrated under the host computer's windowing environment including XWindows (OSF/Motif) and Open Windows.

The 2050 unit is a stand-alone peripheral controlled by software commands over an RS-232 serial port or through a front control panel. The front panel allows you to independently control the video window without a digital link.

Both front panel and software controls handle window positioning and sizing, freeze frame, bypass, video brightness, contrast, saturation and hue, graphic overlays, select television channels and volume, video image storage and chroma key.

The chroma key, which requires no programming, allows full-color computer graphics to be overlaid on the

video display. The graphic overlay contains as many colors as are supported by the host computer frame buffer.

A double buffering option is recommended by RGB. The double buffer contains two separate video frame buffers, one buffer that only writes and the other that only reads. The double buffer allows one buffer to handle image transfer while the other displays live-motion video.

An optional base-level software package, along with the correct hardware, provides UNIX source code device drivers for VME and SCSI interfaces. Simple Control Interface Program code is also available, providing command-level control of all RGB/View functions, including image transfer. Finally, an RGB.TEST code contains a basic script of ASCII commands to verify that all RGB/View functions are operative.

RGB/View 2050 costs \$9,975 with applications encompassing military and commercial needs — ranging from training simulation and surveillance to CAD/CAM image processing and video conferencing. — *Charlie Simpson, Technical Editor*

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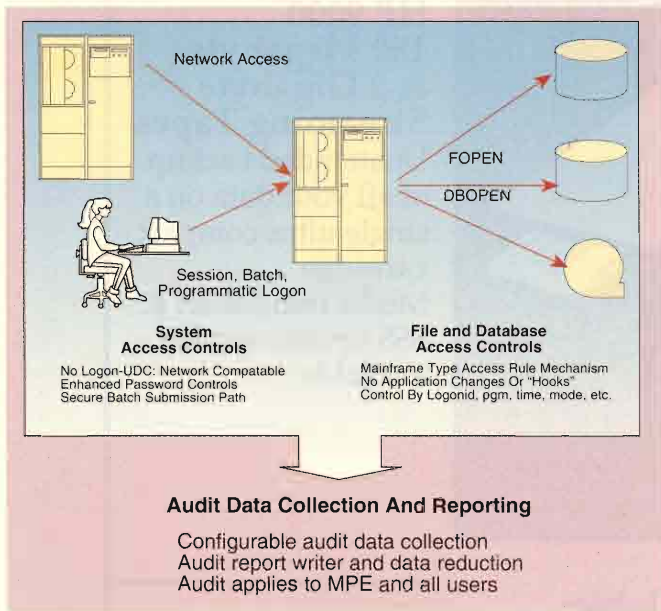
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If normal, everyday system woes disturb your sleep, just imagine the nightmares you can experience regarding system security. Do you find yourself losing Zs, awaiting the day that you, too, will be an innocent victim?

That's why Monterey Software (Cupertino, CA) introduced SAF/3000, a comprehensive security and audit facility for HP 3000 systems. In the HP 3000 world, SAF/3000 provides these features:

File and Database Access Controls. Sharing is what we always were taught to do as kids, but that isn't always the best policy when it comes to computer information. Access rules can restrict access to who should have it. Rules can control access based on many criteria including user name, type of access, date, time and terminal.

SAFRULE is SAF/3000's

editor used to create and maintain access rules. Any file, database or device can have up to 64 rules attached to it. User, group and account level access is possible.

Enhanced Logon Security. While no amount of whip cracking can deter the user from mounting his password to his terminal with a Post-It note, SAF/3000 provides some enhanced password and logon security of note. For example, system administrators can force a password to be a minimum length. Passwords can expire, requiring the user to change it with SAF/3000's PASSWORD command. Password histories can prevent a user from reusing an old password too soon. SAF/3000 does a one-way encryption of passwords, making them tough to read.

Users can be given logon-IDs with session names to prevent sharing. Logon-IDs can be further restricted as to the number of active sessions or jobs they can run. A "killer" program, one that terminates a session that lays idle too long, is also included.

Secure Job Submission Path. So, what good is a secure interactive logon password policy when those same users are sending passwords right down the pike, embedded into job streams?

SAF/3000 eliminates the need for job stream embedded passwords. It doesn't even ask for passwords interactively when the job is submitted, thus foiling password sharing.

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SAF/3000 is available for HP 3000 systems running V-MIT and later. The Monterey Software Group can help you if you need information about SAF/3000 for MPE XL 3.0 and later. — David B. Miller, Senior Technical Editor

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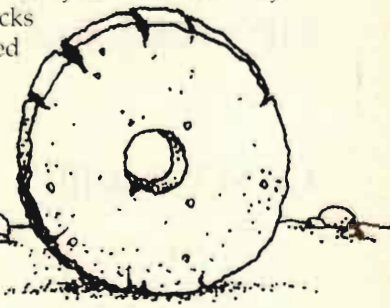
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THE SCSI ADVANTAGE

By Sam Dickey

HP's Adoption

Of SCSI Will

Result In More

And Better

Storage Options

Although the mass storage peripherals market has struggled to keep pace with recent technical advances in processing hardware, it is an area that has seen its share of progress — and lately even some controversy.

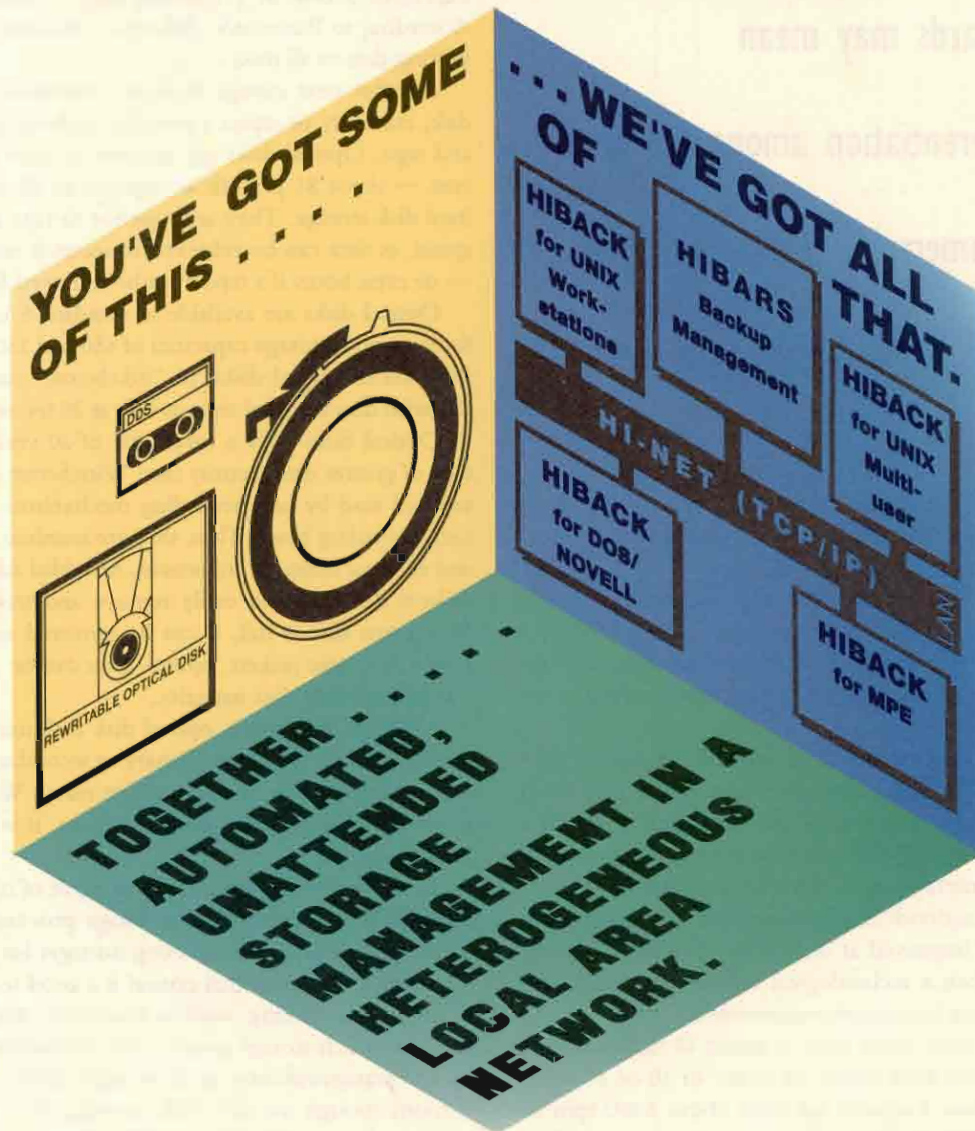
Significant to HP users and independent vendors of HP-compatible mass storage products is HP's recent decision to abandon the proprietary HP-IB interface in favor of the increasingly popular Small Computer Systems Interface (SCSI), and the more advanced SCSI-2, for all of its new storage peripherals.

Although HP's move to SCSI was abrupt, even alarming to some users and vendors of HP-IB peripherals and compatible equipment, it is consistent with market trends in both primary (on line) and secondary (backup) storage. And while the switch from HP-IB to SCSI may mean some short term confusion, it will ultimately be of benefit to HP users.

Rich Raimondi, mass storage marketing manager, Hewlett-Packard (Boise, ID), characterizes the trends in storage peripherals, as in other hardware areas, as moving toward higher performance in smaller, standardized products. In general, these include:

- Smaller primary storage units, offering greater performance

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**While the implementation
of standards may mean
less differentiation among products,
for customers it means
a greater choice among suppliers.**

at a lower cost per megabyte. An accompanying trend is toward the integration of multiple primary and secondary storage subsystems in smaller units.

■ An increasing need for secondary storage as a result of greater on-line fixed disk capacities, multiuser systems and local area networks. Greater capacity and higher performance in tape systems and emerging optical disk technology have evolved in response to this need.

■ A move toward industry standards across the range of storage products. While the implementation of standards may mean less differentiation among products, for customers it means a greater choice among suppliers. The increasing acceptance of SCSI as a standard interface is an example of this trend.

According to Raimondi, the performance of primary storage peripherals has improved at only about five to 10 percent annually. Rather than a technological failure, Raimondi sees this as an opportunity for greater improvement.

"Five years ago, seek times were at about 18 milliseconds," Raimondi says. "Now seek times are closer to 10 or 11 milliseconds. Disk rotation has gone up from about 3,600 rpm to 5,400 rpm, and data transfer rates from 1 MB per second to 10 MB per second. But look at how MIPS have increased in processors over the same period. Storage technology has not kept pace." Nevertheless, improvements in capacity and performance are evident in both primary and secondary mass storage systems.

On HP's own Series 6000 primary storage systems, storage capacity in base configurations has doubled over earlier models, to a maximum of over 4 GB. Average seek time has improved 18 percent and full volume transfer rate has improved more than 33 percent. In addition, many of the Series 6000 prod-

ucts offer the option of both primary and secondary storage media in the same cabinet, configured according to customers' specific needs.

Disk arrays promise even greater performance gains. Subsystems of multiple Winchester disk drives under the command of an array controller, disk arrays take advantage of small, inexpensive 5 1/4- or 3 1/2-inch disks in large configurations. According to Raimondi, disk arrays optimize performance by writing data to all disks at once.

Another new storage medium, rewritable magneto-optical disk, currently occupies a position midway between hard disk and tape. Optical disks are superior to hard disks in terms of cost — about \$1 per MB as opposed to \$5 or \$10 per MB for hard disk storage. They are superior to tape in terms of access speed, as data can be retrieved in seconds rather than minutes — or even hours if a tape must be retrieved from a library.

Optical disks are available in standard 5 1/4- or 3 1/2-inch formats, with storage capacities of 650 and 130 MB respectively. Libraries of optical disks, or "jukeboxes" can store up to 100 GB with data retrieval time as low as 20 seconds or less.

Optical disks offer a media life of 20 years and the advantage of greater data security than Winchester disk. Data is written and read by laser recording mechanisms rather than magnetic recording heads. Thus, they are immune from head crashes and external magnetic influences. An added advantage over hard disks is the ability to easily remove and transport the media. When one disk is full, it can be removed and replaced. Protected in plastic jackets, optical disks can be transported without jeopardizing data integrity.

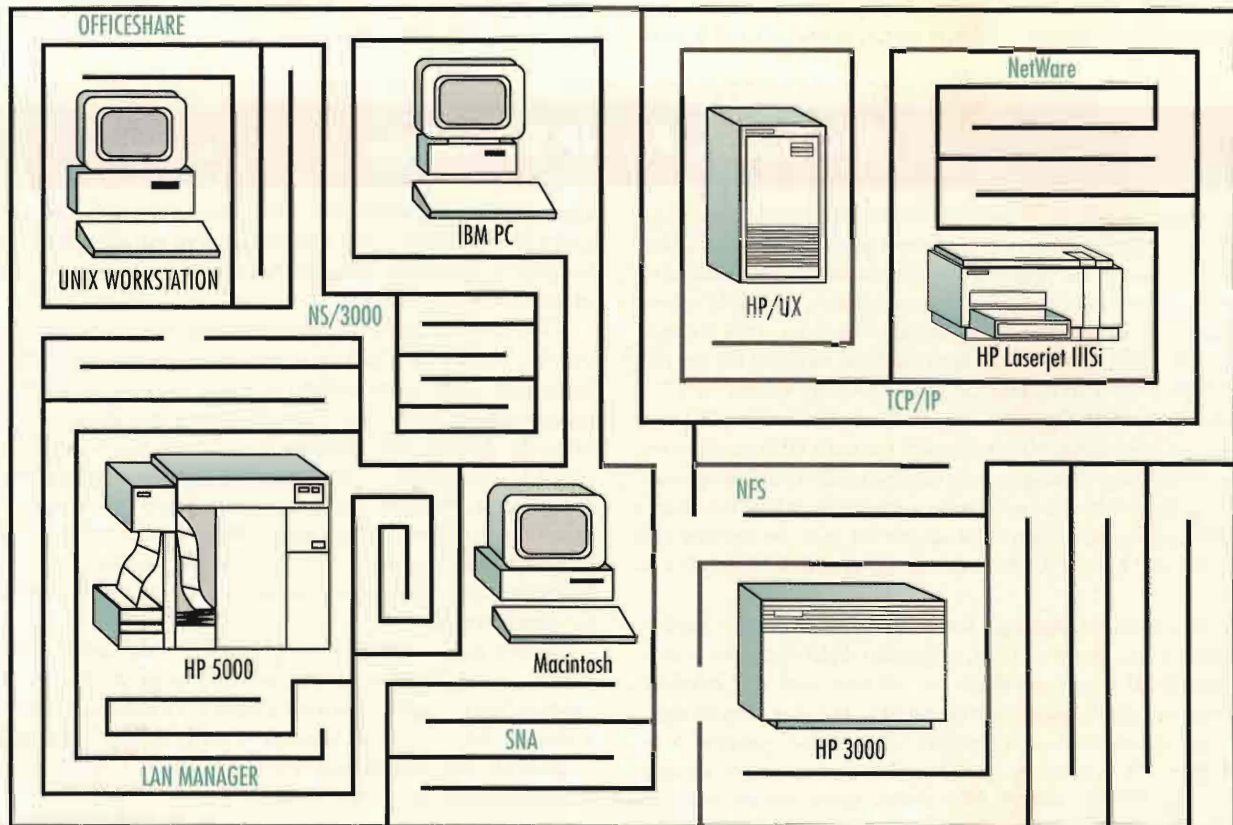
Although promising, optical disk technology is still an imperfect solution for either primary or secondary storage. In large storage applications, it does not yet match Winchester disks in speed. As a secondary storage medium, it is not yet as inexpensive as tape.

According to Raimondi, the strength of optical disks lies in new application areas such as image processing and management. Marina Likhov, marketing manager for Bering Industries (Campbell, CA), adds that optical is a good solution in applications (such as storing medical records or engineering test results) in which storage space is less important than removability and transportability. In these applications, she says, "There is room enough on each disk cartridge for a lot of data at far less cost than on Winchester disks. Because optical disks are a removable, transportable medium it is easy to share data. They can be exchanged between workstations or work sites without danger of damaging the data."

Among secondary storage devices, tape remains the most widely used medium. According to Raimondi, "Tape is the backup medium of choice because, on a cost-per-megabyte basis, tape is the cheapest way to back up information. With a capacity of up to 5 GB on an 8 mm cartridge, it's cost effective and matches the capacities of today's Winchester fixed disks."

Likhov claims that the least expensive, highest capacity tape

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formats today are 8 mm helical tape cartridges and the newer 4 mm digital audio tape (DAT) cartridges. Analog 8 mm tape offers higher capacity, 5 GB of data storage compared to 2 GB for 4 mm DAT. DAT, however, supports data compression, enabling four times as much data, or 8 GB, to be recorded on a single 4 mm cartridge.

A point in favor of DAT, Likhov notes, is that it's not a pro-

proprietary technology controlled by a single supplier. Although DAT is still a relatively new storage medium, Likhov believes it may emerge as a standard format. Several manufacturers, both third parties and HP itself, now make 4 mm products. And according to sales projections from HP, shipments of DAT units are expected to almost double by 1993, compared to little or no growth for 8 mm products.

[8MM BENEFITS FOR HP ENVIRONMENTS]

Over the last decade, SCSI has made serious inroads into the storage market by permitting attachment of a mix of peripherals to one bus. Most important is the variety of peripherals that can be attached to a system. An increasing number of manufacturers, such as Hewlett-Packard, are integrating the SCSI interface directly into their systems.

In 1987, HP introduced an optional SCSI interface for the HP 9000/300 series workstations, and more recently a standard SCSI interface for the HP 9000/400 series. Both are offered with SCSI host adapter plug-in boards. HP's Vectra PC has had a SCSI interface for almost three years. Third-party suppliers have added SCSI peripherals to the multiuser HP 1000 minicomputer series for at least four years, and HP introduced its own SCSI adapter last year. On the new HP 9000/700 and HP 9000/8X7 series, an integrated SCSI interface is standard.

SCSI command language leaves plenty of room for vendor uniqueness and, to some extent, propagates slight variations in host and peripheral implementations. In addition, user and interface software vary significantly. It's at this point that most systems diverge. For many years, third-party vendors have attached peripherals to proprietary HP systems by emulating HP tape drives or actually developing software drivers. HP's recent move toward an open environment and SCSI should make the job considerably easier — with some HP systems. However, HP continues to strategically guard its larger systems, such as the multiuser HP 9000/800 series and the HP 3000 business series, refusing to license details of the interface.

Many HP users who currently rely on bulky nine-track tape drives should consider 8mm's inherent benefits — capacity, size, performance and ease-of-use. One palm-sized 8mm cartridge holds as much data as 28 half-inch reels at 180 MB each. Group-coded-recording (GCR) reels occupy at least four cubic feet and cost about 19 times more. Media cost does not take into account the labor to load and unload reels or the labor to label, store and locate stored reels. The initial cost of an 8mm drive is significantly less than HP's nine-track tape drives. Its physical size is dramatically smaller. An 8mm drive fits in a 5 1/4-inch form factor.

The 8mm format also has some performance advantages over HP's 4mm digital audio tape (DAT) drives. Both 8mm and 4mm are digital helical-scan recording devices using the same metal-particle media. However, HP's 4mm throughput performance is about 63 percent slower than 8mm, meaning that it takes almost three times longer to record data. This parameter becomes critical when a backup window is relatively short. One 8mm cartridge also holds 2 1/2 times more data than a 4mm DAT cartridge. To a certain extent, HP is compensating by using data compression, touting an 8 GB cartridge

capacity. Yet, not all applications can use data compression. Comparing apples to apples, 8mm with data compression still offers three times better performance and at least 250 percent more capacity, regardless of data compressibility.

Disk backup is by far the most common use of tape. Everyone supposedly knows that backing up data is wise, but you'd be surprised how many people never bother to back up their data. A 1990 IDC report indicates that backup is neglected on at least 26 percent of all networks. After all, disks rarely fail these days, so why back them up?

First, consider that 85 percent of all data loss is attributable to human error. Whether a programmer inadvertently changes a few lines of code, someone accidentally reformats a disk or a disgruntled employee sabotages the system, data is lost. Although hardware failure rates are improving, human failure rates will always have room for improvement.

Second, consider that a recent U.S. government study found that it costs \$1,340 (U.S.) to re-enter a single megabyte of data. This assumes that the original data is still available. To elaborate, if you lose a 760 MB disk, you would lose more than \$1 million worth of data — probably more than the cost of the entire system. Considering this, is disk backup really a waste of time?

Eight millimeter provides unattended backup for large networks and midrange systems with disk capacities greater than GB. Two basic drives offer cartridge capacities of 2.5 and 5 GB. The 2.5 GB version transfers data at a sustained 14.7 MB per minute rate and the 5 GB version at 30 MB per minute.

For fully automated tape operations, 8mm cartridge handling subsystems (CHS) provide the necessary reliability, design flexibility and environmental protection. Single-drive subsystems offer either sequential or random access to up to 50 GB of storage. A 580 GB CHS has random access to 116 8mm data grade cartridges, but only occupies a space about the size of a four-drawer file cabinet. Fully configured, end-user subsystems should cost about \$.32 per megabyte.

All 8mm products offer exceptional reliability. A field population of over 260,000 drives has proven the drive's 40,000-hour mean-time-between-failure rate. Data reliability is also field proven at better than one error in 1,013 in cartridge interchange mode. This equates to encountering only one error in the amount of information contained in 10,000 years worth of the Wall Street Journal. Furthermore, 8mm technology is interchangeable, and has been integrated by just about every large system manufacturer, including such companies as Apollo, IBM, Siemens and Sun. HP currently provides 8mm driver support. — *Grant Wilcox, Exabyte product marketing, Boulder, CO.*

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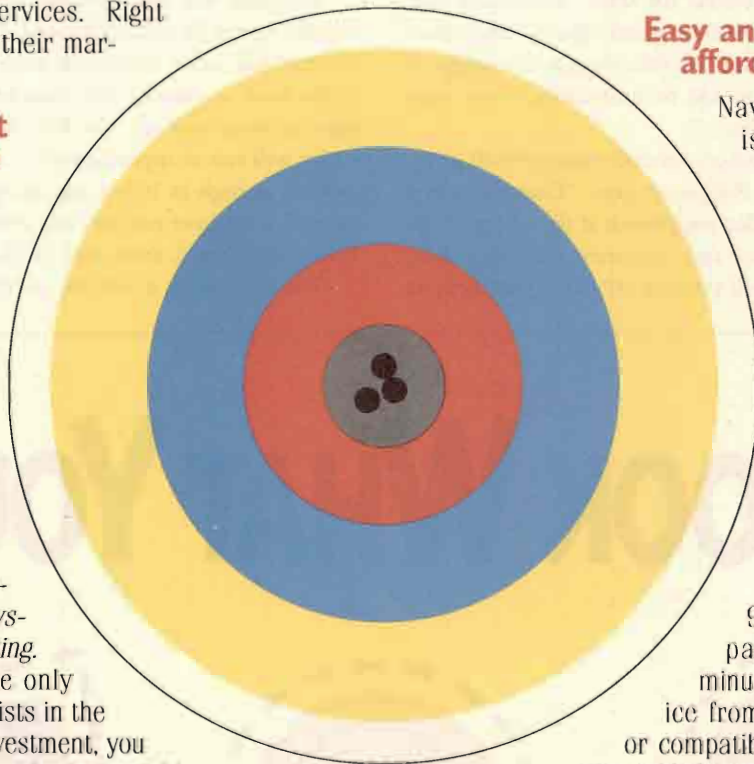
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CIRCLE 476 ON READER CARD

HP's decision to drop the proprietary HP-IB interface in its new peripherals in favor of the SCSI interface can be seen as conforming to a general standards-driven trend. Nevertheless, it has stirred some controversy among users. There are questions regarding HP's reasons for the move — whether HP will continue to support the older interface, and whether HP's SCSI version will be sufficiently open to allow third-party vendors to build compatible products.

According to HP's Raimondi, HP will continue to provide its other proprietary interface, the fiber-link HP-FL, for high-end system configurations. SCSI will replace HP-IB and become the interface of choice across the range of HP products from microcomputers to midrange systems.

"There are a couple of reasons for this," Raimondi says. "Customers are asking for it. SCSI is clearly the industry standard. By adopting SCSI, we will be able to take advantage of advances in technology that would be unavailable if we were going with a proprietary interface."

The good news is that customers currently using HP-IB products will not be abandoned, Raimondi says. "Customers will not have to trade in their older peripherals if they upgrade to new systems. HP will make sure that customers can bring along their older peripherals. We will provide HP-IB connectivity in

the newer systems, but when we introduce a new disk drive or tape drive it will be SCSI-based or HP-FL-based. We will no longer offer HP-IB products."

There are some performance gains to be realized with SCSI. A higher data transfer rate is one advantage of the interface, Raimondi says. While the HP-IB transfer rate is 1 MB per second, SCSI will soon reach 10 MB per second, with 20 MB per second achievable in the near future.

Husni Sayed, CEO and executive vice president of engineering, IEM Inc. (Fort Collins, CO), agrees that one of HP's reasons for the move to SCSI was that today's SCSI peripherals are faster than HP-IB. Nevertheless, he believes that major increases in transfer rates may not be immediately available.

Although the SCSI interface can potentially handle a data transfer rate of 20 MB per second, Sayed says, "The typical Winchester disk today will run at about 2 MB at burst speed, which is the time to transfer one data sector without involving seek time or head motion. The best SCSI interface that I have seen today will run at approximately 1.6 MB per second. SCSI-2 can operate as high as 10 MB per second, potentially at 20 MB per second, but I have not seen any current disk drive that will function at that speed, even with SCSI-2."

The bottleneck is not the interface, Sayed says, but the mass

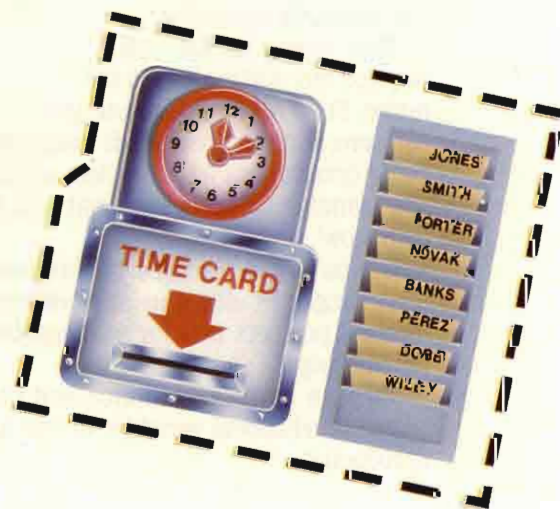
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TAPE



MAN HOURS

storage peripherals themselves. "It's the disk drives and how fast they will rotate that's the bottleneck," Sayed says, "and I don't see a breakthrough that will allow a disk drive to transfer data at the same speed that a SCSI interface can handle it." While disk rotation has been improved to over 5,000 rpm, faster rotation speeds lead to errors with current technology.

Another concern rising from HP's move to the SCSI standard is how open HP's version of the interface will be. Some third party peripheral makers express concern whether HP's SCSI protocol drivers will support non-HP peripheral disk or tape drives — and whether HP will intentionally design its version of the interface to support only HP peripherals. Such a move would not only be a barrier to third-party vendors, but also block a reduction in prices that the adoption of a standard would normally imply.

In Sayed's opinion, HP may have caused problems for some customers and third party vendors by jumping to SCSI without a smooth transition. However, he believes fears of intentional non-support of third party products by HP are groundless. "I don't think HP would make the mistake of doing that intentionally," he says.

HP's Raimondi says that the adoption of the SCSI standard will give customers a wider choice of both peripherals and sup-

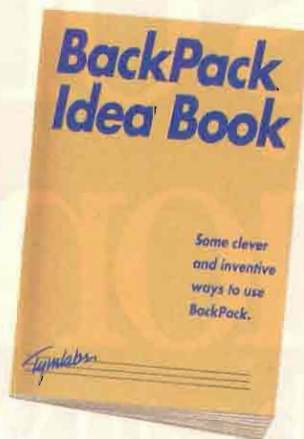
pliers. But he warns, "One caution for customers is that a third party product may not have the same implementation of SCSI as ours. We work closely to make sure our SCSI interface is high performance and is fully tested and supported, but we may choose to implement things that may not be available from a standard SCSI product from a third-party vendor. But the SCSI standard gives customers the option to look outside HP for peripherals if they choose."

All in all, HP's move to the SCSI interface promises more benefits than problems, and is in keeping with HP's stated commitment to an open market strategy. IEM's Sayed applauds the decision. "HP made the right decision," he says. "Maybe in the short term some HP customers will be inconvenienced, but in the long run it will be in customers' best interests."

The result of adopting an industry standard, Sayed says, is that ultimately, everybody comes out a winner. There will be lower prices for customers as well as increased opportunities for third-party vendors — both vendors of new products and of products that continue to support the old interface. — *Sam Dickey is a freelance writer based in West Chester, PA.*

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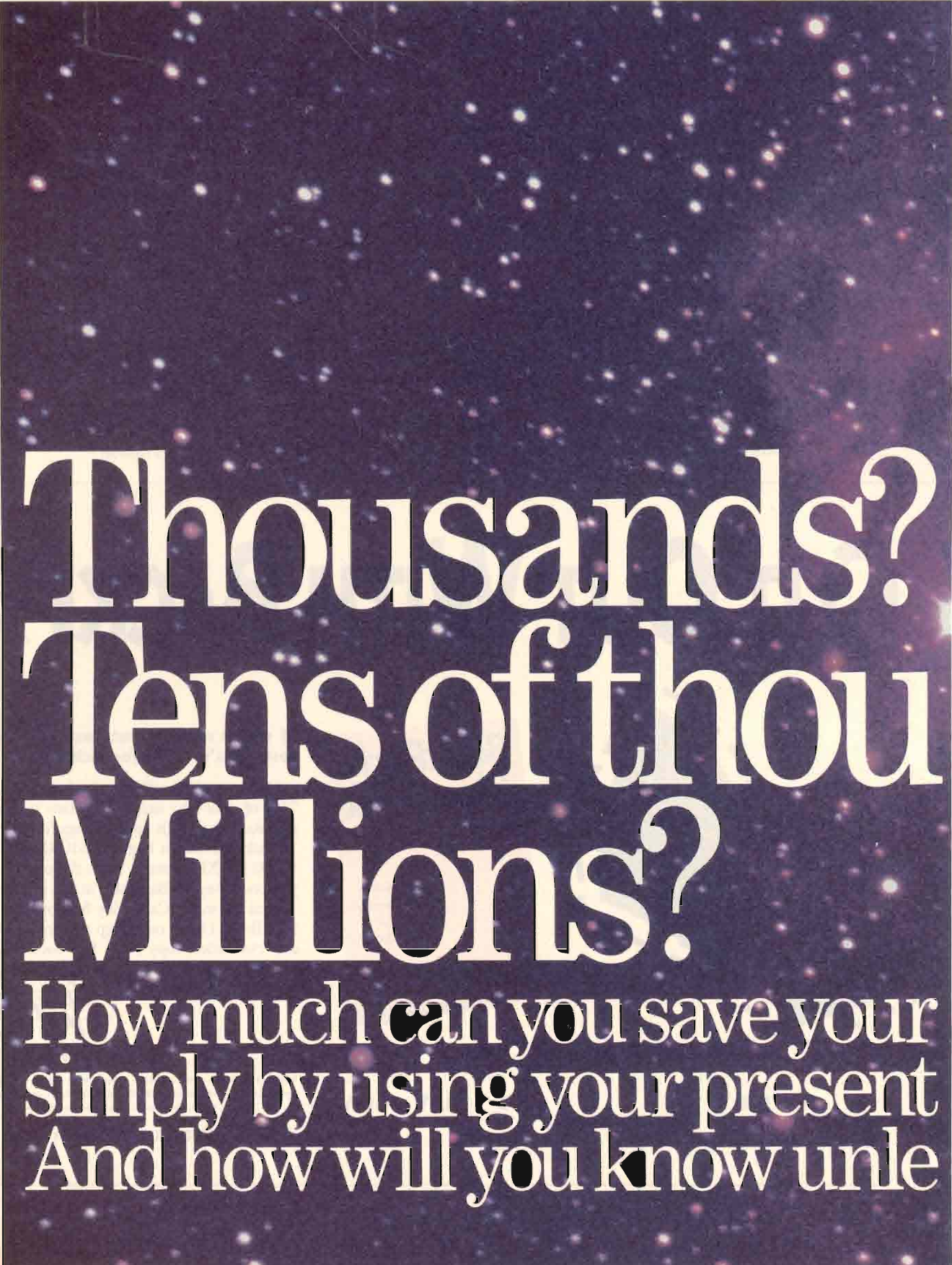


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A
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Breakthroughs In Image Processing Have Placed This Once Obscure Technology On The Leading Edge

By Ron Levine

In this, the new electronic age, nearly every office has a PC, copier, fax and "smart" telephone system. At every level of schooling — in high school and, even some grade schools — many hours are spent teaching students how to use desktop computers and how their use improves office productivity. The standard office electronic communications tools are also commonplace on college campuses. As a result, most people entering the work force today know how to use these office automation components.

Over the last 10 to 15 years, business, industry and government have spent billions automating the office and training employees in the use of electronic equipment. So, with all the resources and attention dedicated to modernizing the office, why is paper still the most prevalent media in most businesses?

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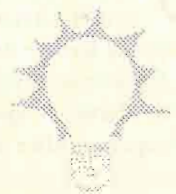
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Even in highly automated businesses, the requirement to hold onto that original piece of paper hasn't diminished.

like to eliminate this antiquated paper filing system (and the associated labor, space and costs), they haven't been able to do so. Such habits are not easily broken.

Even in the most highly automated businesses, such as banks and other financial institutions, the requirement to hold onto and maintain that original piece of paper hasn't diminished. Most paper-intensive office environments are restricted from throwing away hardcopy documents because of the office computer's inability to store anything except the typed word.

As most business documents contain other data (such as graphics, handwritten notes, signatures, and illustrations or photos) along with the typed word, they couldn't be completely input into the office's existing automated systems for electronic filing and communicating. In applications such as banking, finance and stock trading, it has been necessary to keep the original agreement document for signature verification, contract and legal purposes.

The Age Of The Image

UNTIL RECENTLY, THERE wasn't a cost-effective way for most establishments to computerize documents containing visual elements such as illustrations, signatures or handwritten notes. Thanks to advances in image processing technology that situation is changing. Image processing is the ability to input any information visible on paper into your computer. After input, it's stored, filed, retrieved and output, just like any other type of data. If you can see it, you can capture it. And the original information media doesn't have to be a paper document. Images can be downloaded from a host computer or passed over a network.

Text, illustrations, photos, signatures, handwritten data and forms are input and stored. Later, they can be recalled in their original formats and displayed on a workstation monitor, transmitted over the LAN, or output on a laser printer. This type of image data processing once required the addition of expensive,

stand-alone proprietary systems and retraining of personnel. However, standard PCs now can run image application software (with an add-on board or two) that can do the job.

When storing a document image on optical WORM disks, an unalterable audit trail back to the original document always remains — even after making revisions and updates to the document. This is important to many businesses, such as accounting firms, banking and financial services and medical establishments. These types of organizations must conform with IRS codes, government regulations, and industry rules that require such audit trails.

Aside from reducing the need for paper storage areas, labor-intensive paper filing systems and associated costs, users of electronic document imaging systems gain fast retrieval and multi-use benefits. For example, in a standard paper filing system, when one user wants to access a file folder, someone goes to the filing area, physically retrieves the file from the cabinet, and carries it back to the desk.

While the file is out, others must wait for the user to finish with it, and then return it to the filing area. After it's returned, someone must refile it before it's used again. With an image document processing and management system, all users requiring the file can retrieve it immediately, simultaneously, and without leaving their desks.

Document Image Processing At The Desktop Level

THE LARGEST INFORMATION source in most businesses is data recorded on paper. Wouldn't it be marvelous to have all that information online instead of buried in filing cabinets scattered throughout the company's premises? Imagine all that information always available, almost instantly, to everyone needing it, at the touch of a keyboard. This is what desktop document image processing and management systems provide.

Breakthroughs in image processing have brought the technology down to the desktop PC — making it affordable to most businesses. Instead of requiring expensive, proprietary systems image processing capability now is available right on your existing PCs or networks running under the DOS or UNIX operating systems you already know. And, it runs as just another application.

Following are just three examples of current desktop imaging products:

HP's Advanced Image Management System (HP AIMS). HP AIMS provides electronic capture, manipulation, storage and retrieval, and filing of hardcopy information.

Document image management technology is part of HP's NewWave Office. HP AIMS can operate as an encapsulated product within the NewWave office environment, using the graphical user interface and application-integration functions.

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The logo features the letters "HP" in a large, bold, sans-serif font. To the right of "HP", the word "Professional" is written in a smaller, regular-weight sans-serif font. A horizontal line is positioned below the word "Professional".

The imaging package uses a client-server approach to information systems. HP AIMS employs Intel 80286- and 80386-based PCs (including HP Vectra PCs) as clients that initiate processes in the system. AIMS runs on UNIX-based systems (including the HP 9000 Series 300/600/800) that function as "servers" to provide image database storage and processing.

AIMS includes software development tools that allow the creation of image applications on existing networks. These application designer tools permit user interfaces to be composed graphically. The tool set includes a User Interface Builder and a 4GL. Together, they enable value-added vendors or user organizations to build customized end-user solutions.

HP AIMS features include:


- A PC image-coprocessor board, used for image manipulation, compression and decompression.
- Software for scanning documents into the computer. The software resides on both the host computer and on the PC.
- A document scanner as an input device. A scanned document is stored as an image and converted into ASCII text by passing it through an optical character recognition (OCR) unit.
- A UNIX-based system, with associated magnetic and optical disks, serving as a host computer. Compressed images are stored in a database residing on the server platform. Text retrieval soft-

ware helps users find stored documents easily, by key words. A technique called optical clustering ensures that related documents are stored on one disk. This type of storage results in faster retrieval and improved security. Stored images then can be transferred to a PC, decompressed, and displayed in a window on the user's screen.


- A Microsoft Windows-based development kit is included for originating and integrating document image management applications with existing data processing software. Interfaces can be custom made to fit user requirements. The User Interface (UI) Builder tool provides developers a means of creating the MS-Windows environment for end-user applications. Windows 4GL also is used to develop the application. Both the UI Builder and the 4GL combine to produce the full end-user application.
- Support for Ethernet LANS to link PCs with host computer(s).

The HP AIMS package also includes a Sigma Design high-resolution monitor, and support for HP, Fujitsu and Ricoh laser printers. Image compression/decompression is performed using hardware- or software-based technologies, depending on user requirements.

An entry-level system with an HP Vectra 80386-based data server and workstation is available for \$40,000. A typical 20-user system runs approximately \$400,000.



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IDAS, from Advanced IDAS Inc. (Downey, CA), is a PC document imaging software package that can transform any existing stand-alone 640 KB (or above) DOS PC, or LAN into a full document imaging system. Along with the IDAS software you need a laser printer and scanner, if they aren't already on the system. A split-screen monitor (simultaneously showing data on one side of the screen and images on the other half) is optional. IDAS doesn't require new hardware, and integrates right in with your other office applications.

The IDAS configuration for more complex LANs is slightly larger. Small DOS networks need a minimum memory of only 640 KB, but larger LANs (or those with interfaces to UNIX host computers) should have at least 1 MB of memory. For larger networks, it's recommended that your LAN use a compression/decompression PCB along with the IDAS software for improved operation. Also, an add-on PCB to regulate data and image display on the IDAS 19-inch split-screen monitor is desirable.

IDAS runs over Ethernet or Token-Ring topologies and employs standard protocols. All LAN users have access to the images. Files are uploaded and downloaded through a gateway to a UNIX-based midrange or mainframe host. Networking also requires the use of a magnetic jukebox or optical disk to meet the considerable storage requirements of image-based processing. Novell network software is recommended for use with the IDAS index data storage feature.

An IDAS network typically consists of mixed and matched components, such as authoring workstations for document input (each of these usually has a split-screen monitor and scanner), indexing stations for database keyword inquiry tagging of data and images, and retrieval stations for viewing and working with the data and images. All of these stations can be 80286-based or above PCs. Other required components include a file server (for handling standard LAN functions), and an image server (for image management). Optical storage devices and laser printers are shared across the LAN. IDAS runs under DOS or UNIX and can use X Windows.

The IDAS software library contains all image management functions, including scanning, application generation, retrieval management, and utilities software. Additional IDAS software functions include OCR, Computer Output to Laser Disk (COLD), and Test Upon Replicated Form (TURF), which controls the merging of images and text. Host computer communications and hardware/software drivers also are included in the library. Other functions to meet specific user requirements normally are integrated into the above packages.

A stand-alone IDAS System software package costs approximately \$1,500. Network versions cost less than \$10,000. Customization, host system integration, OCR, TURF, FAX, and jukebox modules are priced separately.

By combining image processing and artificial intelligence (AI) technologies, Resumix Inc. (Santa Clara, CA), has created a resume reading, processing and retrieval system for use by corporate-personnel departments. The system, named Resumix, can

read resumes, create a resume summary, and analyze resume data. It also can pair candidates with open positions, and issue acknowledgement letters — all automatically.

Resumix is compatible with HP, DEC, IBM and Sun computers running UNIX or MS-DOS. Resumix includes a scanner, OCR system, cpu, bit-mapped monitor, laser printer and software.

A scanner and OCR system inputs resumes into the computer, then converts the scanned text into ASCII code. Resumix's AI software processes the text and extracts and stores pertinent information, such as name, address, telephone numbers, and education. Up to 60 detailed skill and experience descriptions also can be processed and stored. The system matches resumes with employment requirements and identifies the best applicants to interview. Resumes can be retrieved and electronically mailed or faxed to hiring managers.

Resumix is available in several configurations. Starting with a stand-alone workstation that can handle 10 resumes per day to networked systems capable of processing over 1,000 resumes per day. Prices start from \$25,000.

Document Image Processing Solutions

DOCUMENT IMAGE processing and management solutions are unique to each end-user site. Yet, any organization which is paper-intensive or transaction-intensive will benefit by adding document imaging capability to their data processing repertoire. Document image management isn't only about paper management. It provides the means to utilize and manage your total information resource, not just the typed word.

The banking, health care, pharmaceutical, and insurance industries, along with government offices (because of their size and highly visible paper-intensive natures) have been target sites for the first wave of image processing system installations. Today, due to the ability to add full document image processing capability to existing PCs and LANs, the technology is now a viable and affordable option for paper-intensive businesses of all sizes. Manufacturing, transportation, publishing and other enterprises are getting into the imaging act. It is shaping up as the office automation solution for the '90s.

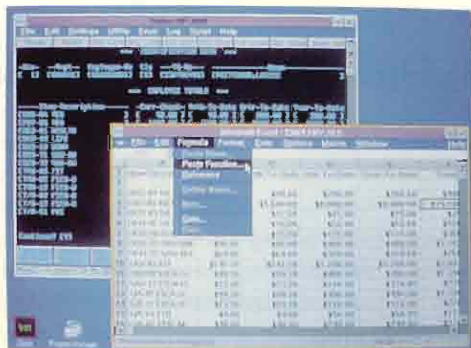
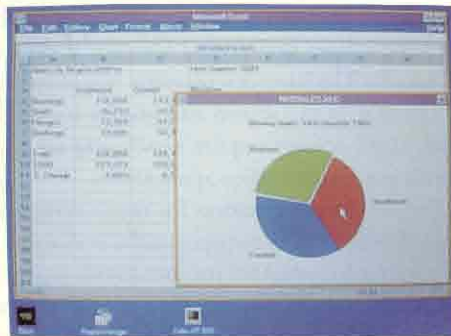
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Session's scripting capabilities can be used to automate many repetitive tasks, such as log-ons, printing files, and creating and deleting files. And Business Session for NewWave takes task automation even further, allowing users to transfer files or run scripts with a simple drag and drop. Better yet, they can let their Agents do the work.

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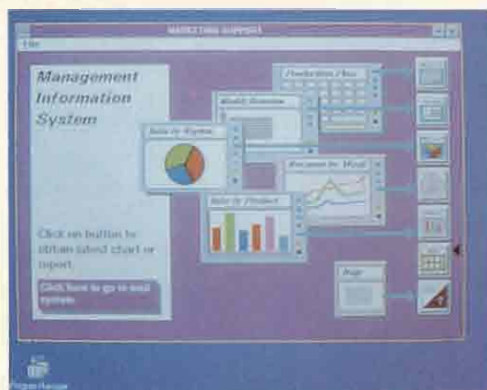
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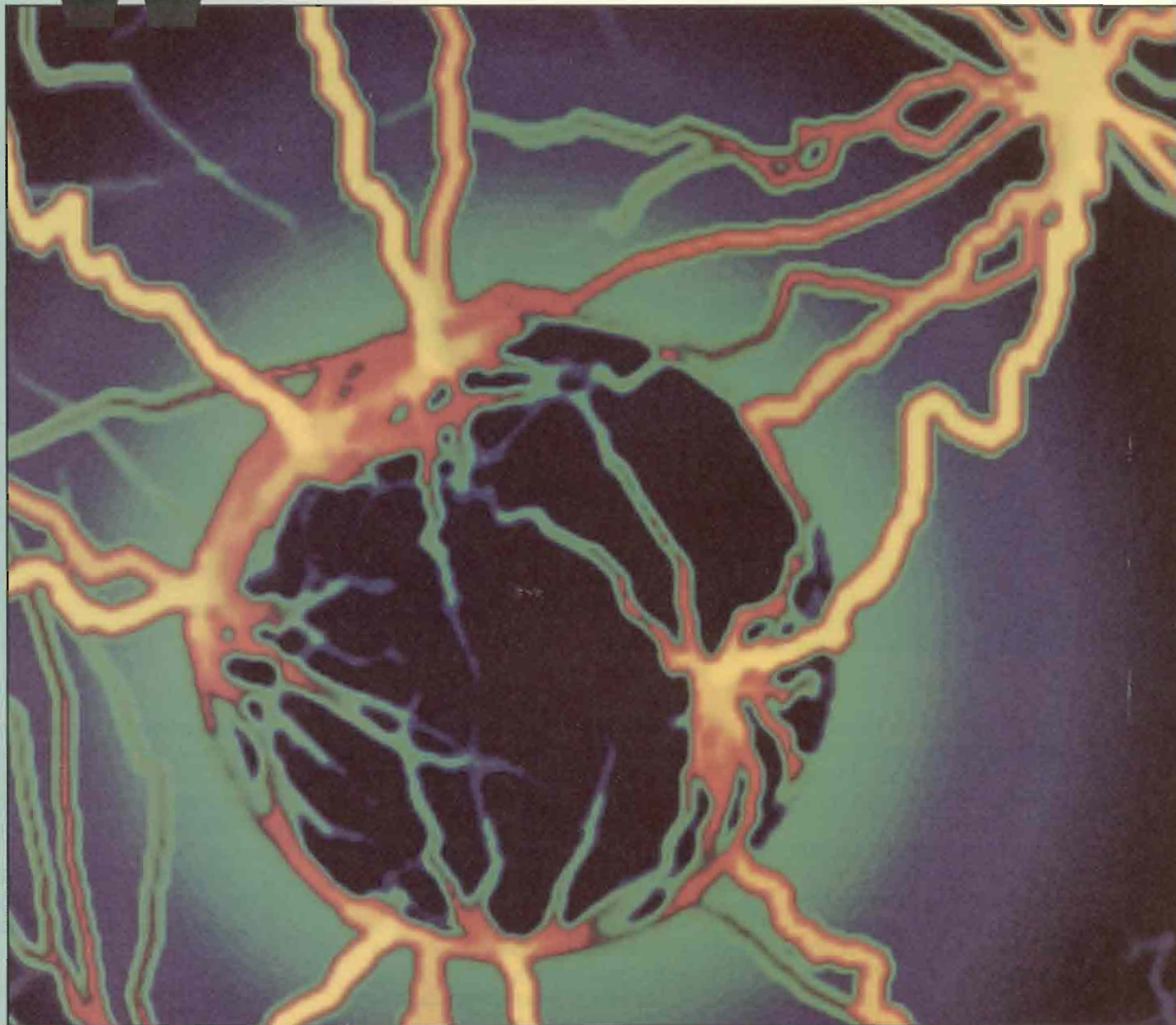
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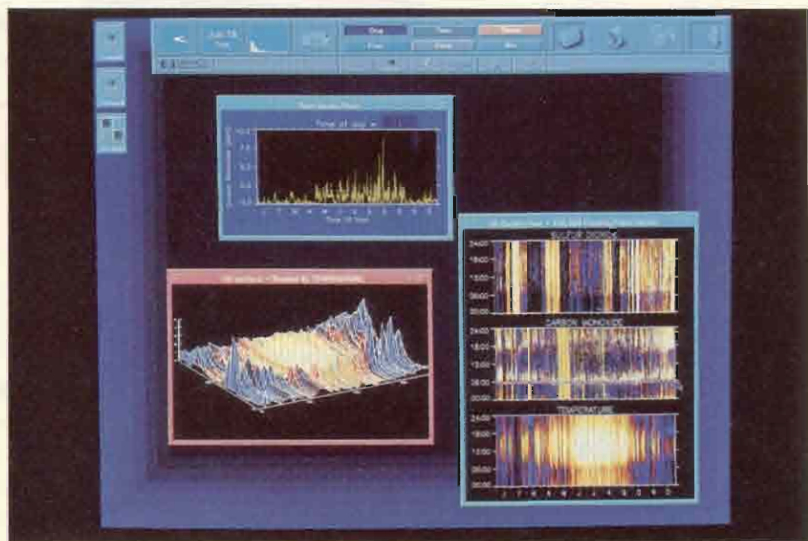


Photo: Precision Visuals

Hewlett-Packard's traditional stronghold among technical application users only is expected to strengthen as the company's recently introduced Series 700 workstations make their way into the marketplace, according to industry software manufacturers.

Already garnering 90 percent of the company's revenue from sales to the technical market, the impact of the 700 series workstations, according to Nancy Battey, an analyst at International Data Corp. (IDC; Framingham, MA), will result in a more competitive stance for HP when opposing the likes of DEC, IBM and Sun.

Developers of technical software such as visualization, mechanical design automation (MDA), electronic design automation (EDA), scientific analysis and computer aided software engineering (CASE), agree that the high performance and sophisticated graphical capabilities of the HP Apollo workstations give users exactly what they are looking for — the means to do more work in less time and get products to market ahead of their competitors.

While the nightmare for any software developer is response time, the 76 mips served up by HP Apollo workstations blows away any processing constraints. "As power improves, it leaves software developers a wider doorway to add functionality to meet users' requirements," says Gene Robinson, senior vice president of sales and marketing at Viewlogic Systems (Marlboro, MA). Viewlogic's EDA software addresses the design engineering phase of the EDA market and provides interface capabilities to other physical design tools.

Imagination rarely stops software developers from enhancing their products, but lack of processing power does. "Hardware like the 700 series allows us to load them to the hilt with functionality and not pay the price with performance," Robinson adds.

According to Thomas (Tim) Bailey, market development manager at HP's workstation division, EDA has been one of the company's strongest traditional technical markets. According to IDC's Battey, HP ranked first in revenue in the design/drafting sector of the EDA market.

EDA, although considered a mature market, is seeing increased use in thermal analysis and finite element modeling, a direct result of increased compute capability, says Bailey.

Compute-intensive EDA processes such as simulation, which involves high performance interactive graphics, also benefit from increased processing horsepower, according to Jack Woida, director of marketing at Mentor Graphics Corp. (Wilsonville, OR), a full system supplier for the EDA market.

"Our software gets very large, taking up hundreds of megabytes, and there's no end to wanting to add functionality. There also seems to be no end in sight to the things we have yet to automate," he says.

Mentor Graphics differentiated itself from its competitors by offering what the company calls the Concurrent Design Environment, a concept that stresses a highly parallel approach to product development. By enabling a serial design process to be overlapped in time, the design process can be shortened and product time to market can be accelerated, explains Woida.

Pat Sheridan, marketing account manager at Cadence Design Systems Inc. (San Jose, CA), an EDA software supplier, says that the EDA model for the 1990s is user choice in selecting both hardware and software, versus proprietary solutions of the past.

He also points out that despite the maturity of the EDA market, a new generation of standards-based software, such as Motif, is emerging. "There are a lot more software manufacturers in this market than there were five years ago," Sheridan says.

That's good news for users, who can expect to see more engineers equipped with workstations as the cost per seat continues to drop.

MDA, another mature technical application stronghold for HP, is also profiting from higher performance hardware that enables software manufacturers to offer users broader functionality.

As an example, HP's Bailey points to Parametric Technol-

ogy Corp. (Waltham, MA), whose Pro/Engineer line is advancing the state of the art. The software architecture integrates the different stages of mechanical design automation and allows changes made in one stage of the design process to be automatically reflected in all other phases of the process.

Calling the product third-generation mechanical computer-aided design (MCAD) software, Lou Volpe, vice president of marketing and operations, says that users take to the product quickly because it is based on intelligent features, or building blocks, based on concepts already familiar to the engineer.

The new feature-based software differs from second generation software which Volpe describes as cryptic, difficult to use and mathematically based.

Dave Tiley, president and CEO of Visionary Design Systems (Mountain View, CA), an MDA developer that sells exclusively on the HP platform, says that the 700 series has revolutionized solids modeling by allowing interactive processing versus batch-like processing.

Solids modeling allows users to work with a solid shaded picture versus a wire frame model. "Solids modeling is better at conveying design intent," says Tiley. "Users want to do all of their design work on the computer, do testing and try to eliminate as many product prototypes as possible — or simply, get it right the first time so that they can get their products to market quickly," he says.

Working with customers at the high end of the MDA market, Bob Brandenstein, product manager at McDonnell Douglas Systems Integration (Hazelwood, MO), points out that his customers never seem to have enough power. "As machine power goes up, users design more sophisticated models," he says. McDonnell Douglas' Unigraphics product family consists of about 50 software products in the area of CAD/CAM/CAE, including MDA.

HP's 700 series, says Brandenstein, is outstanding in performance and graphics capability. "It enables users to work with larger models, more sophisticated designs and better overall designs," he says.

Although scientific analysis (often referred to as the research side of R&D) is far from new, faster workstations are rejuvenating the market. The use of scientific analysis tools among HP users is most commonly found in the manufacturing segment, where, say software vendors, HP has a strong presence.

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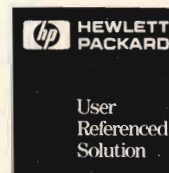
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CIRCLE 461 ON READER CARD

allowing users to work with the data once it's been collected," says Judy Larocque, director of marketing programs at BBN Software (Cambridge, MA).

The company's RS/1 product offers users an interactive graphical way to conduct analysis. Larocque notes that advances in hardware are allowing developers to put more algorithms in their products, which results in more sophisticated analysis.

"As product time to market decreases, we see users shifting from trial and error methods to statistical analysis and experimental design to set up and optimize processes," says Larocque.

Rob Stewart, director of sales and marketing at Minitab Inc. (State College, PA), says that vendors are attempting to differentiate themselves by providing more statistical capability.

"We've chosen to focus development efforts on job activity — for example, quality control engineering, quality control analysis," Stewart explains.

SAS Institute Inc. (Cary, NC), a vendor of data management and information delivery software, competes in HP markets in the healthcare, oil, gas and pharmaceutical industries.

Randy Betancourt, the company's workstation marketing manager, says that successful vendors in analysis software are exploring all of the capabilities of UNIX, such as graphical user interfaces based on X, such as Motif. "There's a trend in the industry to rewrite software to incorporate additional capability," he says.

Betancourt also points out that the richness of the UNIX environment affords vendors the opportunity to bring 3-D capability to the marketplace.

One key goal of vendors of statistical analysis software is to bring data within the reach of users at lower levels in the organization to enhance decision making capability throughout the company.

Newer Technical Markets

APPLICATION AREAS SUCH AS visualization and CASE are receiving a different type of market attention as a result of increased processing power.

Over the past four years, the visualization market has evolved from the innovative stage to the early adopter stage, says HP's Bailey.

Key to the broadening acceptance of visualization software is its increased ease-of-use, enabling this sophisticated software to find its way into the hands of the everyday engineer.

Additionally, says Bailey, higher performance workstations with more sophisticated graphics capabilities are allowing users to generate more realistic images more quickly.

Hal Elgie, director of business development at Research Systems Inc. (Boulder, CO), points out that since the inception of science, there have been pictures associated with it. "Computer-based visualization," he claims, "is taking off because cost effective workstations have enough mips to allow scientists to do something useful."

As an example, he notes that it is now possible to see pictures in 3-D without having to wait 15 minutes.

Research Systems offers IDL, an interactive programming language for the analysis of observed and simulated scientific and engineering data.

Elgie stresses that the company's approach to visualization is that it is only one piece of the scientific analysis puzzle. "A truly integrated solution includes both computational capability and a visualization environment," he says.

Precision Visuals Inc. (Boulder, CO), recently began shipping its visual data analysis software — PV-WAVE Command Language Version 3.1 and Point and Click — products for the HP Apollo series 700. The company is working closely with HP to penetrate the lab sciences area where HP has a strong presence, says Brian Richie, vice president.

Richie observes that faster workstations are enabling users to explore more of their data. "In the past, users would lose valuable information in patterns and trends because they would often throw out data," he says. "Now users can look at all of their data and choose to look at a subset of that data," he adds.

Because the software is easier to use, Richie adds, it requires less computer prowess, which results in more research time for the scientist and less reliance on the system support staff. As a result, training overhead is also reduced.

Ian Reid, vice president of marketing development at Wavefront Technologies (Santa Barbara, CA), reports that the visualization market is emerging rapidly in the manufacturing and design arena.

"Engineers want to see realistic images before committing to prototype — a costly aspect of the design process," he says.

The company's Visualizer Series serves the manufacturing and design, broadcast and entertainment, and scientific data visualization markets.

Reid observes a rapid increase in the number of people, across industry segments, that recognize the compelling power of video 3-D representation.

The burgeoning CASE market, estimated at \$4.8 billion in 1990, is finally gaining recognition as having something substantial to offer.

Users, says Tony Wasserman, president and CEO at Interactive Development Environments (San Francisco, CA), are getting serious about the technology. "It was only over the last couple of years that people took a good look at how they develop software — and they found out that they weren't doing it well. This led to CASE tools getting the attention of upper management," he explains.

Key to the snowballing acceptance of CASE is the price/performance capability of the new generation of workstations which allow the CASE story to be brought home to a wide range of users.

Vendor differentiation is occurring in application domains such as real-time embedded systems, traditional database systems, single user versus multiuser, etc.

In the CASE application area, says Wasserman, the more mips the merrier. "With software development being an expensive resource, fast processing gives developers a cognitive advantage and allows them to concentrate on the tasks at hand," he says.

The company's Software through Pictures is a family of integrated CASE development environments that supports the complete software development process.

A key trend in all of these technical application areas, says Bailey, is that the industry is nearly at the point (or will soon pass it) where software constitutes the bottleneck, not processing speed. High-speed, graphically sophisticated workstations are enabling application functionality not before available on the desktop, such as solids modeling, with no performance degradation.

Software manufacturers see only good news in the latest high speed desktop devices which have the power to not only turn heads but break market holds as well. —Lynn Haber is a Boston-based freelance writer specializing in computer and communications technology.

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Team Psychology

BY MARSHA JOHNSTON

HP Experiments

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“Team Computing” is one of Hewlett-Packard’s favorite marketing concepts these days, and one that many industry observers expect to be further enhanced by the arrival of multimedia systems. But, as some of HP’s best researchers can attest, creating a multimedia computer system that enhances team interaction is decidedly more difficult than it might seem.

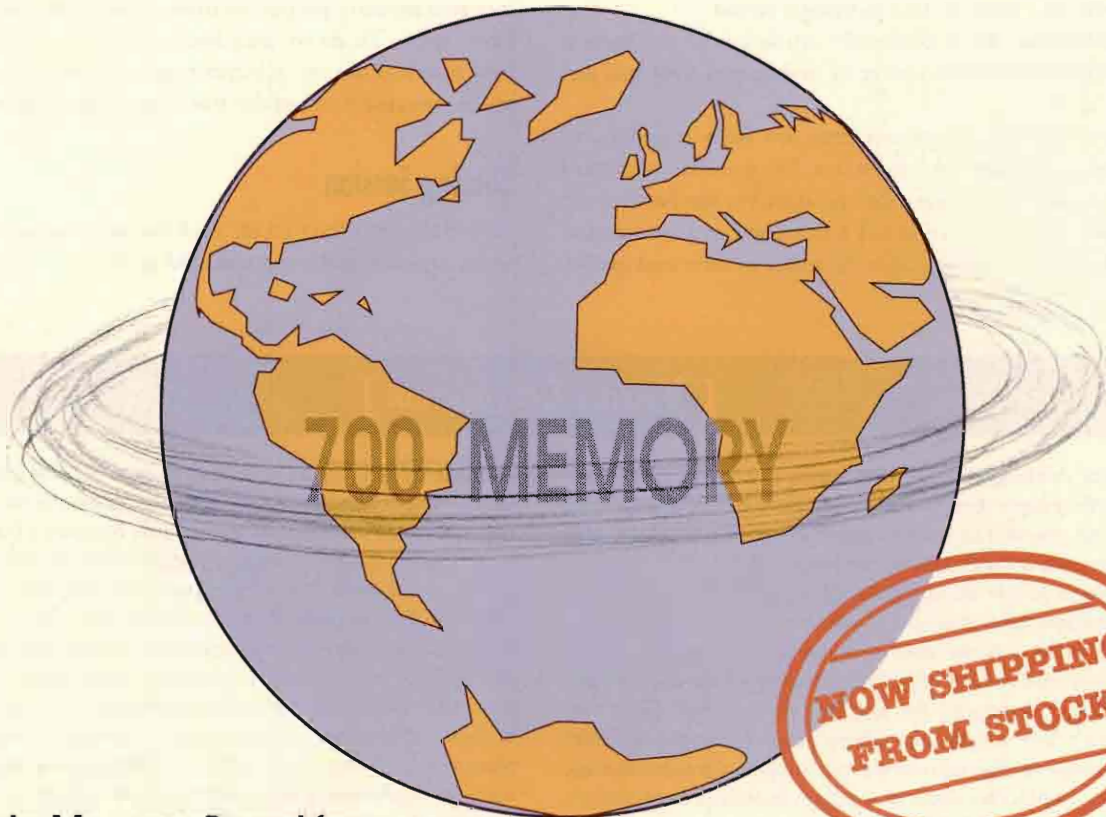
At a recent conference in Geneva, Switzerland on the future of computing, Stephen Gale, a researcher at HP Labs in Bristol, England, presented a videotape showing some results of experiments designed to get people to work together with multimedia workstations. “A lot of people say multimedia will solve team computing problems,” Gale declared. “They always say, ‘Oh, with video and audio, it [the work] will be quicker,’ but if you believe that, just watch this tape.”

The video screen displayed four windows, each with a man, wearing an audio headset in a rather dimly lit room, staring out at the audience. It was apparent they actually were looking into their workstation screen, that was equipped with a built-in video camera. For this experiment, the third in the series, they had been directed to coordinate their fictitious personal timetables and arrange a two-hour meeting in the only available meeting room.

Their interaction wasn’t exactly chaotic, but it was close. First, someone suggested a time that was good for him, but there was no agreement. Someone else suggested another time, but still no agreement. Then, on a whim, one person suggested that they all put their timetables up to the camera so everyone could get an idea of the different schedules. That lasted a moment or two until they realized that without copying down each schedule it was too difficult to compare them carefully.

Then they thought of a way to use their workstations’ common writing space, or “whiteboard.” They decided to construct a weekly schedule diagram and fill in everyone’s commitments. One subject says, “I’ll draw the days,” while another agrees to draw the hours. Watching them try to draw

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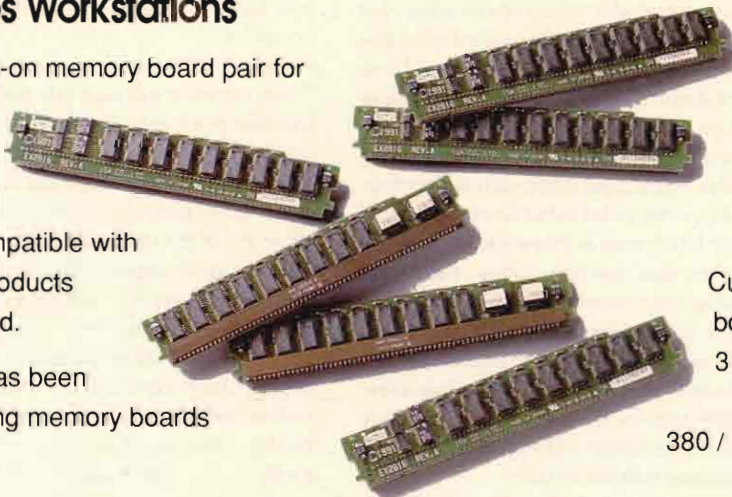
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the grid so the lines intersected properly and the spaces were proportional, one had the sense they were trying to break new ground in nuclear fusion. Then suddenly, one of the participants accidentally deleted the workspace, but nobody would own up to having done it. The videotape ended.

The crowd murmured, obviously struck by the destruction of the popular myth of the power of multimedia they had just witnessed.

"When we started the experiments, we were expecting to see increases in productivity," Gale says. "And, in fact, the user's perception is that he is being more productive, but [with those technologies] there's lots of social and formal communication going on, so the task takes longer. In terms of time and quality

of output, there was a drop in productivity, but in terms of team cohesion, perception, it increased."

The other two tasks in the experiments required different types of interaction. For the first, the four members had to select two housing properties from information on five they had been given. To do so, they had to negotiate which two homes best matched the set of buyer requirements they also had been given, because none of the five houses matched perfectly.

Sharing Session

FOR THE SECOND TASK, each member had to call upon personal opinion and experience to settle on a set of answers to

[VIRTUAL COLLOCATION]

So you're thinking about closing down that remote office and moving the people there to your local office. Before you take this drastic step, consider the technologies that make it a viable option to maintain geographically distributed teams.

Teams of people that are geographically dispersed can remain effective teams through a concept called virtual collocation. Collocation is defined as the state of being placed together. Virtual collocation is the concept of providing the capabilities and communications such that people feel as if they are collocated when they really aren't. Virtual collocation allows people to function as a team — collaborating, sharing information, attending group meetings, etc., even though they don't sit together. In today's environment, working with geographically dispersed people is commonplace — and moving them together is not always an option.

The combination of computers and telecommunications has resulted in new technologies (or new faces to old technologies) that make virtual collocation not only possible, but productive. These technologies fall into three distinct categories: static information sharing, dynamic information sharing and collaboration.

Static information sharing has been available for some time and still provides valuable benefits. These capabilities, such as electronic mail, electronic notes (like Lotus Notes or Un*x Notes), and shared file systems (like the Andrew File System or Network File System), allow teams to centralize their data and information. Each team member is, thereby, working from common ground. Electronic mail/notes is limited today to text for the most part, but near term changes will allow users to mail image, graphic, spreadsheet and audio information. The Andrew or Network File Systems allow access to remote files as if they were local. These files can be of any type. Problems can arise if the information is changing quickly, and requires constant access and coordination by users.

Bridging the gap between static and dynamic information sharing is the facsimile machine. Static information can be shared via fax almost immediately. This information can be in any form as long as it is printed out. By merging this capability with computer networks, the need for black and white hardcopy can be eliminated

on both the sending and receiving ends. Even though each team member starts with the same information, as soon as any changes are made the static nature of the information becomes a burden.

Recently, dynamic sharing capabilities have become available for computer networks. Some companies have teleconferencing capabilities at their disposal. A teleconference typically employs a live video link between two or three sites and incorporates the ability to share graphic images. Users can see static information as well as see/hear other participants. Networked computers now have the ability to share information on their screens real-time. Products such as Microcom's Carbon Copy for PCs and Hewlett-Packard's SharedX for Un*x workstations allow users to share information from their computer to others. Modifications made at any computer are reflected on all the participants computers. Look for teleconferencing and real-time screen or window sharing to be combined at the computer.

Information sharing can only provide a portion of the solution. Team members still must talk with one another. This collaboration can take place statically via voice mail or an audio annotation file attached to a specific data file. Audio capable computers can playback voice mail messages or specific comments attached to a data file.

And, the telephone is still absolutely necessary, especially when using any of the dynamic sharing capabilities. The telephone allows dynamic voice contact while dynamic sharing allows the modification of the computer information. Future capabilities will further merge the telephone, voice mail and fax with your computer.

Virtual collocation is a reality. The computer networks of today provide many capabilities to enable and enhance the collaboration required of productive, successful teams. With virtual collocation, remote teams can realize improved end results with fewer errors or problems in a much shorter amount of time. Exactly what every company wants — more for less. So, before you disrupt the lives of those remote team members, investigate virtual collocation and the numerous benefits it provides.—Randy Branson is a product engineering manager for HP in Fort Collins, CO.

The quality and content of the output didn't vary according to the system bandwidth.

an unfinished statement such as, "the most desirable characteristics of a project manager are...."

Each task was run over five days, performed each day with new information, such as completely different timetables and property descriptions. Every day, the task was performed under three conditions of communication — "data sharing only" (the shared workspace, or "whiteboard"), "data sharing plus audio," and "data sharing plus audio plus video." The incoming video from the built-in workstation cameras was displayed

on one of three six-inch monitors placed along the top of the computer, allowing a four-person meeting.

The software engineers performing the experiments were instructed to produce a slide that represented the group recommendation and the reasons behind it. They were given no guidance about how to solve the problem, how they should communicate with one another, or how to use the media.

At the end of the experiments, the quality and content of the output didn't vary according to the system bandwidth.

However, the various completion times for the three tasks emphasized that increasing communications bandwidth doesn't necessarily reduce completion time; it can, in fact, increase it. Although the differences in completion times for tasks one and two under the three conditions weren't significant, the first task was fastest when the subjects only used the whiteboard.

Smile, You're On ...

THE THIRD TASK, IN CONTRAST, proved slowest when the subjects only used the whiteboard. However, it wasn't the addition of video and audio that improved the completion time for that scheduling task.

Conversely, the subjects' perceptions of productivity, both

[TALKING HEADS]

A futuristic multimedia system has been developed in a lab at the University of Ottawa, and at press time was awaiting final funding for an applications study from the Province of Ontario and four European regional governments — Rhone-Alps, Baden-Wurttemberg, Milan-Lombardo, and Catalonia.

Once the funding is worked out for the principle agreement — already signed by the four regions in France, Germany, Italy and Spain respectively — Ottawa will supply its telepresence system for them to use in developing applications.

Telepresence is a combination of video conferencing with the concept of document sharing, says Morris Goldberg, professor of electrical engineering at the University of Ottawa and sabbatical professor at Ecole Nationale Supérieure de Telecommunication, Paris.

"It uses the concept of a talking head on your desk," Goldberg says. For a conference with four people, for example, he says, a user would have three columns, each about four to five inches wide and 18 inches high on the desktop. Each column would contain a TV monitor, camera, speaker and microphone. "The camera represents someone else's eyes, the monitor is the face, and the mike and speakers represent the ears and mouth," Goldberg explains. "When you look at the camera, his face shows up on the monitor. The other two will know where you're looking by angle of your head."

This scheme is tied together with some kind of monitor or

projection system behind the three talking heads that shows a document. "What you have are four workstations all synchronized," says Goldberg. "If someone makes a change to the document, everyone sees it. By using videolink, the user interface to the document sharing part is much easier because you have cues from the video conferencing that you can use to say, 'Who's doing what?'"

Getting telepresence into real use, he says, involves study of how people would use it and requires some application software which Ottawa would work on with its European partners. "Each region would try the technology with their different application, then they would link up to work on the operating part of the system, to test new software, etc. The German's have taken the lead in setting up the administration part of the system," Goldberg says.

Rhone-Alps and Baden-Wurttemberg are looking at management applications in publishing and tele-education. Rhone-Alps is interested in tele-educations industrial uses, Goldberg says. Although Milan-Lombardo has not decided on an application, it is likely to choose medicine, as Catalonia has done already.

"We think management administration would be the optimal application for the system, due to the cost of sending managers around. Also, for those documents, the data is less technical to represent," Goldberg says.

The ultimate objective of the project, he says, is to demonstrate the system in real life application. — *Marsha Johnston*

for themselves and the group, increased with bandwidth, as did their estimations of the maximum amount of time they could save with the system.

Nevertheless they all recognized, on the negative end of the scale, that a site-wide audio- and video-equipped system held great potential to lose them time. For all three levels of bandwidth, Gale says, "All of the subjects thought that the system had the potential to lose them time. Nobody had a positive minimum estimation, it was with zero or minus, probably because with more people using such a system, the opportunities for informal, non-work related discussions grow. This may distract and cause people to spend more time to do the same amount of work."

With the presence of audio and video, multimedia systems achieve a greater sense of what social psychologists call "social presence," which is a construct relating to how much people feel the presence of other people. In fact, says Gale, "Some of the multimedia systems verge on virtual reality, because people feel like they're in the same room at the same time and in fact they're not."

As a result, users' reactions to these systems are more complex than those they experience with simpler machines. Therefore, says Gale, designing multimedia systems that improve

With audio and video, multimedia systems achieve a greater sense of what social psychologists call "social presence."

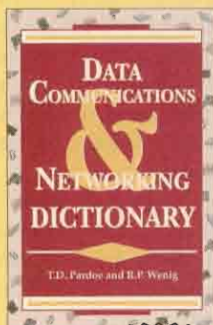
teamwork will require careful and comprehensive evaluation of the effects of such systems on their users. "Such evaluation must change its emphasis away from human-computer interaction towards an approach that analyzes human-human interaction and considers the technology merely as a mediator," Gale stresses.

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In other words, says the bespectacled young researcher, "How do we make a computer better than being there? How do we generate a computer system that captures the spontaneity and creativity in those conversations at the coffee machine? Why limit ourselves to face-to-face interaction; why not go beyond that?"

To try and get more answers to those questions after the experiments, Gale's lab in Bristol and its sister lab in Reading just set up a video camera in one of their corridors. It was, Gale says, "like having a hole in the wall." For several weeks, researchers could just call out to whoever was passing the camera and either talk to that person or say, "Hey, would you get Joe? I need to talk to him." After the trial, Gale says, "The R&D manager in Reading told me that he talked more to the R&D manager in Bristol during that time than he had in the previous two years. The experiment generated lots of enthusiasm and momentum."

Drawing Conclusions

CAPTURING THAT SPONTANEITY in a multimedia team computing system is like trying to catch the proverbial will-o'-the-wisp. "In trying to develop group interfaces, we have

to study things like social skills, human interaction," Gale says. "These are the types of subtle things that go on in teams that we're trying to measure. It can be a nightmare. It isn't like chemistry, predictable; that if you have the right quantity of one substance and the right quantity of another and you'll have this reaction. Three women and a man on a team will operate quite differently than one woman and three men."

Although the results of his research have been delivered to HP's product division, no plans exist at present to turn them into any product, Gale says. Instead, he says, HP research and marketing staffs are concentrating on working with several major accounts to determine what the technology means for business.

"The technology is out there, the real difficulty is how to offer solutions that offer value," he says. "I mean, how really relevant is my research on four people working in separate rooms to someone working in a merchant bank in Paris? Honestly? You get some clues, but we need to work hand in hand with customers because people generally don't understand the impact of a technology until it's been used."

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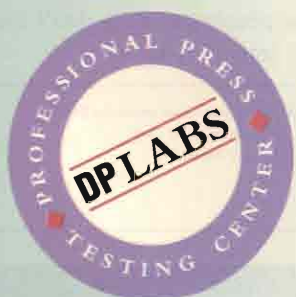
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BY ANDY FEIBUS

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Earlier this year, while reviewing the HP 9000 Model 720, I created a set of benchmark tests to determine the characteristics of the workstation's incredible speed. I also ran these benchmarks on other workstations, including the Sun SPARCstation 2, the IBM RS/6000 POWERstation 520, and the DECstation 5000 Model 200 CX. The results of these tests and the lab review can be found in the April 1991 issue of *HP Professional*.

However, although the intent of each benchmark test was reported, I've never shown the actual code. Without the code, how can you decide if the benchmarks represent the type of operations you plan to perform on the workstation? You can't.

All the benchmarks were created using C code and compiled using the -O (optimize) compiler option. Each benchmark is discussed below, and the time each workstation took to complete the benchmark is also reported at the end of each section. All test times are reported in seconds of actual time.

The times reported here are for the benchmarks listed in this article. These times may differ from those reported in the April 1991 HP-UX column, either because I changed the benchmark slightly or because I ran the benchmark with the newest compiler available for the workstation.

Integer Computations

THE FIRST BENCHMARK test checks how fast a workstation performs about 200,000,000 integer calculations (see *Benchmark 1*).

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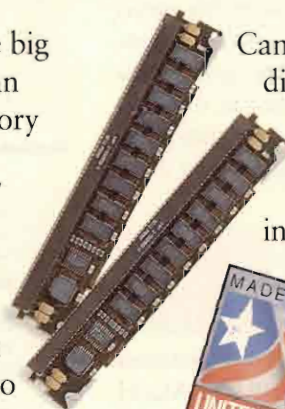
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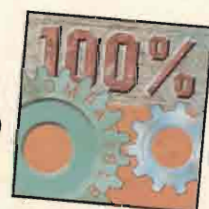
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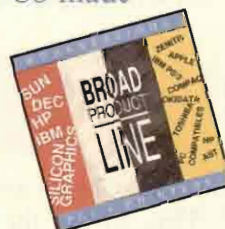
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the speed of the random number generator and isn't relevant to this benchmark. The test then times how long it takes to do 100 iterations of the following task: Multiply all elements of the array by three and sum the results. The test results follow:

HP 9000 Model 720	14
DECstation 5000/200	34
IBM RS/6000 PS 520	29
SUN SPARCstation 2	31

The only surprising result in this benchmark is the relatively good performance of the IBM POWERstation 520. Other benchmarks (e.g., the integer SPEC tests) have shown the PS 520 to provide about 75 percent of the integer computational speed of a DECstation 5000/200. Different benchmarks can produce different results.

Floating Point Computations

BENCHMARK II CHECKS THE speed of the system when performing approximately 200,000,000 double precision floating point operations (see *Benchmark II*).

The code first creates an array of one million double precision numbers (using the subroutine drand48). Creating this array is not timed, because it's dependent on the speed of the random number generator, which is not relevant to this task. The test then times how long it takes to do 100 iterations of the following task: Multiply all elements of the array by 255.9 and sum the results.

HP 9000 Model 720	18
DECstation 5000/200	59
IBM RS/6000 PS 520	17
Sun SPARCstation 2	56

I was surprised to discover that the RS/6000 POWERstation 520 ran this benchmark slightly faster than the HP 9000 Model 720. This result is doubly surprising when you compare the Mflop ratings reported for these systems (Mflop is the number of million floating point operations that a system performs in one second):

HP 9000 Model 720	17.0
DECstation 5000/200	3.7
IBM RS/6000 PS 520	8.5
Sun SPARCstation 2	4.2

According to the Mflop rating, the HP 720 should perform twice as fast as the IBM RS/6000. Why, then, is the IBM RS/6000 slightly faster?

The answer is in the data cache. A cache is a block of high-speed memory. Both systems use a data cache to improve the performance of arithmetic operations. When your application requests a floating point operation, the data is first loaded into this cache (if it is not already there) and then the operation is performed. If the data your application needs is not currently in the cache, your application generates a cache miss. When a cache miss occurs, the system must retrieve the data from normal memory before the operation is performed.

```

/*
 * Benchmark I: Perform 200,000,000 integer calculations.
 */
#include <stdio.h>

double drand48();
void srand48();
int array[1000000];

main()
{
    long count;
    long time();
    long start_time, end_time;
    long result;
    int j;

    start_time = time(NULL);

    srand48(start_time); /* Seed to current time */
    for (j=0; j<1000000; j++)
        array[j] = (int) (drand48() * 256);

    start_time = time(NULL);
    for (j=0; j<100; j++)
    {
        result = 0;
        for (i=0; i<1000000; i++)
            result += array[i] * 3;
    }

    end_time = time(NULL);
    printf("Result = %ld\n", result);
    printf("B1 time = %ld\n", end_time-start_time);
}

```

Benchmark I

```

/*
 * Benchmark II: Perform 200 million floating point operations.
 */
#include <stdio.h>

double drand48();
void srand48();
double array[1000000];

main()
{
    long count;
    long time();
    long start_time, end_time;
    double result;
    int j;

    start_time = time(NULL);
    srand48(start_time); /* Seed to current time */
    for (j=0; j<1000000; j++)
        array[j] = drand48();

    start_time = time(NULL);
    for (j=0; j<100; j++)
    {
        result = 0;
        for (count=0; count <1000000; count++)
            result += array[count] * 255.9;
    }

    end_time = time(NULL);

    printf("Result = %f\n", result);
    printf("B2 time = %ld\n", end_time-start_time);
}

```

Benchmark II


```

/*
 * Benchmark II.A: Perform 200 million floating point operations.
 * Do this test 10 times, varying how you access the array.
 */
#include <stdio.h>

double drand48();
void srand48();
double array[1000000];

main()
{
    long count;
    long time();
    long start_time, end_time;
    double result;
    int j, step;

    start_time = time(NULL);
    srand48(start_time); /* Seed to current time */
    for (j=0; j<1000000; j++)
        array[j] = drand48();

    for (step=1; step<=10; step++)
    {
        start_time = time(NULL);
        for (j=0; j<100*step; j++)
        {
            result = 0;
            for (count=0; count<1000000; count+=step)
                result += array[count] * 255.9;
        }

        end_time = time(NULL);

        printf("Result = %f\n", result);
        printf("B2.A(%d) time = %f\n", step, end_time-start_time);
    }
}

```

Benchmark II.A

The HP 9000 Model 720 has a 256-KB data cache and the IBM RS/6000 provides a 64-KB data cache. Because the array used in this benchmark is 8 MB long, the entire array cannot fit into cache, so the size of the cache is not a factor in this benchmark.

However, the way in which the cache is organized is a factor. The HP data cache is organized into a series of 32-byte cache lines while the IBM data cache is organized into a series of 64-byte cache lines. Each time your application generates a cache miss, the system replaces the entire contents of the cache line with new data. A cache miss takes time. A larger cache line usually generates less cache misses; however, the larger the cache line, the longer a cache miss takes to complete.

Having larger a cache line ensures that under many circumstances (like those exhibited by *Benchmark II*), your program can run faster because it generates fewer cache misses. The downside to a large cache line is that if you only need to use a small portion of the data that was loaded into the cache line, your program generates a lot of cache misses.

I verified this difference by modifying *Benchmark II* (see *Benchmark II.A*).

The difference between *Benchmark II.A* and *Benchmark II* is that the step variable is used to control how the code accesses the array. The first time through the step loop, every element of the array is accessed in order; the second time through, every other element is accessed, and so on. The last time through the array, only every 10th element of array is accessed. The point of this change is to generate an increasing number of cache hits for each pass through the step loop.

The results for the 10 runs are shown below; only the HP 9000 Model 720 and IBM RS/6000 POWERstation 520 are compared for this test, because these two machines displayed the fastest floating point response for *Benchmark II*.

Run (Step) #	HP 720	IBM PS 520
1	18	29
2	27	38
3	37	42
4	46	48
5	47	55
6	47	62
7	47	67
8	44	72
9	48	72
10	47	73

You can draw a few conclusions from these results, especially when you compare them to the *Benchmark II* results.

- The HP C code optimizer is a whole lot better than the IBM C code optimizer. That conclusion can be drawn from the run with step set to 1. The HP 720 ran just as fast as *Benchmark II*; the IBM ran 13 seconds slower.

- The IBM PS 520 cache line is 64 bytes and the HP 720 cache line is 32 bytes. This conclusion comes from the IBM needing to reference every eighth (8-byte) element to always generate a cache miss; the HP only had to reference every fourth.

- Subtle differences in your code can markedly vary the performance from one workstation to the next. For example, change line 16 in *Benchmark II* to read:

```
for (count=0; count
```

and line 27 to read:

```
int j, step=1;
```

The HP performs the new test in 18 seconds; the IBM takes 29. No change in the results, but a big difference in speed.

Just to see how the size of the cache affects performance, I changed the benchmark to perform 200,000,000 floating point operations using a smaller array. The results for these tests on the two machines are:

Array Size	HP 720	IBM PS 520
2000	10	11
10000	10	17

At 2,000 elements, the array fits entirely into cache on both systems; at 10,000 elements, the array fits entirely into cache only

on the HP. In other words, a large cache can help, but only if your application is tuned to use it.

File Write

BENCHMARK III CHECKED THE speed of a workstation's I/O subsystem by writing one million bytes to a file, one byte at a time. See *Benchmark III* for the code to perform this task.

As with the first two benchmarks, generating the 1,000,000 values is not timed. The benchmark reports how long it takes for a workstation to create and open a file, write the 1,000,000 values into the file (one value at a time), and close the file. The results for this benchmark are:

HP 9000 Model 720	80
DECstation 5000/200	229
IBM RS/6000 PS 520	205
Sun SPARCstation 2	150

Obviously, you should write as much data as possible with each write call; a smaller number of writes writing a larger quantity of data yields much better performance. However, the test doesn't determine the fastest way to write a file, but the worst-case performance of the I/O subsystem.

What would happen to this benchmark if the program were rewritten to write 1,000 bytes on each pass through the loop (and only performing 1,000 loops)? A quick change to the code (left as an exercise for the reader) and the benchmark takes less than two seconds on all workstations.

As mentioned before: how you write the benchmark affects how fast the benchmark runs.

File Reads

THE FOURTH BENCHMARK (see *Benchmark IV*) is the inverse of the third benchmark: To read back the 1,000,000 bytes placed into the file, one byte at a time. This is another worst-case performance test of the I/O subsystem. Here are the results:

HP 9000 Model 720	67
DECstation 5000/200	101
IBM RS/6000 PS 520	139
Sun SPARCstation 2	83

As with *Benchmark III*, changing the program to read 1,000 bytes on each pass through the loop (and only performing 1,000 loops) causes the benchmark to run in less than two seconds on all workstations.

X Windows

FINALLY, THE WORST OF the worst-case scenarios: drawing single pixels into an X window. This benchmark (see *Benchmark V*) was designed to bypass any special graphics acceleration a workstation's hardware might provide and to determine the speed of a workstation's graphics hardware/X server.

This benchmark reports how long it takes to perform the

```

/*
 * Benchmark III: Write 1000000 bytes to a file, 1 byte at a time.
 */
#include <stdio.h>
#include <fcntl.h>
#include <errno.h>

double drand48();
void srand48();
unsigned char array[1000000];

main()
{
    long count;
    long time();
    int file_desc;
    long start_time, end_time;

    start_time = time(NULL);
    srand48(start_time); /* Seed to current time */
    for (count=0; count<1000000; count++)
        array[count] = (unsigned char) (drand48() * 256);

    start_time = time(NULL);

    file_desc = open("1MBfile", O_WRONLY | O_TRUNC | O_CREAT, 0664);
    if (file_desc == -1) exit(errno);

    for (count=0; count<1000000; count++)
    {
        if (write(file_desc, array+count, 1) != 1)
            exit(errno);
    }

    close(file_desc); /* 1MB file completed */

    end_time = time(NULL);
    printf("B3 time = %ld\n", end_time-start_time);
}

```

Benchmark III

```

/*
 * Benchmark IV: Read contents of 1 MB file, 1 byte at a time.
 */
#include <stdio.h>
#include <fcntl.h>
#include <errno.h>
unsigned char array[1000000];

main()
{
    int file_desc;
    long time();
    long start_time, end_time;
    long count;

    start_time = time(NULL);

    file_desc = open("1MBfile", O_RDONLY, 0664);

    for (count=0; count<1000000; count++)
    {
        if (read(file_desc, (array+count), 1) != 1)
            exit(errno);
    }

    close(file_desc);

    end_time = time(NULL);

    printf("B4 time = %ld\n", end_time-start_time);
}

```

Benchmark IV

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```

/*
 * Benchmark V: Create a 512x512 X Windows and place the contents
 * from the 1 MB file into it.
 */
#include <stdio.h>
#include <fcntl.h>
#include <errno.h>
#include <X11/IntrinsicP.h>
#include <X11/CoreP.h>
#include <X11/X.h>
#include <X11/Xutil.h>

/*
 * Defines the data used by this program.
 */
Display *display; /* Display structure pointer */
Window draw_window; /* Window pointer to drawing window */
GC PixGC; /* Drawing window GC */
unsigned char buffer[1000000];

main()
{
    int file_desc;
    long time();
    long start_time, end_time;
    long count;
    unsigned char *bufptr;
    int i, j;
    XSetWindowAttributes w_attr;
    long pixel;

    file_desc = open("1MBfile", O_RDONLY, 0664);
    if (file_desc < 0) exit (errno);
    for (i=0; i<1000; i++)
    {
        if (read(file_desc, buffer+(i*1000), 1000) != 1000)
            exit(errno);
    }

    close(file_desc);

    w_attr.border_pixel = 0;
    w_attr.background_pixel = 0;

```

```

start_time = time(NULL);

/*
 * Open the server connection
 */
display = XOpenDisplay(NULL);

/*
 * Create the window with this colormap
 */
draw_window = XCreateWindow (display,
                             RootWindow(display, DefaultScreen(display)),
                             100, 100, 512, 512, 2, 8, InputOutput,
                             CopyFromParent,
                             (long) (CWBOrderPixel | CWBackPixel), &w_attr);

XMapWindow(display, draw_window);

/*
 * Create the GC for copying the image to the window.
 */
PixGC = XCreateGC(display, draw_window, 0, NULL);
XSetFunction(display, PixGC, GXcopy);

/*
 * Clear the window
 */
XClearWindow(display, draw_window);

bufptr = buffer;
for (i=0; i<512; i++)
    for (j=0; j<512; j++)
    {
        pixel = *bufptr;
        XSetForeground(display, PixGC, pixel);
        XDrawPoint(display, draw_window, PixGC, i, j);
        bufptr++;
    }

end_time = time(NULL);
printf("B5 time = %ld\n", end_time-start_time);
}

```

Benchmark V

following functions: create a connection between the client program (the benchmark) and the X server, create a 512 by 512-pixel window, clear the window, and then vertically draw (using XDrawPoint) single pixels into this window. The benchmark does not begin timing until after the array buffer is initialized.

All tests were run using non-accelerated eight-plane graphics hardware, with the X server running on the same workstation as the X client (the benchmark program). The results from running this benchmark test are:

HP 9000 Model 720	14
DECstation 5000/200	23
IBM RS/6000 PS 520	38
Sun SPARCstation 2	23

The Final Word

I CAN MAKE THREE basic conclusions about the use of benchmarks. Never make a monetary decision based on the results of any "standard" benchmark tests. I only use them to help determine relative workstation performance for certain operations.

Second, optimizers can be (and are!) written to generate ex-

ceedingly fast code for certain benchmark programs; however, your application may not run as fast as the benchmark indicates. How an application is written affects its speed; how a optimizer is tuned is just as important.

Third, most benchmarks won't reflect the performance characteristics of the applications you plan to use.

Finally, I designed these tests before finding out how fast the HP 9000 Model 720 ran them; that the Model 720 ran these tests fastest should only be one data point in your workstation purchasing decision. — *Andy Feibus is an independent UNIX and porting consultant based in Atlanta, GA.*

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FROM THE LAB

This Old Workstation



In This Episode: Extending The Life Of An HP 9000/200 With Some Help From Eventide

Editor's note: When we last checked in with Don and Dave (Episode 2 of *This Old Workstation*, September 1991), they were busy upgrading an HP Apollo 9000/400t to a 425t with an HP upgrade kit. As part of DP Labs' Do-It-Yourself series for computer professionals, the intrepid duo has again provided the original script and still shots. We dedicate this, their final installment as a team, to former Managing Editor Don Marks. — *Grant Evans, Managing Editor*

Voice-over: Hello again, and welcome to another edition of *This Old*

Workstation. For our next workstation upgrade, we visited the Hewlett-Packard offices in Valley Forge, PA, of American Revolution fame.

Here, we'll show you how to extend the life of your HP 9000/200 workstation and increase the performance of your SRM network by using an Eventide Ethernet board in addition to or in place of the HP Shared Resource Manager hardware.

[Fade to black ... then, a shot of Don and Dave at HP, Valley Forge ...]



By David B. Miller

If you'd like an all-Ethernet system, Eventide has a solution for you.

Don: Many of you are running older HP workstations, perhaps the 200 series or early 300 series. Your environment might include several machines using HP's Shared Resource Manager (SRM). If you'd like to switch to an all-Ethernet based system and improve performance as well, Eventide Inc. of Little Ferry, NJ, has a solution for you. The company's WLZ-320 Ethernet board can replace or coexist with HP's SRM, but it will, nevertheless, give you some significant performance boosts over your network as well as allow you to migrate to an industry standard.

Dave, you previously spoke to HP Application Engineer Joe McAffrey, and he showed you what the Eventide board can do, right?

Dave: That's right, Don. In fact, Joe did a file transfer across the network for me and he got double the throughput with the WLZ-20 over the HP SRM card.

Don: Tell you what, Dave, HP's Raphael Martinez has graciously allowed us to show our viewers how easy it is to upgrade a 200 series workstation with the WLZ-320. Why don't we talk to him?

Don: Hello, Raphael, thanks for arranging this visit for us. Can you show us what we've got?

Raphael: Sure, Don. This is one of the older 200 series workstations running SRM. Notice the SRM card is still in this box.

Don: It's still there, Raphael. But, it's easy to slip in the Eventide board, right?

Raphael: Absolutely, Don. In fact, I'll even let you guys tackle this one. It's as easy as finding an available slot and plugging in the card ...

Dave: Think you can handle this Don?

Don: No sweat, just let me at the back

of this cabinet with my trusty special HP cabinet tool and ...

Raphael: Dave, What is Don doing with that prybar?

Dave: Don't worry, Raphael. I'll take care of it. Don, forget the prybar. It

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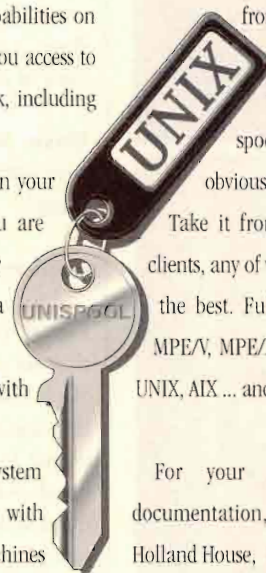
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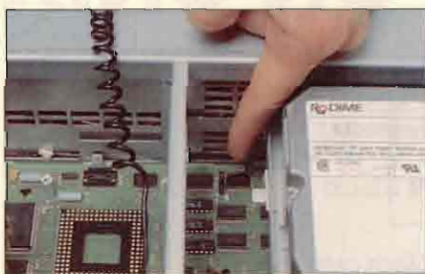
CIRCLE 286 ON READER CARD



HP's Raphael Martinez greets Don and Dave at HP's Valley Forge, PA offices.



Don't open the cabinet: Just remove the backplane plates.



Insert the Eventide Ethernet board into any available slot.

might be an older workstation, but it's not *that* old...Save the prybar for your IBM PCjr, OK?

Dave: OK, just loosen these two screws here and pull off the dummy plate ... oops, there's something in here already, Raphael.

Don: Running into a little trouble there, Dave?

Dave: Nothing that can't be overcome, Don. Right, Raphael?

Raphael: Sure Dave. You've got a memory board in there. In fact, that workstation has four 256-KB memory boards for 1 MB total. Looks like the house is full. But, if you opt to buy a 1 MB board and replace the four smaller capacity boards, you've got plenty of slots. You'll be able to keep our SRM card in there as well.

Dave: So, with this configuration, I either sacrifice memory, or do the upgrade thing?

Raphael: That's right.

Dave: OK, thanks for letting us know that so our viewers won't be surprised. Well Don, let's assume that we've done the memory upgrade. The Eventide board looks like this [shot of board in hand —hey, by the way, is a board in hand worth two in the backplane?] It just gets plugged in the available slot like this. Add a dash of thick or thin Ethernet, and you're off and running!

Don: Dave, what other features does the WLZ-320 have that we'd like to know about?

Dave: The Eventide board costs about half that of the HP SRM card. It also uses about half as much power. That's really enticing considering the improved performance you'll get out of the WLZ-320 to boot (no pun intended). You won't need any additional cards in your SRM



The Eventide WLZ-320 Ethernet board.

server, unless it, too, does not have an Ethernet card. But, if you're using a later model 300 series or a 400 or 800 series workstation with its own Ethernet connector, you'll only need Eventide boards for the workstation nodes.

Don: Won't all that wiring be confusing?

Dave: Not really. SRM and Ethernet use the same wiring and terminators. If you do a complete conversion to Ethernet, you can use your existing SRM wiring. If you run both SRM and the WLZ-320, you won't have to worry about incompatible cables.

Don: I thought you couldn't boot a 200 series or early 300 series workstation with an Ethernet card. Their boot ROM doesn't recognize an Ethernet card.

Dave: No sweat, there Don. The WLZ-320 has its own boot ROM that allows the older stations to recognize the card. So that means that with the WLZ-320, you can boot your 200 or early 300 series workstation over the network, eliminating the need for a local disk.

Don: So, even if I already have an SRM network set up. I could still realize gains by switching to an all Ethernet solution?

Dave: Exactly.

Don: I guess the WLZ-320 is particularly suited in sites where the server is a UNIX box. Does the Eventide board help me out if want to run SRM/UX on my HP-UX server?

Dave: Right again, Don...With SRM/UX installed on your UNIX-based server, you can take better advantage of the all the workstations on your network, including your older boxes, because of the throughput gains you'll get. SRM/UX lists for about \$4,500 and runs on HP-UX machines. SRM/UX on a server system, plus Eventide boards in your older workstations gives you the best of all worlds...SRM compatibility, Ethernet capability and HP-UX interoperability...need I say more?

Don: Don't think so, Dave. Sounds like a good deal? How much?

Dave: Each board lists for \$995. Both thickwire and thinwire connectors come on the board, so you won't have to remember different product numbers. What's more, you can keep your SRM cards installed and run them both, if you need to.

Don: I think you said that according to Joe McAffrey, there are some more than 30,000 SRM nodes out in the market. So, a lot of people could take advantage of the speed and throughput gains the WLZ-320 gives you.

Dave: That's right, Don. And it's easy to do, as you can see. Don't even need to bring out the heavy artillery.

[Don and Dave standing triumphantly over the 200 series]

Don: Raphael, thanks for having us over. Dave, thanks for the upgrade work.

[Upgrade 200 series segment over]

Don: Well, we're back here at the ranch. By the way, if you need more information on the Eventide WLZ-320 Ether Board, we'll be flashing Eventides address and phone number on the screen

at the end of the show. And since it is the end of the show, here's that information. So long!

[Closing theme music, Don and Dave turning off workstations in DP Labs ... fade to public service announcement ...]



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Ether Board WLZ-320

PLATFORMS: HP 9000 Series 200 and Series 300 workstations.

PRICE: \$995

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CIRCLE 307 ON READER CARD

Paired To Print



The LZR-16 ScrollWriter And FANTASIA Are Combined To Bring Versatile Printing Power To Your HP 3000

Hardware and software vendors are well aware of the importance of working together. For example, a good quality laser printer is practically useless without the appropriate software. Likewise, a printer software driver won't produce much of an output unless it's talking to a printer.

Oak Grove Systems Inc.'s LZR-16 ScrollWriter continuous forms laser printer, along with its L-25X HP 3000/9000 HP-IB Printer Protocol Converter combine to form a printing system for your HP 3000 or 9000 computer.

In addition, Proactive Systems' FANTASIA/3000 package is a page formatting software product for the LaserJet series of printers and HP 3000 computers (and is also available for HP-UX, MS-DOS and OS/2 platforms). The package contains a

formatter, an editor, a form maintenance system and various supporting utilities.

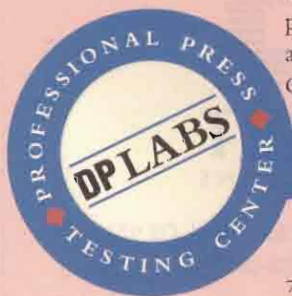
Combining these hardware and software elements in our lab provided us an opportunity to see a versatile printing team in action.

Team Initiation

The hardware we used was an Oak Grove Systems LZR-16 continuous forms laser printer and the L-25X HP 3000/9000 HP-IB Printer Protocol Converter. Our HP 3000 served as the host.

The L-25X HP 3000/9000 HP-IB Printer Protocol Converter emulates the HP 256X family of printers. Its function enables HP 3000/9000 users to connect a variety of printers directly to the HP-IB interface using the standard system parallel line printer spooler.

By George T. Frueh



We positioned the LZR-16 printer and L-25X Protocol Converter near our HP 3000 and began connecting cables. We connected an HP-IB cable between the HP 3000 and the L-25X Protocol Converter. A parallel Centronics cable was connected between the L-25X and the LZR-16.

Both the LZR-16 printer and the L-25X Protocol Converter require separate power connections, and all connections are made on the rear of the units.

Configuring the new printer on the HP 3000 was a simple matter. We set up the L-25X Protocol Converter as LDEV 06 with the HP-IB address of 04. We used the driver name HIOCIPR0, and specified LP2 as the device class.

The installation instructions were very clear, and we experienced no problem installing FANTASIA Version E.04.07 on our HP 3000.

Creating A Form

When FANTASIA/3000 is executed, a main menu appears containing eight items. You select the items using function keys.

The first five function keys execute FANTASIA programs. With these keys, you can edit and print a file, design a style sheet, design a chart and measure character string length. Other function keys provide screen indexes, on-line help and an exit option.

FANTASIA gives you the flexibility to create and edit files. The LARC Editor is similar to the HP Edit/3000 or TDP Editor, but is supplemented with enhancements that support both word processing and the LASER formatting capability.

The LARC Editor is a command-driven editor with a collection of features and options. The F2 key runs the LARC Editor. When run, the prompt changes to a slash (/), from which you can execute both MPE and LARC Editor commands at this prompt. For example, to create a file, you can type in the word ADD at the prompt, just as you would in Edit/3000. You also could type in the MPE command LISTF to display a list of files in your account.

The barcharts and barcodes that we printed contained no streaks or smears, and all edges were sharp.

FANTASIA also lets you design style sheets and charts. The F3 key invokes the FANTASIA Style Specification Screen. From here, you can specify page layout, fonts, output lines and miscellaneous items. F4 invokes the FANTASIA Chart program screen. This program lets you create line, bar and pie charts.

FANTASIA contains a Screen Program to design simple grid forms on an HP terminal using the HP line drawing character set. 41 is entered into the FANTASIA Main Menu to start the SCREEN Program. Once the form is completed, you can convert it into a printable form using the SCRNVCONV program.

FANTASIA also contains three sets of LASER commands for creating customized forms. **Backslash**, **escape**, and **info** allow you to create graphics and line drawings, as well as various types of barcodes.

Proactive Systems recommends using the WYSIWYG PC-based FANTASIA/PC Forms Designer for creating forms. With this method, a page of the associated spoolfile is loaded from the HP 3000 and the form is drawn around the data using a mouse or the arrow keys. The completed form is downloaded to the HP 3000 and merged with production spool files. The provided facility automatically merges production spoolfiles with the required form.

Printing A Form

We created several of our own forms, first using the SCREEN program and then with the LASER command language. The output on the LSR-16 continuous forms laser printer was crisp and clear.

The barcharts and barcodes that we printed contained no streaks or smears, and all edges were sharp. The fonts came out very readable, even down to the 6 PT HELV.

The LZR-16 occupies the footprint of a standard desktop laser printer and operates quietly.

At the time of this evaluation, Oak Grove Systems Inc. merged the LZR-16 and the L-25X into one product. The new product is the LZR-16 Model 3. The LZR-16 Model 3 will service both the HP-IB system and remote spooled printing requirement.

FANTASIA and the LZR-16 ScrollWriter continuous forms laser printer definitely complement each other. The two products work together to create some truly impressive artwork. ■

LZR-16 ScrollWriter

PRICE: \$7,995.

OAK GROVE SYSTEMS INC.

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Menlo Park, CA 94025
(415) 325-1500
(415) 325-6160 FAX

CIRCLE 303 ON READER CARD

FANTASIA

PLATFORMS: MPEXL or MPEV (HP3000), HP-UX, MS-DOS, OS/2

PRICE: Ranges from \$349 for the PC version, and from \$1,750 for the HP 3000/HP-UX version.

PROACTIVE SYSTEMS

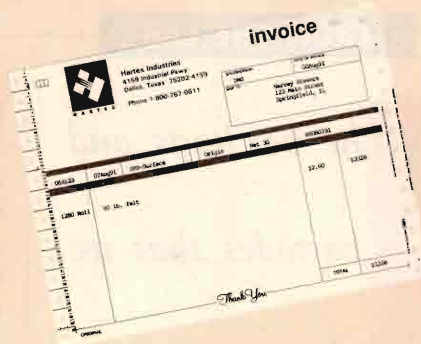
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CIRCLE 304 ON READER CARD



TALE of TWO FORMS



THIS IS THE FORM THAT
2^{HIGH} PRINTED.

This is the Salesman taking
your order for the forms that
2^{HIGH} Forms Company printed.



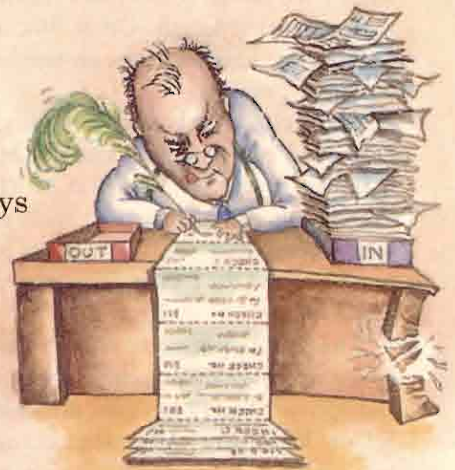
This is the 2^{long} time that passes
while you wait for the forms
that 2^{HIGH} printed.

This is your 2^{big} warehouse
that stores the forms that
2^{HIGH} printed.

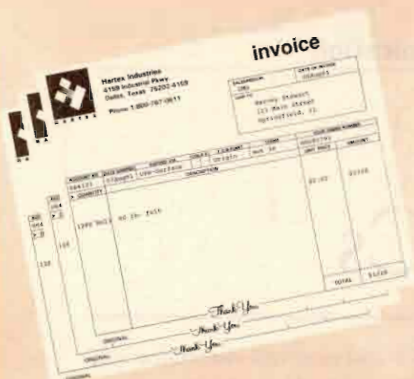


This is the 2^{many} trips lugging around
the forms that 2^{HIGH} printed.

This is the 2^{busy} accountant who pays
for the forms that 2^{HIGH} printed.



This is the 2^{much}
waste that's created
when you throw
away the forms that
2^{HIGH} printed.



THIS IS THE FORM YOU LASER PRINTED USING FORMATION.



Design and edit your own forms on a PC with our easy drawing program. Upload the forms to your HP 3000 and compile them into standard environment files. When you need a form, your HP 3000 automatically merges your form with your application data and prints completed reports on any HP laser printer,

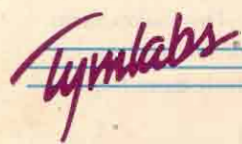
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CIRCLE 265 ON READER CARD



NETWORKING

Tim "Ollie"
Cahoon

In October's column, we reviewed HP's integration of its two Datacommunication and Terminal Controllers (DTCs) into one version for both the HP 9000 and HP 3000 lines. This month, we'll look at some of the options the revamped DTC now makes available.

The HP OpenView DTC Manager on an application that runs on DOS-based PCs, controls and monitors your network of Datacommunication and Terminal Controllers (DTCs). Version 10.5 of the HP OpenView DTC Manager can control up to 50 DTCs while running an IBM PS/2 model 55, Compaq Deskpro or HP Vectra.

By year's end, the software will use protected mode in Microsoft Windows to reduce memory constraints, enabling any DOS-based PC running Windows 3.0 to serve as DTC Manager. Although this will make the implementation of HP OpenView DTC Manager considerably easier, there are a few initial considerations.

Weighing The Options

Because the DOS system designated as DTC Manager will run an entire communications network, it must be chosen carefully. If there are compatibility or hardware problems with the DTC Manager, you won't be able to monitor and manage the network of DTCs. You may want to leave the cheap PCs for word processing and invest in a proven brand for the DTC Manager.

The size of the PC is an equally important factor. One of the most time consuming functions a DTC Manager performs is the downloading of the pro-

ocols to each DTC. A DTC without its protocols is like a PC without its DOS. Most people probably will start out with a 386-class machine to obtain adequate performance from Windows. For significant improvement in the downloading process, users of larger DTC networks should consider 486-based systems.

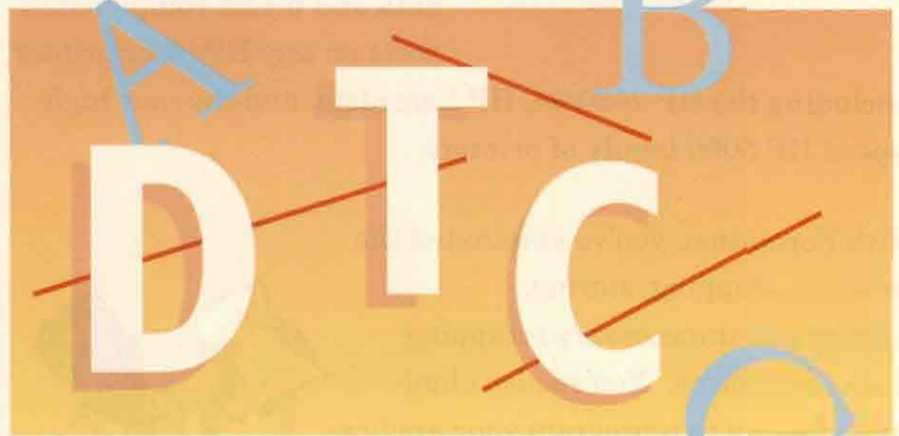
The DTC product has enjoyed considerable success with WANs. In WAN configurations, bridges, or better yet BRouters (bridge and router devices), are needed to control distributed DTCs because the Avesta Flow Control Protocol (AFCP) is currently only Level 2 bridgeable. The AFCP enables communication

bandwidth and cost will determine success in your particular environment.

System And User Roles

Because X.25, ARPA Services and dumb terminals now are part of the DTC product offering, it looks like the only things missing are IBM software products. And, I wouldn't be surprised to see that migration in the next few years. But this scenario isn't entirely correct. There still are communications products on the HP cpu itself, and many play important roles. To understand this we must understand how our network is used.

We use our network in two basic



between the DTC and HP 3000. Look for AFCP to become fully routable in the near future.

The Internet Protocol (IP), used by the DTC to communicate with HP 9000s via Telnet, is still routable. To increase your WAN success factor, HP OpenView DTC Manager now includes a suite of tools to support and modify IP transmission timers.

The new DTC Network Planning and Configuration Guide to help you select the correct parameters for your environment. As with any networking project, packet sizes, transmission delays, available

fashions: communicating as a *user* to a *system* or as a *system* to another *system*. Both types of communication have distinct needs and priorities.

User to system communication is what the DTC is all about — *users* running applications on *systems*. The DTC products provide high throughput communications for users connected directly to it or your network. Products like ARPA Services and X.25 are integrated into the DTC for this purpose. This makes them shareable, frees up valuable cpu cycles, and gives the user a much more responsive product.

Some of these products also are used by a *system* to communicate to another *system*, and could have been designed to run directly on a *cpu*. Putting them on the DTC network makes more sense, however, since they are mainly used in *user to system* communications. Also, being on the network makes them shareable between systems, and saves *cpu* cycles.

System to system products usually reside directly on a *cpu*, but also may be shared network resources. Because their job is to talk to other systems, most companies tend to create dedicated applications for the *cpu*.

Communication Offerings

Currently, you can connect your HP 3000 to a network via a Lanic card or an INP Board. The Lanic card comes standard with the new PA-RISC systems. The INP board is used for synchronous communication (most commonly with IBM systems). In mid-1992, the PU 2.1 facility will be added to HP's LU 6.2 software. The PU 2.1 system to system communication will make your HP a peer with other IBM systems.

With the Lanic card you get the AFCP along with the DTC Virtual Terminal (VT) and Printer Services. Because terminal users will be connected to DTCs, this comes in handy. Unfortunately, because new products tend to evolve quickly, and because the AFCP is proprietary, no vendor has yet implemented it in its products. Because AFCP was designed for *user to system* communications, it's optimized for terminal users.

To put a more standard stack on your system, you need to purchase ThinLAN Link. This adds a true TCP/IP stack and a limited VT Service to your system. HP's ARPA Services, a File Transfer Protocol (FTP) product, uses the ThinLAN Link to communicate with other systems.

The main terminal emulators, Reflection, MiniSoft 92 and Business Sessions, all require the ThinLAN Link to communicate with an HP 3000. These products allow a PC on your network to access your HP 3000 without a DTC or a PC LAN. This is an important consider-

ation for companies getting started with PC LANs.

When ThinLAN Link first appeared, its implementation of TCP/IP was less than optimal. Over the last few years, the product has been transformed to use a true TCP/IP protocol. Lately, it has been further enhanced to handle quadruple the number of TCP/IP connections (up to 4,096 from 1,024). Performance also has been increased to prevent it from becoming the bottleneck on your LAN. Additional enhancements include network management and the ability to disable PROBE.

Keep in mind that ThinLAN does not provide the services such as Telnet or FTP that are normally associated with TCP/IP. FTP is available separately and Telnet is implemented in the DTC.

The Novell IPX/SPX stacks can be added to your system with the purchase of Portable NetWare for the HP 3000. Portable NetWare for the HP 3000 (and HP 9000) allows your machine to act as a server on your Novell network. This gives your HP two different operating environments. More and more vendors are producing products to bridge MPE and Netware or HP-UX and Netware.

TokenRing is a favorite standard with the Novell LAN and IBM crowds. Look for a native TokenRing Link product for the HP 3000. This will fit directly into the *cpu*, and will not only support Novell networks, but in the future will support IBM's SNA as well.

The OSI crowd can rejoice with the ability to run OTS (OSI Transport System) and FTAM (File Transfer Access Mechanism). These products are also available on the HP 9000.

As you can see, some of the products available on the HP 3000 provide different options for the DTC network. There are now ways to make your HP communicate with almost anything. It's your choice. — *Tim Cahoon provides wide area network and HP technical support for the manufacturing operations of a Fortune 500 company.*

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APOLLO

Fred Mallett

Window Shopping

Since we were first presented with choices in workstation windowing systems, we have had disagreements over which windowing system offers the greatest benefit to the users. Two camps that have clashed most often in the window manager battle for Domain workstations are the "Display Manager diehards," and the "X Windows advocates."

Display Manager users enjoy the benefit of dedicated function keys to manipulate the windowing environment. In addition, experienced DM users take advantage of the tightly integrated DM editor (read "built-in," or as the DM diehards prefer to say, "omnipresent") to rapidly modify text in any editable window in a WYSIWYG (What-You-See-Is-What-You-Get) environment. Other outstanding DM features are scrollable transcript and edit pads, and paste buffers, which the undo feature uses so effectively. The major drawback here is that DM isn't exactly widely available.

By contrast, the X Window System offers an environment that is controlled through intuitive menu selections using only a mouse. (X advocates call this "user friendly.") X users also enjoy the ability to execute applications on one system and display the results on a different display. If, for example, you are executing a cpu-intensive simulation that results in an X graphics image, the simulation can be run on your HP-UX Series 9000 Model 750 speed-demon, and the results of the simulation, as well as interactive input, can be displayed locally on your DN4500. X Windows also offers many of the standard personal applications written in a graphical wrapper. Tools such as a calculator, calendar, clock, mail, text

and bitmap editors are included to enhance your environment.

X also behaves differently than the DM in its treatment of screen cursors. X provides multiple cursors which stay in windows to identify input positions, and an additional cursor, often called the pointer, which is free to roam the display, activating other applications and modifying window positions.

Best Of Both Windows

From a user perspective, strong arguments can be made to support the use of either windowing system. It's basically a philosophical decision, between the speed and efficiency of the DM and the

play Manager. The good news is that you can have the best of both worlds. Yes, the X Window System and the Domain Display Manager can coexist in a well behaved manner on your system.

If you have at least 8 MB of memory and at least a DN3xx0 class machine, you can explore the world of X Windows and still maintain a DM environment. To understand how this is done, a basic understanding of X Windows is necessary.

The X Window System is based on a client-server model. The X display server is a background program that keeps track of all input coming in the form of client data, mouse movements and keyboard

It's a philosophical decision, between the speed and efficiency of the DM and the more modern capabilities of X Windows.

more modern capabilities of X Windows.

From the application developer's perspective, X Windows offers an opportunity to develop applications on one vendor's workstation and easily port them to other vendors' hardware without rewriting the code. For this reason, almost all new workstation applications are developed in X Windows.

Suffice it to say there are many reasons for choosing an X Window-based environment and a compelling number of reasons to stay with the Domain Dis-

input. As the X display server receives information, it updates the client application on your display. The X display server may run locally on your computer or on an entirely different machine. If Domain servers and clients are on different machines, they communicate through a TCP/IP link.

X clients can be thought of as X applications that make requests to the X display server for such things as moving,

resizing and iconifying windows, as well as updating application graphics within appropriate windows. In a Display Manager environment, the DM fulfills the role of the display server, and DM applications (clients) behave as X clients by making requests to the DM to update the display.

The X Window System makes use of window manager client applications to control the display environment. Like any other X client, these window managers make requests of the X display server to update the display. The two most popular window managers are **uwm** (Universal Window Manager) and **mwm** (Motif Window Manager). Each window manager has methods for moving, resizing, rearranging, and changing windows into icons.

Who's In Control?

You might assume that the DM has been rewritten to serve as yet another window manager client for the X display server. Wrong. The Domain display server (Xapollo) is actually a shared server that allows DM applications and X based applications to coexist and share the same physical display.

This is possible because both X and DM use the same low level system facilities for processing input, and managing the display information. These are the Input Demultiplexor (IDM) and Rectangle Manager (RM) utilities. The RM manages a global database of rectangular areas on the screen. It contains information such as size, location, stacking orientation and parent/sibling relationships. The IDM controls keyboard and mouse input. It, too, maintains a database of information including event queues, and event relationships binding with information contained within the RM database.

With both the DM and X running simultaneously, which windowing system controls the positioning and behavior of the windows on the display? Actually, the choice is yours. Xapollo can run in either a borrow display mode, in which the window system is controlled by X and only X applications can run, or in one of two share modes described in the following paragraphs.

When the DM owns the root window, the DM acts as the primary window system. It controls the movement, resizing, icon creation and window management functions for X and DM windows. This mode can be identified by the arrow shaped cursor in the root window.

When X owns the root window, X is the primary window system. An X window manager (such as **uwm**) controls all the window management such as moving, resizing, and creating icons of both X and DM windows. This mode can be identified by the X shaped cursor in the root window.

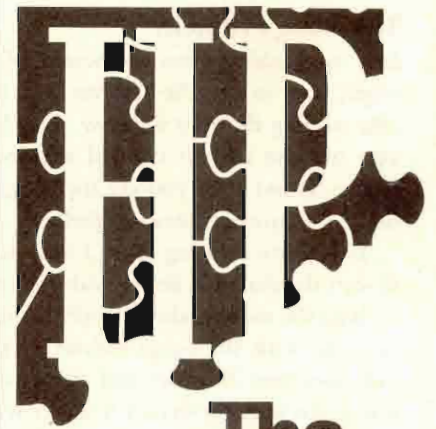
Before You Leap

Before you plunge into the exciting new world of X Windows, a few things need to be done. First, if you haven't done so already, you should plan on configuring and running TCP/IP. It is possible to run X Windows without it, but you cannot use some functionality. If for some reason two X servers get started, they will get confused about which client they're serving and generate "unexpected results." Without TCP/IP running correctly, it will take a long time for the X server to start. That time delay may fool you into thinking the X server didn't start, causing you to attempt to restart the X server resulting in the above problem. One other good reason for using TCP/IP is that the client and X server may run on different systems.

The X Window system requires a minimum of 16 pseudo-ttys (/dev/ptyp[0-f]). Use the **/etc/mkdev** command to create additional pseudo-ttys if the OS version you are running did not.

Be sure that **x11lib** is listed in your **/etc/sys.conf** file. This is done automatically with the installation of SR10.2 or later.

As mentioned earlier, X can display client applications on either local or remote systems. The **DISPLAY** environmental variable defines the host and display to actually draw on. It is best to set this when the user logs in so it is not forgotten. X will not be able to execute any programs without it being set.



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The Root Problem

DM users easing into the world of X might want to start the X server with the DM owning the root window. This lets you use the DM to control windows (move, grow) until you get the hang of using X terminals instead of shells.

If you are running SR10.3 and wish to start the shared X server with the DM owning the root window, simply include Xapollo with the other entries in the /etc/daemons directory and reboot the node. To start the shared X server with X owning the root, include X in the /etc/daemons directory and perform a reboot. To start an X window environment with out any DM functionality, use the /etc/daemons file xdm.

Once the display server is running, X window managers can be started at login time. There are a couple of window manager programs to choose from, possibly the subject for another "choices, choices" column.

Operating in an environment with

both X windows and DM windows active on the display concurrently offers users the ability to run both DM and X applications at the same time. It also allows you to choose the style of window control you want to use, X menus (and key accelerators) or DM grey keys.

Try It (Again), You'll Like It

If you took the opportunity to load the early ADUS X11 release in the SR9.7 time frame, you owe it to yourself to revisit X with the SR10.3 release. It really has been cleaned up and offers substantially better performance.

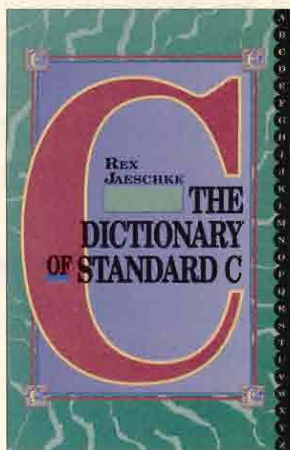
I recently had to install the Q3 PSK. This provides X11 R4 support and the performance is improved over the SR10.3 release, but at a price. The PSK replaces the shared mode Xapollo display server with a borrow mode server. It does however, have a feature that allows you to hot key between X and DM screens. It was not a trivial process to install, and I would recommend attempting the in-

stallation on a non-critical node before mass distributing it to your end users.

The best news I saved for last. If you were at the ADUS summer conference, you heard already, but if not: Sooner or later we will all find ourselves in an "X-environment-like-it-or-not" because of OSF/1, and HP-UX, and the gradual demise of SR10. That wasn't the good news. The good news is that HP already has a functional version of and will soon release an X-based application that provides DM-like capabilities. The function keys and "grey" keys all work like always. The version I used was great, the only feature on the copy running at ADUS that didn't work was rectangular copy and paste. I even like the HP internal nickname for it: "DM Lite." — Fred Mallett is president of FAME Computer Education in Bloomington, MN.

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PC TIPS

Miles B. Kehoe

Did you know that there are ways to customize Windows 3.0 that Microsoft never told you about? There are several options available to start Windows, as well as ways you can circumvent the normal Microsoft logo screen you see every time you start Windows.

Before we get to the undocumented start-up options, let's briefly review the options that Microsoft *does* document. As you probably know, there are three operating modes in which Windows can run: real mode, standard mode and 386 enhanced mode.

Real mode provides the most compatibility with earlier versions of Windows, and is the only choice when using an Intel 8088-based Vectra. In real mode, you're limited to 640 KB of memory, but it may be your only choice if you have applications developed for earlier versions of Windows.

Standard mode requires an Intel 80286, 80386 or 80486 system, and can run in a system with as little as 640 KB of conventional memory and 256 KB of expanded memory. It will, of course, use additional expanded memory, and may provide faster execution of applications than either of the other two modes.

386 enhanced mode requires an Intel 80386- or 80486-based system, and requires at least 640 KB of conventional memory and an additional 1 MB of extended memory. It also allows you to allocate part of your hard disk as extended memory. 386 enhanced mode provides the most power and flexibility, but often results in slower program execution than Standard mode. In 386 enhanced mode, Windows can require as much as 6 MB of free disk space if you aren't using a dedicated swap file.

When you start Windows, one of the first things it does is to determine which mode to use. It bases this decision on the type of processor, and the amount of conventional, expanded and extended memory installed in the system. If you want to override Windows' default selection, you can add additional parameters on the command line when you invoke Windows. Below is the listing for the command line and parameters for each mode.

Mode	Command Line
Real Mode	win /r
Standard Mode	win /s
386 Enhanced Mode	win /2 win /3

A Command Line Start

Windows allows you to define programs to load or run automatically by including the program name in the WIN.INI file. However, you can run any application from the MS-DOS command line by entering its name when you start Windows. You also can enter additional parameters at the same time. For example, to open Microsoft's Word for WINDOWS directly, with the document C:\DOCS\COVERLET.DOC loaded, you can enter the following command line:

```
win winword c:\docs\coverlet.doc
```

You can use Windows or non-Windows applications, or even a PIF. Remember, if you start a non-Windows application, Windows will use the default PIF file "_defaults.pif".

Losing The Logo

Many of you who have used earlier versions of Windows will remember that, in the past, you could override the standard Windows logo by entering a space after typing "win". This got you into Windows 2.X a bit faster, and you didn't have

to see the Microsoft advertisement every time you started Windows.

In Windows 3.0, this trick doesn't work. However, by appending a single colon to the command line, you can accomplish the same effect. Start Windows using the command line:

```
win :
```

Windows will start, but you won't have to view the Microsoft logo screen. If you enter a start-up mode, you need to specify the mode ahead of the colon on the command line. If you want to start an application, you may find it attempts to interpret the colon as an option or filename, so you may not be able to suppress the logo. However, there is more than one way to get the job done!

Making It Permanent

What Microsoft doesn't tell you is that you can eliminate the standard logo completely. To start Windows, you use the WIN.COM program. If you look on the Windows distribution disks, you won't find a file called WIN.COM. The SETUP program actually creates WIN.COM from three other files based on information you provide. These files include a small program that determines the PC configuration; a second program which will load and display the Microsoft logo; and the actual start-up logo image.

The first of these three files is called WIN.CNF. This is actually a small COM file that checks your hardware and the MS-DOS command line to determine which of the three Windows modes to use. It then transfers control to the second file that SETUP, in turn, includes in your WIN.COM.

This second file sets the appropriate mouse port and video mode and displays

the standard Microsoft logo. Incidentally, it is this program that can add several seconds to your start-up if you have a serial mouse installed on port COM2. The last file that SETUP includes in your WIN.COM is a bitmap graphics image of the Microsoft logo. These files differ depending on the type of video device used. Figure 1 shows the names of the files which SETUP includes depending on your video device.

SETUP stores WIN.CNF and the appropriate files from Figure 1 in the SYSTEM directory under your Windows directory. This lets SETUP reconstruct a WIN.COM as necessary.

If you want to avoid the Microsoft logo, and you haven't changed your system configuration, you can manually create a replacement for WIN.COM that only includes the WIN.CNF portion. To avoid any errors that might prevent Windows from starting at all, it's prob-

ably a good idea to make a backup copy of WIN.COM in your Windows directory, as well as the LGO and RLE files in the SYSTEM directory. For an additional measure of protection, I'd suggest you call your customized version something other than WIN.COM!

Change your Windows directory and create a file called MYWIN.COM by entering the following line:

COPY WIN.CNF MYWIN.COM

Next, start Windows using MYWIN instead of WIN. You'll see Windows start normally, except that you won't see the standard Microsoft logo! — *Miles B. Kehoe is based in Mountain View, CA.*

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FIGURE 1	
Display File	Bitmap File
VGALOGO.LGO	VGALOGO.RLE
EGALOGO.LGO	EGALOGO.RLE
EGAMONO.LGO	EGAMONO.RLE
CGALOGO.LGO	CGALOGO.RLE
HERCLOGO.LGO	HERCLOGO.RLE

Files included in WIN.COM.

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OmniQuest Speeds Information Access

Dynamic Information Systems Corp. (DISC) shipped OmniQuest, a product that provides OMNIDEX instant information access to a broad spectrum of report writers, including QUIZ, QUERY, QTP, BRW and Inquisitive. OmniQuest lets users select records for reporting using OMNIDEX keyword retrieval from within the report writer program using a Qualify instruction. Records can be selected from a prompt/response window invoked by OmniQuest, then imported directly into the report writer for importing.

OmniQuest also allows users to more effectively interact with the database before reporting by providing drill down capabilities. Users can select records using keywords and values, then receive an instant count of the records that have qualified. Those records can be further qualified, or the user may start the selection again if they're not satisfied with the result.

The OmniQuest interface module is \$2,000 to \$12,500 depending on cpu. Contact DISC, 5733 Central Ave., Boulder, CO 80301; (303) 444-4000.

Circle 400 on reader card

Talarian Corp. Enhances RTworks Software Tools

Talarian Corp. released RTworks Version 2.0, a set of software tools for building intelligent operator systems. Applications developed with RTworks allow operators of complex, time-critical systems to process, display and distribute data.

RTworks Version 2.0 includes an improved development environment with a point-and-click interface for creating, testing and debugging. This environment conforms to the Motif GUI standard and includes object browsers.

Features include dynamic object creation and deletion in both knowledge bases and graphical views, backward-chaining in a real-

time system, multiple inheritance, if-then-else constructs within rules, Motif-widget input objects and raster or bit-mapped images in the delivery graphics environment, data archive and playback modules, and improved task management that enhances the automatic failover and fault tolerance of RTworks.

RTworks Version 2.0 is available on UNIX workstations including the HP 9000.

The complete development system is \$28,000 and runtime versions are \$8,000. Contact Talarian Corp., 1043 N. Shoreline Blvd., Ste. 201, Mountain View, CA 94043; (415) 965-8050.

Circle 399 on reader card

OCS Improves Librarian For HP 3000s

Operations Control Systems (OCS) released Librarian 3.0 for all HP 3000 configurations.

Librarian 3.0 features include the MAKE facility. Modeled on the UNIX utility of the same name, MAKE helps keep the executable version of files up-to-date. By utilizing a set of user-defined rules and analyzing timestamps, MAKE determines which files have been altered and automatically rebuilds the application.

Another enhancement is the Librarian ShortCut, designed to help you implement Librarian's basic features including checkout/checkin, serial access control, file retention and compression and audit trails.

Contact OCS, 560 San Antonio Rd., Palo Alto, CA 94306; (415) 493-4122.

Circle 395 on reader card

Network Adapter Attaches Printer To Many Computers

Imageworks debuted its Image Director, an intelligent network adapter that allows one laser printer to attach to up to six separate computer environments simultaneously and automatically switch print modes according to application source, without manual intervention.

The multiple port Image Director accepts input from HP Spectrum Series, IBM PC networks, IBM 4300 Series mainframes, IBM Systems/3x and AS/400 minicomputers, AppleTalk networks and DEC VAX mainframes. It supports a variety of print emulations including: HP Series II, Postscript, IBM proprietary printing protocols and HP 256X, Digital's LNO3+ and Wang proprietary printing protocols.

The Image Director currently connects to high-performance versions of Dataproducts LZR 1200 and HP Series laser printers. The device can be configured to be plug-compatible with RS-232, PC parallel, HP-IB, Coax, Twinax and AppleTalk connectors.

Price ranges from \$695 to \$5,000.

Contact Imageworks, 10 State St., Newburyport, MA 01950; (800) 348-1350.

Circle 398 on reader card

USS Offers UNIX Resource Management Products

Unified Software Systems (USS) introduced new resource management products to provide management and ease of access for UNIX systems. Presently packaged under the name UNICORN, the product consists of a series of software modules that can be used separately or in conjunction with each other.

The first module is an access control module that runs as a shell around UNIX. When you log onto the system, you are captured by this module. Once access rights are determined, you are given a menu of authorized tasks. As you select a desired task, UNICORN launches that task.

The second module is a security audit package, which examines each file, directory, user logon, etc. in order to determine security vulnerabilities.

The last module is a security daemon, or background process not associated with any particular terminal, which "wakes up" periodically to perform a specified task. It will search for changes to critical files, users who have obtained more capabilities than

authorized, and other suspicious activities. Contact Unified Software Systems, 6551 Loisdale Ct., Suite 400, Springfield, VA 22150; (703) 922-9800.

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FrameMaker Available On HP And Sun Workstations

Frame Technology Corp. announced that FrameMaker and FrameViewer 3.0 X, running under the X Window System and OSF/Motif, is now available on HP 9000 Series 300/400/700/800 workstations. FrameMaker is also available for Sun-3, Sun-4 (SPARC and SPARC compatibles), and Sun 386i workstations. In addition,

FrameMaker and FrameViewer 3.0 X is available on HP Apollo DN2500-DN5500 systems and Series 400, and on IBM's RS/6000 family.

FrameMaker 3.0 X combines word processing, tables, page layout, graphics, equations editing, hypertext and structured document tools in one package. FrameViewer is a product for online viewing and distribution of FrameMaker documents. Using FrameMaker 3.0, all FrameMaker files created in version 2.1 are automatically converted and directly usable with formatting completely preserved.

FrameMaker 3.0 X is \$2,500 for a floating license that can be shared across a network.

Contact Frame Technology Corp., 1010 Rincon Circle, San Jose, CA 95131; (408) 433-3311.

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Robelle's Xpress 2.8 Includes Screen Editor

Robelle Consulting Ltd. released Xpress 2.8, its electronic mail system for the HP 3000 running MPE and MPE XL.

Features now include native-mode availability. The installation job stream automatically installs the native-mode versions on MPE XL machines. MPE XL native-mode spoolfiles can be imported into Xpress using only the spoolfile number.

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CIRCLE 222 ON READER CARD

Xpedit provides full-screen editing capabilities for users who are unfamiliar with programmer-style editors like Qedit. Xpedit provides the ability to update, add, insert and delete lines of text. Movement through the document is accomplished using clearly-labelled function keys, and online help is available from the main edit screen.

Contact Robelle Consulting Ltd., Unit 201, 15399-102A Ave., Surrey, B.C., Canada V3R 7K1; (604) 582-1700.

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ISSI Offers Data Management Tool For MPE XL

Interactive Software Systems Inc. (ISSI) announced its user data management tool UDMS for the HP MPE XL environment.

UDMS enhances the functions of and access to existing applications. UDMS allows users to transparently access information across the many databases and file structures available with MPE XL. UDMS enables "relational joining" of up to 32 files from databases such as TurboIMAGE, ALLBASE, INGRES and KSAM. The ANSI window-based user-interface of UDMS enables the entire user spectrum to bring information to their desktop and perform functions such as summarization of data, defining reports, executing online queries, creating data management forms and exporting data to PCs.

UDMS is written in C and is coupled with the offering of an Enhanced TurboIMAGE Interface that employs advanced key retrieval techniques not inherent in the standard TurboIMAGE offering.

Prices range from \$4,500 to \$100,000.

Contact Interactive Software Systems Inc., 7175 W Jefferson Ave, Suite 2500, Denver, CO 80235; (303) 987-1001.

Circle 392 on reader card

Oak Grove Extends Printer Capabilities

Oak Grove Systems announced the HP LJIIISi Modular Extender for HP LaserJet developers and the L-25Si Catalyst proprietary HP-IB interface card.

The Extender card is compatible with the Modular I/O port, an interface between the HP LJIIISi and an intelligent I/O card. Extender extends the I/O bus approximately seven inches and is fitted with a metal slide

provided for external support. All data, command and power lines are extended.

The L-23Si Catalyst is an HP-IB interface card designed to increase performance of the HP LaserJet IIISi running from HP 3000 and 9000 platforms. The L-25Si catalyst measures 5 1/2 by 6 inches and is user-installed into the modular I/O port. The Catalyst performs at 500 KB per second and dynamically shares HP hosts. The user may choose from four different interfaces: HP-IB, GP-IB, remote spool status checking, and PC serial Xon/off.

Oak Grove System's Extender is \$395. The L-25Si Catalyst is \$795.

Contact Oak Grove Systems Inc., 1550 El Camino Real, Suite 270, Menlo Park, CA 94025; (415) 325-1500.

Circle 391 on reader card

Visibility 5.0 Improves Manufacturing Control

Visibility Inc. released Visibility Version 5.0, in which the manufacturing control system now features two new modules, Features & Options and Field Service, as well as enhanced functionality to existing modules.

Features & Options facilitates configuration of features and options for custom orders and quotations. It helps "to-order" manufacturers speed up the quoting and order entry processes and minimize errors. Selection rules ensure the accuracy of each order configured. To implement these rules, Features & Options allows clients to establish a master file or list of all required and optional features of an assembly, including quantities, styles, colors and sizes. Users establish selection rules to relate options and features. Field Service helps manufacturers manage field service operations and track service call activities.

Other enhancements include serial and lot number tracking and traceability, finite scheduling, independent tracking of labor and machine hours and support of an unlimited number of currencies and exchange rates.

Contact Visibility Inc., Two Main St., Stoneham, MA 02180; (617) 279-2100.

Circle 390 on reader card

Infotek Rolls Out HP Memory Upgrades

Infotek Systems announced memory upgrades for the HP 9000 Model 425c and Model 382. The boards are based on the industry-standard 4-megabit chips that utilize ECC logic.

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The EM425e and EM382 Series are available in 8- and 16-MB capacity sets, each set consisting of two boards. The pairs can be installed into the computers' memory-expansion slots up to the machines maximum configurations. The Model 425e has six memory slots and a maximum configuration of 48 MB. The Model 382 has four slots and a capacity of 32 MB.

The EM425e and EM382 modules are priced at \$1,350 for the 8 MB module and \$2,750 for the 16 MB module.

Contact Infotek Systems, 625 S. Lincoln, Suite 204, Steamboat Springs, CO 80487; (303) 879-1184.

Circle 389 on reader card

MiniSoft Delivers PerfectMail

MiniSoft announced the PerfectMail electronic mail system for HP 3000, HP 9000, LAN and PC users.

PerfectMail features a full screen word processor and spelling dictionary for message composition on any terminal or PC. PerfectMail also includes a direct interface for PC-based word processing packages and offers automatic mail notification, distribution lists, bulletin boards, message forwarding and individual message security.

PerfectMail connects to the outside world through links to FAX, MCI Mail Sprint Mail and other external services. PerfectMail supports terminal emulation packages such as MiniSoft 92, Reflection and Advancelink.

Prices begin at \$1,000.

Contact MiniSoft Inc., 13617 State Hwy. 9, Snohomish, WA 98290; (800) 682-0200.

Circle 388 on reader card

Contemporary Cybernetics Offers 1-GB Disk Drive

Contemporary Cybernetics Group introduced the CY-2000, a 1-GB magneto-optical disk drive that is plug-and-play compatible with most PCs, workstations and servers including those made by HP Apollo, Sun, Macintosh, DEC and IBM.

The double-sided media, called optical platters, are erasable, rewritable and available in both plastic and glass. The dimensions and mounting provisions are identical to those of standard 5 1/4-inch Winchester or floppy disk drives. The CY-2000 offers an average seek time of 35 ms, a 10 mbps average transfer rate and employs both read-after-write

checking and automatic ECC.

The CY-2000 is a turnkey subsystem that features the drive in a tabletop unit with controller, power supply, cabling and a 12-month warranty with support. Erasable-optical and 8mm helical scan tape backup can be combined in a single unit combining near-line storage and archival storage.

Contact Contemporary Cybernetics Group, 11846 Rock Landing, Newport News, VA 23606; (804) 873-9000.

Circle 396 on reader card

GBS Consultants Introduces Tracker/3000

GBS Consultants introduced the Tracker/3000 system for tracking the history of an end user request from initial contact to resolution.

Tracker/3000 offers management controls within the work unit, distribution of work loads, prioritization of end user requests and problems, measurement of individual and departmental performance standards, equipment inventory, maintenance records and service call status. Tracker/3000 also offers a hardware and software inventory tracking system.

Contact GBS Consultants Inc., 6087 South Quebec, Suite 101, Englewood, CO 80111; (303) 721-077

Circle 387 on reader card

WRS Creates VxWorks For 68040 Architecture

Wind River Systems Inc. (WRS) announced support for the Motorola CISC-based microprocessor, the MC68040, for the VxWorks real-time operating system/development environment. Compared to the 68030 chip, which ran at 12 mips at 50 Mhz, the MC68040 delivers 22 mips at 25 Mhz.

With the release of the first 68040-based VME boards, VxWorks has been ported and is available on the Motorola MVME 165 and MVME 167, Force cpu 40 and the Tadpole TP41.

Based on cross-development with UNIX, VxWorks is an open-architecture, real-time operating system with integrated networking facilities, true real-time performance, and a complete software development environment.

Pricing starts at \$19,500.

Contact Wind River Systems Inc., 1010 Atlantic Ave., Alameda, CA 94501; (415) 748-4100.

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CIRCLE 196 ON READER CARD

Introl Supports Erasable Optical Jukeboxes

Introl Corp. announced support for the HP line of erasable optical jukeboxes on Sun workstations and the availability of its enhanced 4mm DAT subsystems for Sun and Solbourne workstations.

Introl's current line of 6- and 10-GB Personal Library Jukebox Subsystems has been expanded with the addition of HP's 10- and 20-GB jukeboxes. Software support is provided by Introl's SCSI-FLEX UNIX jukebox driver package, providing transparent operating system support for the jukeboxes by emulating multiple hard disks.

Introl's 4mm DAT subsystems incorporate Introl's latest DAT software, providing full support for DDS tape formatting, dual partitioning and fast search capabilities. With tape directory information maintained in one DAT partition and data contained in another, fast data retrieval utilizing the DAT fast search command for tape positioning is enabled. Compatibility with existing tape formats is

maintained by utilizing the UNIX standard tar format for the data partition. This ensures that the tapes can be read on other systems not incorporating the Introl drivers.

Introl's complete Jukebox Subsystem prices start at \$9,995. The complete DAT Subsystem prices start at \$2,495.

Contact Introl Corp., 2817 Anthony Lane S., Minneapolis, MN 55418; (612) 788-9391.

Circle 384 on reader card

ISA Offers DAT And Tape Subsystem

ISA Co. announced two products: the ISA Model 5031 DAT Unit, and the ISA Model 5050 Tape Subsystem.

ISA's Model 5031 DAT Unit is a second generation DAT subsystem featuring on-board hardware data compression circuitry providing a maximum of 5 GB of data storage on a 4mm DAT tape cartridge. Two recording modes are available: DDS or Compression Mode, with over 500 KB per second transfer rate provided in Compression Mode. The Model 5031 is available with

either an HP-IB or SCSI option, and comes in a half height form factor.

ISA's Model 5050 Tape Subsystem offers IBM-Type interchange data format tape cartridge support to HP computer users. The 5050 features 500 KB per second data transfer rate and fast repositioning time. HP-IB or SCSI options are available. The HP-IB model supports the HP 79xx Tape Series nine track tape. The 5050 Tape Subsystem is ideal for archive applications and file transfer between systems and provides automatic loader support.

Contact ISA Co. Ltd., 14825 St. Mary's Lane, Suite 208, Houston, TX 77079; (713) 493-9925.

Circle 383 on reader card

Sedasis Unveils 5 GB Storage Unit

Sedasis announced the SED4850 5 GB 8mm storage unit. The SED4850 offers a 500 KB per second data transfer rate and short search time.

The SED4850 features an IEEE interface

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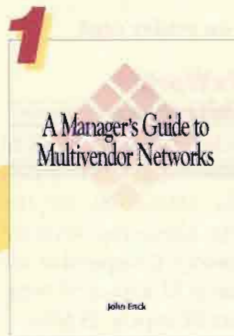
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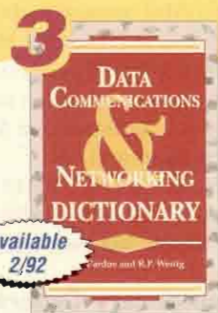


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and is compatible with HP7900 or DAT. The SED4850 emulates on your choice of HP79xx tape drives or a DAT (DDS) series HP1300.

Contact Sedasis, Le Vendome-12, Rue du Centre, 93167 Noisy Le Grand Cedex, France; (33) 1 45 92 3650.

Circle 382 on reader card

Optimization Releases Terminal Emulation Software

Optimization Inc., an HP VAB, introduced two terminal emulators. In addition to the VT220/241TE and the HP2392/97TE running in HP-UX on the HP 9000 Series, the new emulators offer support for the new RISC-based machines, including the HP 9000 700/800, SUNSPARC and IBM RS/6000, and the SCO/UNIX operating system.

These emulators run in the Xwindow/Open window environment and incorporate an Xkeyboard which interprets any USASCII keyboard as well as foreign language keyboards.

Contact Optimization, 1755 E. Bayshore Rd. #23B, Redwood City, CA 94070-4142; (415) 365-9880.

Circle 381 on reader card

HP's Upgrades RTAP/Plus Toolkit

HP announced version 5.1 of RTAP/Plus, the integrated, scalable software toolkit for building industrial automation systems.

New features and enhancements of RTAP/Plus 5.1 include HP-UX 8.0 compatibility with a user interface based on OSF/Motif 1.1, a display server that interconnects schematics, control panels and the RTAP database without writing programs, compatibility with HP workstations including the HP Apollo 9000 Series 700, HP 700/RX X stations and non-HP terminals, and with HP Visual User Environment (VUE), support for Siemens PLCs using the H1 Protocol, and process- and environment-monitoring program that monitors health of remote RTAP nodes.

The RTAP/Plus industrial automation enabler acquires data from end devices such as PLCs or RTUs and integrates this data to help automate company operations. The RTAP/Plus open-software platform, based on industry standards such as a UNIX operating system, X Window System and Motif, provides flexible application development and multivendor interoperability.

System Warehouse Supplies OilTrak Upgrade

System Warehouse announced the Kim Petroleum Computers' OilTrak Oil & Gas Company Management System on HP-UX for the RISC-based Series 700 and 800 product line. In addition, System Warehouse will custom-tailor the package to include CAD systems and SCADA process control systems integration.

In addition to the various General Accounting and Human Resource Management modules available, OilTrak offers several industry-specific modules including Joint Interest Billing, Land/Lease Management, Reserve Estimating, Revenue Accounting, Wellhead Database Management, Well/Job Costing and Estimating and Gas Utility Billing.

Contact System Warehouse, 350 SM 1959, Suite 105, Houston, TX 77034;

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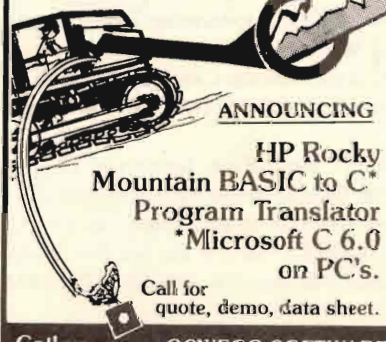
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[CALENDAR]

[JANUARY]

28-30: A Windows & OS/2 Conference will be held at the San Jose Convention Center, San Jose, CA. Call Stan Politi (510) 601-5000.

[FEBRUARY]

12-14: The Royal Dutch Fairs is organizing the 4th European SuperComputing Exhibition and Conference at the CNIT Exhibition Centre "La Defence", Paris, France. Call Mrs. Marjolein Jacobs 31.30.955.622

[MARCH]

9-12: NCGA is sponsoring CAD & Engineering Workstations '92 and Business Graphics '92 at the Anaheim Convention Center, Anaheim, CA. Call NCGA (703) 698-9600.

16-17: Wind River Systems in conjunction with Digital Consulting will sponsor the first real-time developers forum in the U.S., WINDAYS USA, at the San Jose Fairmont Hotel, San Jose, CA. Call (800) 767-2336.

23-26: The National Database Exposition and Conference, DB/EXPO will be held at the Moscone Convention Center in San Francisco CA. Call NDN Enterprises, (800) 2DBEXPO.

[APRIL]

14-17: Jobscope Corp. is holding its annual Jobscope User's Conference at the Clarion Hotel In New Orleans, LA. Call Kathryn Heckelmann, (803) 234-4847.

The Association of Contingency Planners, N. California Chapter will hold monthly meetings the last thursday of every month in San Ramon, CA. ACP focuses on disaster and business recovery planning and issues. Call Stacey Jonasen (415) 765-2270 or Belinda Tovar (510) 460-1623.

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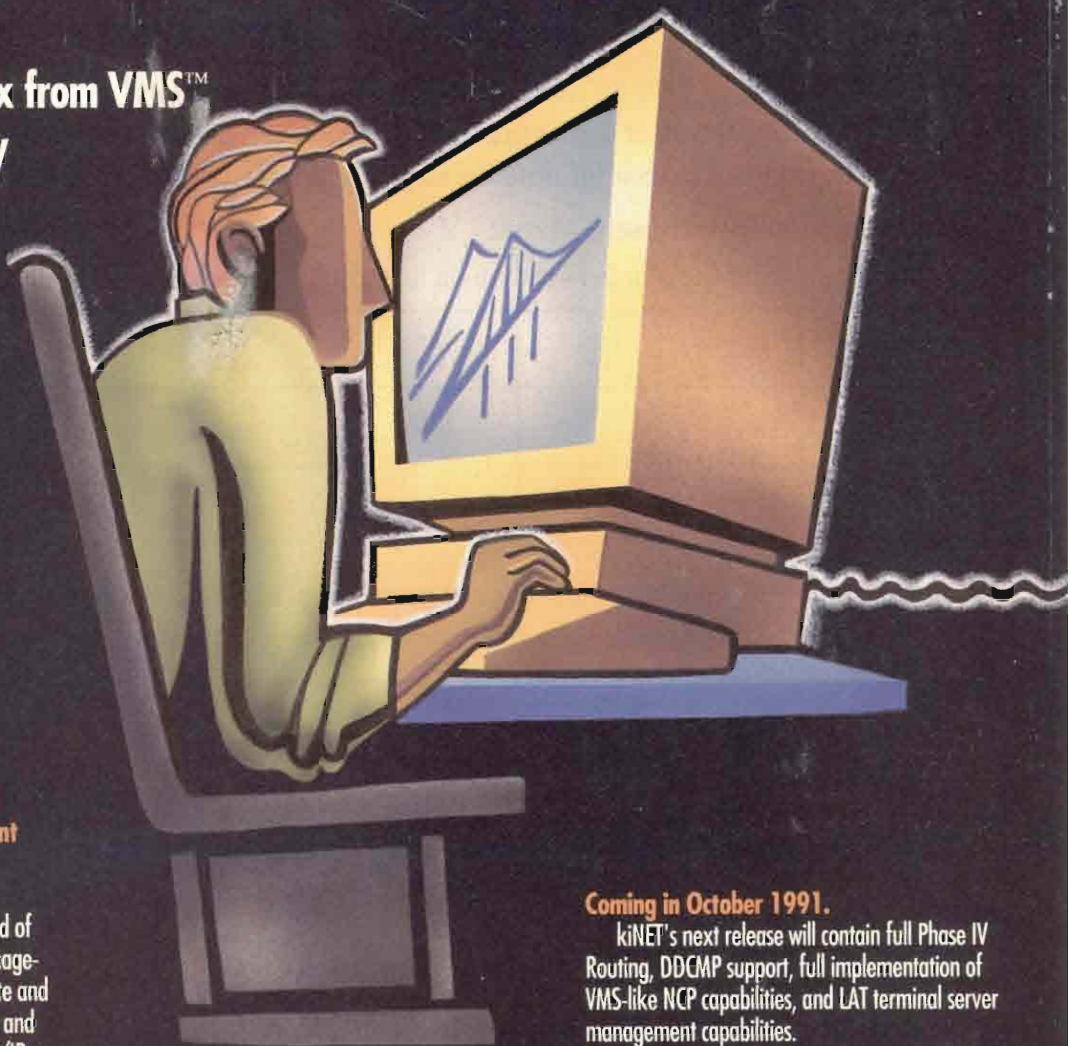
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AND DEC WORLDS.

UNIX Today! DEC's New Strategy

Offerings Reflect Deeper Commitment To Open Systems

BY MITCH WAGNER

Maynard, Mass.—Digital Equipment last week rolled out a huge number of new networking products, offered DECnet source code for the first time and revealed plans to license its multivendor Network Application Support (NAS) technology. The announcements, combined with the release of an aggressive effort to port software to Hewlett-Packard, IBM and DEC's recent state-of-the-art migration to all-RISC architectures, suggest: Last week's news shows that DEC is pushing its traditionally proprietary products into the open systems arena as hard as it is pushing itself to business practices and internal standards practices and internal standards into its products. "I think it's great," said managed Salomon Brothers analyst Michael J. "Mike" Salomon on May 31, "it's a significant step into a new direction."

The undersigned Vendors and End Users acknowledge and are encouraged by DEC's most recent announcements in regard to providing DECnet as a defacto/non-standard protocol across UNIX platforms by making their Ultrix DECnet "End-Node" code available.

We think ki Research has already accomplished what DEC states it intends to do and much more. In our minds, ki Research's kiNET is the defacto DEC connectivity standard providing not only "Full-Function" DECnet but LAT and MOP capabilities as well.

We have selected kiNET as the defacto DEC connectivity standard for our UNIX systems because:

- kiNET's VMS-like command line interface and simplified program interface are identical across 28 vendors and 60 plus hardware platforms.
- The kiNET product is fully supported by ki Research, a company specializing in DEC Connectivity for UNIX platforms.
- ki Research offers and delivers 24 hour support service 7 days a week world-wide.
- The kiNET product is continually enhanced and improved. The latest enhancements will include DECnet Phase IV Routing, LAT Application Services, a complete NCP implementation and LAT Terminal Server Management.
- kiNET's two year old LAT Host Services is the most mature LAT Host Service Product for UNIX Systems on the market today.

We, the undersigned, are proud to offer and use kiNET as the defacto DEC Connectivity Product supporting "Full-Function" DECnet, LAT and MOP capabilities.

* All signatures are on file.

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- Shari Cohen, MODCOMP
- Neil Kleeman, Solution Systems, Inc.
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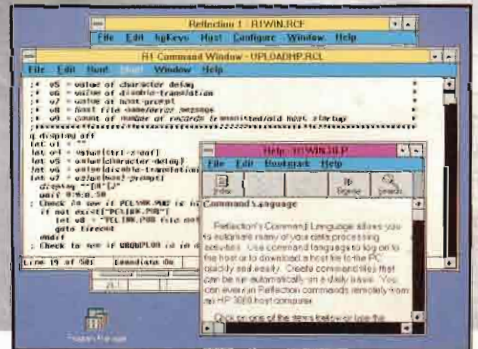
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