4 Professional Press Publication

HP Professional

THE INDEPENDENT MAGAZINE FOR NEWWAVE COMPUTING ▲ VOL.5 NO.4

APRIL 1991 ▲

NEW WAVE

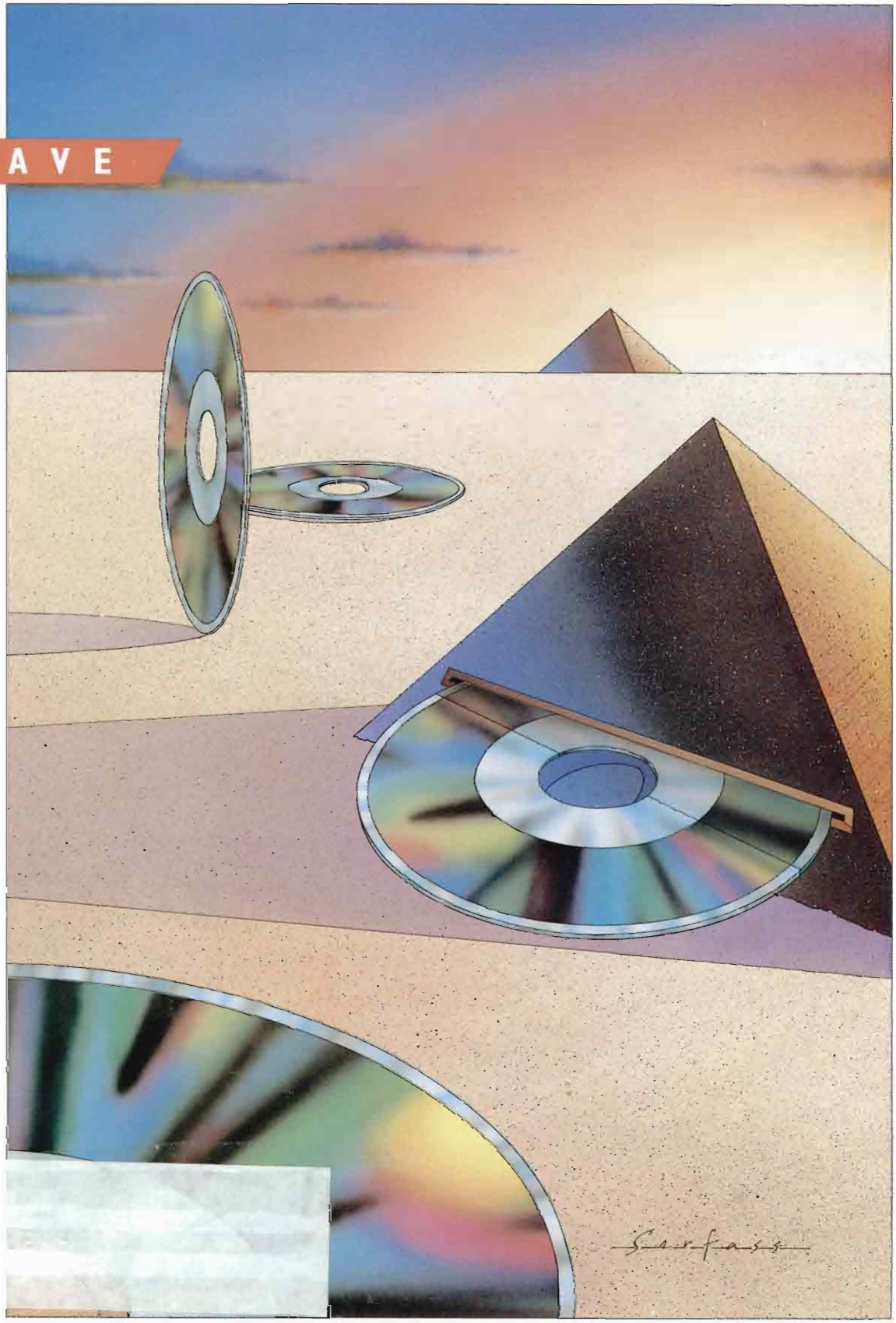
Storage Hierarchy

- Playing For Keeps: Choose The Right Backup Device
- Two Helical Scan Tape Technologies Go Head-To-Head

SPECIAL REPORT:

Workstations

- HP Apollo's Dream Machines
- Apollo's Future
- From The Lab: HP Apollo's Model 720



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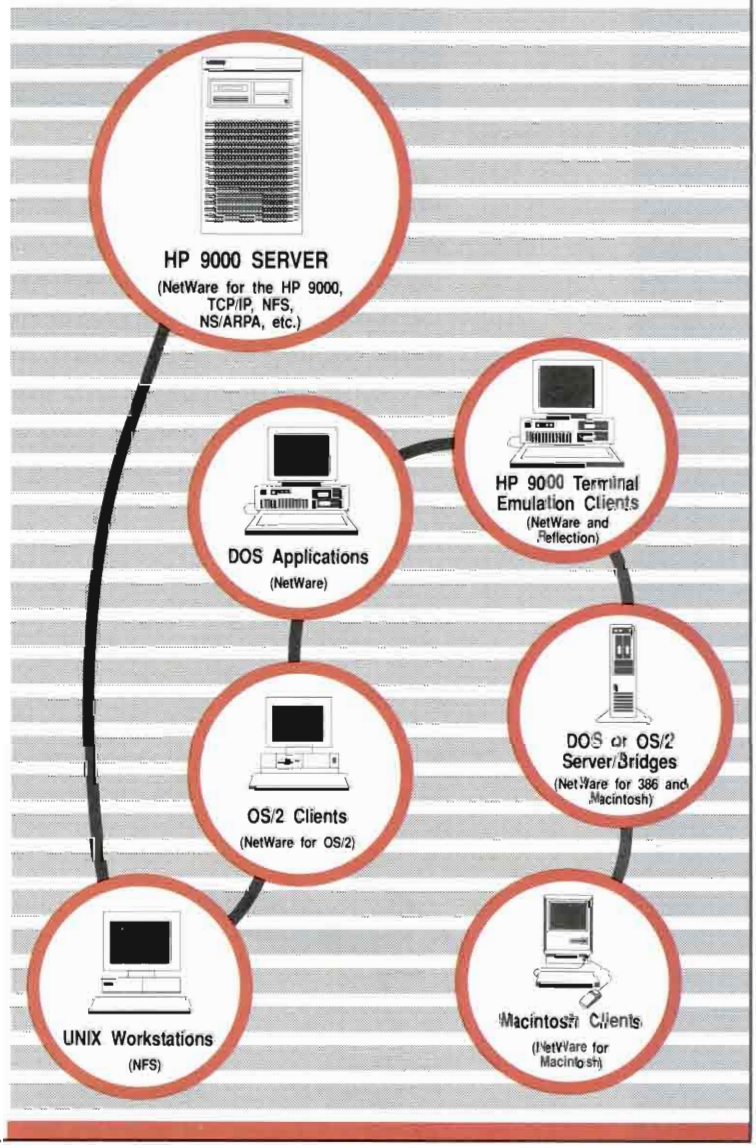
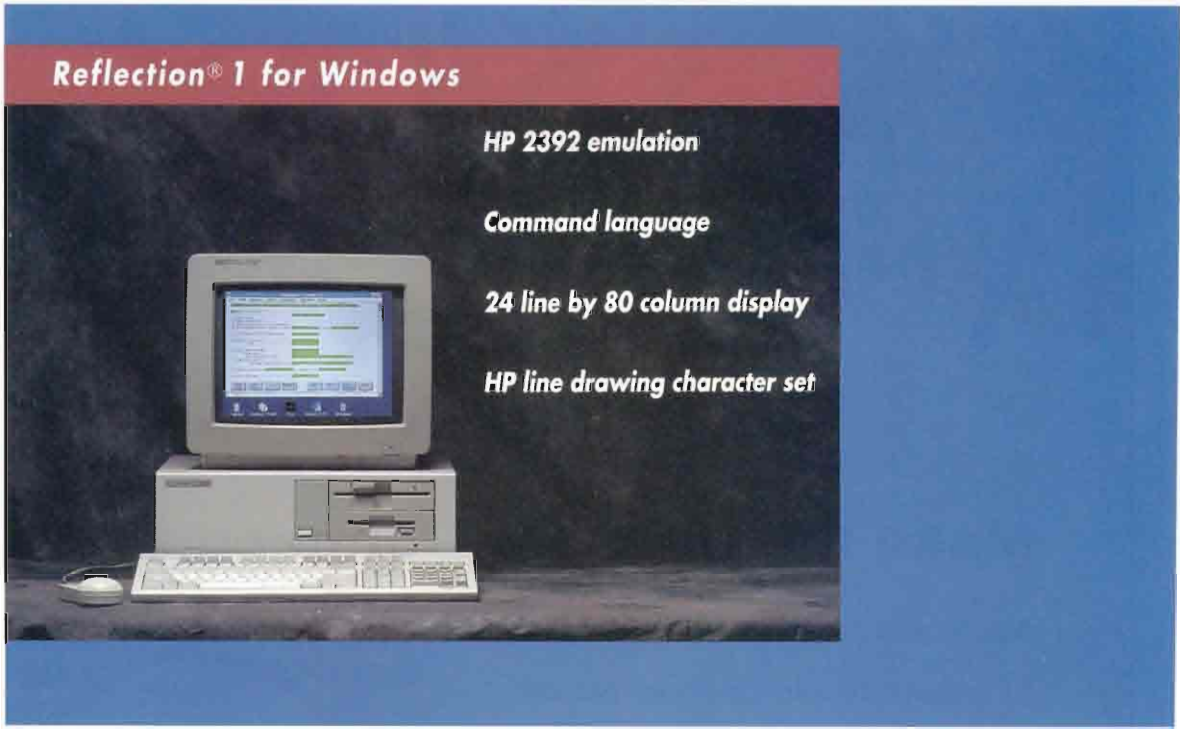


Reluctant Release.



Since 1984, we at Tymlabs have been developing and shipping products based on the belief that graphical user interfaces were the wave of the future. The folks at Walker Richer & Quinn, on the other hand, have focused almost solely on the DOS world.

When it comes to Windows, WRQ doesn't share the Tymlabs vision. As recently as 1988, WRQ told you that Windows would never fly. That same year we shipped Session for Windows 2.0. Last June, just three weeks after the Microsoft release, we shipped a version of Session for the amazing new Windows 3.0.

Now, as WRQ begins to ship their first Windows product, we're shipping two, all-new versions of Session for Windows and NewWave. Both packed with enhancements that stem from years of Windows experience.

Head to Head. Like Reflection, Session can emulate a 2392 terminal . . . but Session adds 700/92, 700/94, HP ANSI, and VT-100 emulation. While Reflection provides only a 24 x 80 character display, Session lets you set your window for up to 160 columns and as many lines as your monitor will allow.

Like Reflection, Session has a scripting language . . . but Session's language, TermTalk, brings a modern, English-like approach to task automation. It even lets you turn on a recorder that builds scripts for you as you work. And TermTalk was designed to interface directly with NewWave's Agent Task Language.

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HP 2397 text color pairs

Full support of Microsoft's DDE with both client and server models

Full native NewWave support

But there's more to the story. Consider this.

It used to be enough just to emulate terminals and to do simple file transfers. These days, integration is the key, whether it's with other PC applications or with your HP host.

Session supports Microsoft's Dynamic Data Exchange . . . Reflection doesn't. DDE lets you link Windows applications together. This means an Excel spreadsheet can automatically use Session to retrieve data from a host database. Your users won't even have to know Session is running. And because DDE is an industry standard, Session can talk to all the hot new Windows applications.

If you plan to adopt HP's NewWave Computing as your integration strategy, then you should know that Session supports HP NewWave today . . . Reflection doesn't. With Session for New Wave, your users can transfer files or run scripts with a simple drag and drop. Or better yet, they can let their Agents do the work.

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CIRCLE 141 ON READER CARD

The Reno Surprise

At the Interex conference in Reno, MPE V users had something to get excited about. No, they didn't roll collective sevens at the craps tables or bust the slots *en masse*. Rather, they heard, for a change, some good news about their favorite operating system. MPE V has had a long, perhaps even illustrious history. It is, at this point, a finely-tuned operating system that has served the HP 3000 and its users very well. So, you ask, why all the excitement?

The Classic Problem

The problem with MPE V, of course, is that, in computing, as in most aspects of life, things change. Spectrum RISC comes out, Classic 3000s fall by the wayside, MPE XL takes over. One day you turn around and everybody's staring into tiny, little windows on great big screens. They talk about POSIX and X terminals and NewWave Computing. They think of UNIX as the future.

You resign yourself to MPE V's long, slow demise, the gently calibrated obsolescence of your operating system and its hardware. Tomorrow, you say to yourself, you'll read that HP-UX column. But, what's the rush? My system's up and running every day of the year. I'll never get around to UNIX, you think; I'll never have to.

Then, suddenly, you hear the stories. HP is unbundling TurboIMAGE; RAPID and TRANSACT are killed; MPE V is put out to pasture, a mature product. Aaaagh! you say. You start biting your nails, attending more RUGs, avoiding more UNIX. At SIG meetings, you demand the restoration of the good old days, the days of innovation and excitement, the days of having the Cadillac of systems, — the best on the block, — and not caring who knew it.

But instead of giving you back the past, HP stonewalls you. Doesn't cut you loose, mind you, but patiently asks what it is you're so angry about. You comply with all their requests, you submit your lists of grievances, you patiently await their response. But you feel a little like yesterday's hero. You won't listen to HP's promises anymore, you tell yourself. You'll be disgruntled. You'll hold a grudge.

March rolls around and you swagger out to Reno, a chip on your shoulder, a pocket full of quarters, a fistful of gripes—ready for the shootout. Then, just as you're getting used to your new combatant's role, HP does an aboutface. And what an aboutface! You go three sheets to the wind with restored confidence. You can believe again.

The Solution?

The answer to your prayers, the end result of all your well-articulated grievances is a new HP program dedicated to support for MPE V and related products. HP's Marc Hoff announced in Reno that MPE V support is moving to his Application Support Division (ASD). He promised continued support and *enhancements* for MPE V and a slew of other Classic 3000 applications. According to Hoff, his organization will support MPE V "as long as there's a single customer" to take advantage of the program. ASD managers are already talking to user groups and SIGs to collect information about what to work on first.

But this is more than just an olive branch offering of continued support. This is research, too, and development, with a genuine development lab known as the Software Technology Center (STC). The new lab will be headed by performance guru Tony Engberg, the guy who brought us GlancePlus and LaserRX. According to Engberg, the STC will devote 30 to 40 HP software engineers to MPE V alone. Their mission will be to make certain that Classic 3000 users can remain productive in their current environment and to ensure easy migration — when users are ready — to other HP platforms.

Yep, that's the Reno surprise. HP is committing substantial resources and top-level people to this project. Pinch yourself, it's for real.

Cautious Enthusiasm

Lest you let your euphoria run away with you, HP's Sue Cook, product marketing manager for the ASD, advises "guarded optimism." "The reorganization is still very new," she cautions. The new organization's strategy, she explains, is to make its decisions, get to work and tell us what it can deliver at the Interex convention in San Diego this August.

One thing that sticks with me from my meetings with Cook and Engberg is their sense that they are on to something good. They know the STC is just what customers ordered, and they sense that there are still plenty of dynamic and interesting developments to come from MPE V. Perhaps an even more encouraging sign is that they see this new installed-base support policy as a smart, long-term investment. As Cook says, "We believe this is a good business decision and a good customer satisfaction decision."

Of course, all this doesn't mean change isn't going to come. Large numbers of HP users have moved to MPE XL, HP-UX sales continue to grow at unprecedented rates and NewWave Computing continues to push the envelope of commercial applications. What it does mean is that you can move into multiplatform environments and distributed computing applications at a pace that makes sense for you. This has always been the promise of open systems and NewWave Computing. HP's new strategy might just allow it to come true.

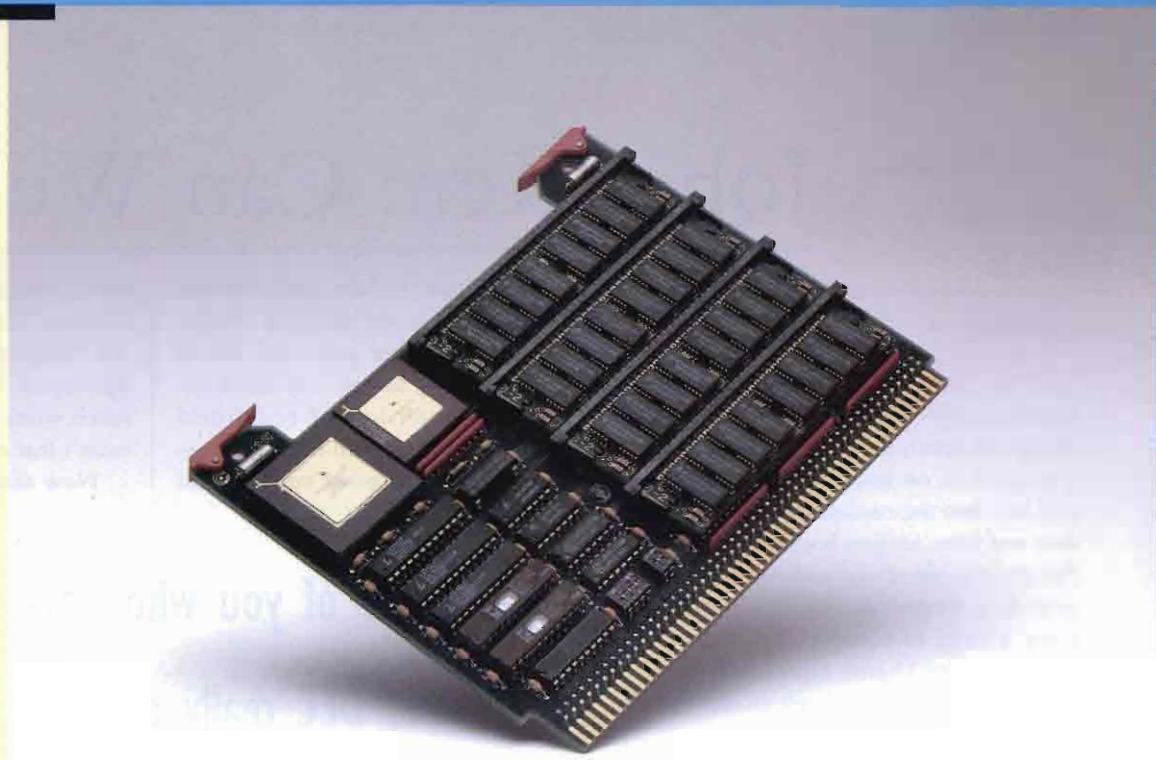
To Your Workstations, Everyone

"Oooooh it's HOT!" as James Brown used to say. I don't know how else to sum up HP's new workstation announcement. The HP Apollo 9000 Series 700 systems are hot stuff indeed, with enough mips and mflops to melt the competition and blaze through your applications. Check out this month's Special Report (page 51) for all the details.

Don Marks

TURBO-33

HP Series 9000 Accelerator



General Description

The TURBO-33 is a 33 Mhz accelerator card for Hewlett Packard Series 9000 computers. The card contains a Motorola 68020 processor, an optional Motorola 68882 coprocessor and 1 to 4 megabytes of 80 nanosecond dynamic ram. An internal 32 bit data bus provides high speed data transfers between the processors and the memory.

Compatible Models

The TURBO-33 is compatible with the HP 216, 217, 220, 226, 236, 237, 310 and 320 workstations. The card uses one slot in the host computer.

BASIC and PASCAL

The TURBO-33 is designed for the BASIC and PASCAL operating systems. No modifications are required for user programs.

Speed Improvement

Programs run from 6 to over 100 times faster.

The speed increase depends on the type of computation. The following table shows the range of speed improvements.

PROGRAM TYPE	COMPUTATION TYPE	SPEED INCREASE
Compiled Programs	Integer Arithmetic	6 to 8
	Real Arithmetic	29 to 50
	Real Transcendental	142 to 293
Interpreted Programs	Integer Arithmetic	6 to 7
	Real Arithmetic	9 to 11
	Real Transcendental	32 to 63

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INDUSTRY WATCH

Bill Sharp

John, Ken: Can We Talk?

"Hello, yes, this is a conference call. Please put me through to John, now—thanks. Hello, John. . . doing just great, thank you very much. I've got Ken on hold and I'm going to pull him into the conference now. Hello, Ken and John, are you both there? Great! For the benefit of our audience, we are now in a three-way conversation with John Young of Hewlett-Packard and Ken Olsen of Digital Equipment. Our topic for today is very simple in concept: Gentlemen, can we talk?"

Well, that was the way I was going to do it. We were going to talk to the two of them, ear to ear, and just figure this out like friends. Unfortunately, I ran out of time, and John and Ken aren't exactly my biggest fans, anyway—still, it could have worked.

Shop Talk

The reason I wanted to conduct this conversation in the first place was to help you folks improve your in-house communications. Obviously, lots of you have HP minicomputers, workstations, PCs and even some of the new stuff that looks like mainframes — not to mention these wireless patient monitoring systems, but that's another story. Perhaps not so obviously, many of you also have — dare we say it — Digital Equipment Corp. computer products such as the VAX 9000 high-end minicomputer, which runs either VMS or ULTRIX (DEC's UNIX), MicroVAX low-end minis/servers, or DECstation or VAXstation workstation products. It sure is a heterogeneous world these days.

Each of these large, yet capable computer makers operates in a generally respectable manner, and yes, they each make some good products. Each one also thinks its products are one heck of a lot better than the other guy's and would spend days telling us just why this is so. Fact is, however, lots of real-world people have systems from both these giants, as well as from other vendors, and the failure to link them all together is becoming frustrating and expensive. So let's take the world as it is and get this gear together.

For those of you who have wondered if HP and DEC really can talk to each other, the answer is definitely yes.

Making Conversation

For those of you who have wondered if HP and DEC really can talk to each other, the answer is definitely yes. So great, how do we start? We start with a disclaimer: The following discussion is grossly oversimplified, intended as a starting point for the serious, and background for the curious.

If cutting through all the silly stuff is your style, slash your way over to the nearest telephone and call either HP or DEC. Tell them you have computers from different companies that need to yak at one another. Then hold the phone close to your pocket and make money-rustling sounds. When they show up nanoseconds later, waggle your hands in the air frantically and make connecting motions. Then gesture vaguely toward the computers. Make it very clear you don't speak computer lingo, and leave for lunch when they're not looking—there, wasn't that easy?

Now that you've tried the short cut, I'm sure you'll agree that it tends to cost a lot and creates indigestion when you return from lunch. A better bet is to learn a few of the terms involved so you can say them now and then in conversations. It's not unlike the garage mechanic who senses you don't know a torque wrench from a tea ball. You don't want to whip out your Berkeley sockets set and start cranking, you just want to sound like you've heard of them.

Standard Phrases

Patrick Lelorieux is a product marketing manager at HP's Information Networks Division, Cupertino, CA. He says connections between HP and DEC computer systems fall primarily into three categories; basic services, advanced services and database services.

Right from the start it is easy to get confused. Although the physical links are

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CIRCLE 161 ON READER CARD

made between the computers themselves, the level of service you need depends on the applications you use. Sending E-mail back and forth between a VAX and a 3000 is not the same as maintaining a distributed file system or sharing a common database.

Networking is structured a lot like a huge sandwich. At the base level is hardware, and above that are stacked various capabilities made possible by combinations of hardware and software wizardry. Each level up brings a bit more capability and a measure of additional complexity that makes the capabilities possible—like salami and provolone. Also, like a large sandwich, networking takes some time to digest.

Basic Services

Stripping down networking brings us to the basic connectivity links: X.25 and 802.3. These industry standards define the connections and communications behavior, or protocol, used in base-level message sending across a network. This is the stuff of Ethernet (802.3) and wide area networks (X.25).

Lelorieux says you have a couple of choices if this is your pleasure. You can put HP networking software on a DEC system, or DEC software on an HP system. Some third-party solutions will also do the job. To make HP gear talk DECese, load up DECnet. To get DEC systems to talk in HP lingo, use HP Network Services (NS).

Clamber up one level in the basic services category and things get a little fancier, a little more formal. Now we're in the realm of TCP/IP protocols and ARPA services. These have been around for several years and are very widely used. They're more complex and also more capable than the first level basic services. They are the basis for lots of very nice systems, and they're available from both HP and DEC. ARPA services on TCP/IP may vary from one system to another, but generally they include:

- Telnet, for terminal emulation running applications.
- File Transfer Protocol (FTP) for, guess what, file transfer.
- Berkeley Sockets, for interprocess communications.
- Simple Mail Transfer Protocol (SMTP), for, yep, your mail.

Both HP and DEC sell Wollongong implementations of TCP/IP and ARPA services. Microsoft LAN Manager also provides some of this capability, says Lelorieux.

The Latest GOSIP

We're still not done yet with basic services. We have a third level, and one that bears watching. Open Systems Interconnection (OSI) protocols are gradually evolving standards from the International Organization for Standardization (ISO). OSI services will appear over time, gradually displacing TCP/IP, but don't hold your breath. (See Gordon McLachlan's Networking column in the February 1991 issue of *HP Professional* for more information on TCP/IP vs. OSI.)

Networking is structured a lot like a huge sandwich, and it takes some time to digest.

Don't be alarmed when you start hearing the latest networking GOSIP. GOSIP is the influential U.S. Government OSI Profile, and specifies the level of OSI compliance government contractors must achieve. Available OSI services include:

- X.400 Mail Handling Service (MHS), available now to hook HP and DEC systems for HP Desk or VAXmail use. The advantage of moving from TCP/IP's SMTP mail capability to X.400 is that SMTP handles only text, while X.400 can carry text, voice and images. It is, however, less well established. (See Gordon McLachlan's "The Electric Postman," in *HP Professional*, March 1991.)
- X.500 Directory Services is available from HP, but not yet from DEC, so wait a while longer for this one. Eventually, this will allow a system to "know" where on a network everybody is, simplifying communication tasks.
- FTAM is a zippier file transfer service than the ARPA model.

Advanced Services

We're still stacking, and here's where the sandwich gets into true hero sizes:

- Remote Procedure Call (RPC) services available from the Open Software Foundation (OSF) are actually a joint submission from HP and DEC. This is available from HP for HP 3000 and HP 9000 systems, and from DEC for its VMS and Ultrix systems as well.
- Network File System (NFS) for sharing files across a network is available from both DEC and HP. This is originally from Sun Microsystems. NFS is available from DEC for both VMS and Ultrix systems. HP has it available on HP-UX systems and will have it soon for HP 3000/MPE systems. "This time, for the HP 3000, DEC is waiting for us," says Lelorieux.
- LAN Manager does what you would expect it to do. Both DEC and HP supply it. Over time, the Distributed Computing Environment (DCE) from OSF will replace some of this with even cleaner and more capable industry standard implementations, such as the Andrew File System (AFS) instead of NFS.

Database Dialogue

Accessing databases from other vendors' systems, the third and final level of our network sandwich, will become a common requirement. Both HP and DEC are well aware of the need, and at work on an SQL based on OSI, called OpenSQL. Meanwhile, both vendors endorse third-party vendors using current standard query language techniques. These include Oracle, Ingres and Sybase, says Lelorieux. ■

Closing Arguments

Only ORACLE supports virtually every vendor's software, hardware and network.

Today, some companies claim that their software products are "open." They may even graft the word onto their product names. It is a confusing situation, but a clear definition of "open" is finally emerging.

Software is "open" only if it adheres to industry standards and works with products from

other vendors.

More specifically, a database is open if it works with other vendors' databases. For example, ORACLE now provides access to HP TurboIMAGE in addition to IBM's DB/2 and DEC's RMS.

An open database should also work with other vendors' applications. ORACLE supports PC and MAC software like Lotus 1-2-3, WordPerfect, Borland's Paradox and Apple's Hypercard. Even Dbase applications run on ORACLE.

Software is open if it runs on every vendor's operating system. ORACLE runs on MPE XL, UNIX, MS-DOS, Mac OS, VMS, MVS and virtually every other operating system on the market.

And software is open if it supports every vendor's network. ORACLE supports HP AdvanceNet, TCP/IP, LAN Manager, NetBIOS, DECnet, Novell's SPX/IPX, X.25 and many others.

Choosing open software today lets users choose any vendor's hardware, software and network tomorrow.

Call 1-800-633-0567 Ext. 0934 to sign up for an Oracle Database Conference near you. And keep your software and your options open.

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NEWS & TRENDS

HP Announces NewWave Office 3.0

New Release Supports More Platforms, Offers Integrated Office Solutions

HP announced NewWave Office 3.0, the latest version of its third-generation office information system. The new version adds support for additional platforms (including SCO UNIX), standards-based multivendor networking, and enhanced client-server support to the product's existing capabilities.

According to HP's Steve Jeffery, marketing manager for NewWave Office, the new release demonstrates that HP offers office solutions its competitors can't match. IBM OfficeVision, DEC All-In-1, AT&T Rhapsody and NCR Corporation all compete against NewWave Office in the office information systems market.

"IBM and DEC remain mostly proprietary, mostly second generation and have experienced product delays," Jeffery says. "AT&T and NCR, base their systems on HP NewWave, which we've licensed to them, but they offer limited scalability and platform choices," he adds.

Among the networking features added to NewWave Office are support for Netware on both the HP 3000 and HP 9000 and support for HP LAN Manager on the HP 3000, HP 9000 and SCO UNIX/386 platforms. Additional host/client services for NewWave Office include HP NewWave Access and HP AdvanceLink for MS-Windows/HP NewWave.

One of the most important enhancements to NewWave Office 3.0 is support for integrated third-party software applications designed to add value and functionality to the product. Calling them WaveFront Developers, HP has enlisted several independent software vendors to write applications for NewWave Office. Software from WaveFront Developers will work in conjunction with the core services of NewWave Office to provide solutions in three primary areas: business intelligence, document management, and procedural automation.

According to Jeffery, business intelligence applications will include extensive decision support capabilities for all levels of a business organization. These applications will make use of NewWave technologies, such as agents and event-based triggers, to assist customer service personnel as well as executive decision makers.

Document management applications will provide users with the ability to transparently store documents across a variety of servers. Search and retrieval utilities predicated on object management technology will also be offered.

Procedural automation products will take advantage of technologies such as smart folders, objects, agent tasks and intelligent routing to automate the customer's current office practices. With the help of HP consulting and support services, customers also can begin to re-engineer their office operations. *—Don Marks, Managing Editor.*

HP Makes Equity Investment In Informix

Agreement Offers Customers Latest OLTP And CASE Solutions

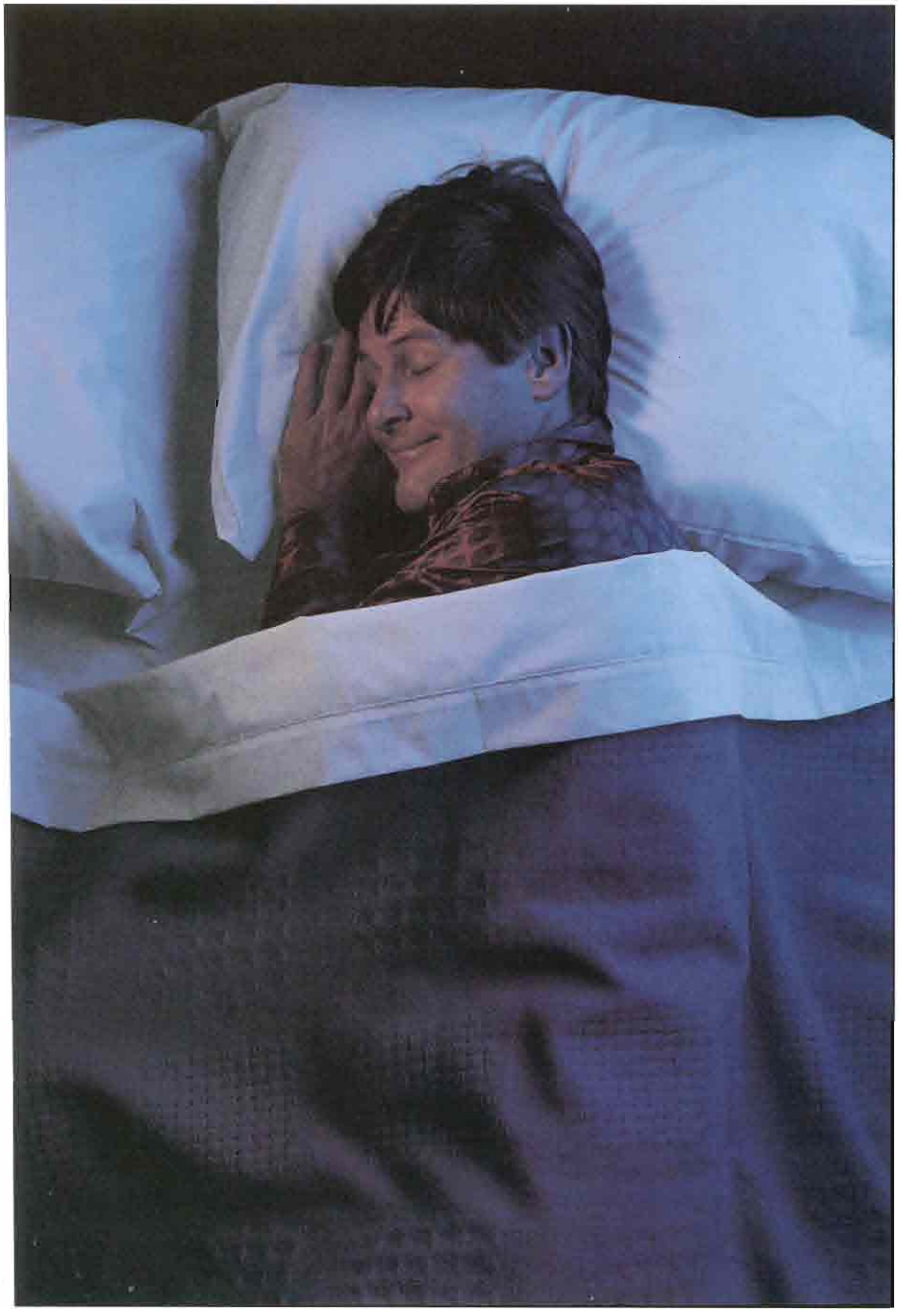
Hewlett-Packard and Informix Corp. signed an agreement under which HP will acquire up to 10 percent of the common stock of Informix (Menlo Park, CA). In addition, the companies signed a five-year agreement for joint development, marketing and sales.

As part of the five-year agreement, HP and Informix will work together to bring the companies' customers the most current combinations of HP hardware and Informix software.

Also under terms of the agreement, HP and Informix will participate in joint activities to develop higher-performance products and to provide customers with faster delivery of the companies' products for CASE and OLTP solutions. HP 9000 business servers and workstations will be among the first to support new software made available from Informix.

The first result of Informix and HP's joint development and marketing efforts is the Informix OpenCase/ToolBus, a new product based on SoftBench technology from HP. OpenCase/ToolBus is part of an integrated, flexible, CASE environment that Informix will make available to other hardware and software companies for application development on open systems.

With HP TurboSTORE/XL II this is the proper position to back up an HP 3000.



Introducing on-line, unattended backup for your HP 3000.

Forget late night backups. Back up your HP 3000 when you want. On-line and unattended. With on-line backup, users can stay on the system during the backup process.

They don't have to wait, and neither do you. Because HP-engineered data compression and high capacity media mean no waiting around to change tapes. You can devote that time to more productive activities. And features such as interleaving and parallel restore make HP backup lightning fast.

With TurboSTORE/XL II you can use magnetic tape or low-cost HP DDS-format digital audio tape with capacity up to 5 Gbytes or the HP Rewritable Optical Disk Library System with capacity up to 70 Gbytes—enough for a whole week's worth of backups.

Best of all, TurboSTORE/XL II is from HP, so there's no question of hardware compatibility. And future compatibility with evolving HP hardware and software is assured, protecting your investment.

Call **1-800-637-7740**, Ext. **2212** now and find out how you can receive a FREE TRIAL COPY.* Call today and sleep better tonight.

**Trial copy offer expires July 15, 1991.*

HEWLETT PACKARD

WalMart Installs HP Computer Systems

100 UNIX-Based Multiuser Computers Included In $44 Million Contract

HP announced that more than 100 of its UNIX-based multiuser computers have been installed in Wal-Mart Stores Inc.

HP is expected to deliver HP 9000 Model 375 multiuser systems — based on the Model 375 workstation — to 800 of Wal-Mart's more than 1,500 stores.

The HP 9000/375 systems serve as the core of in-store computer networks for Wal-Mart and replace IBM Series 1 computers. In addition to acting as applications servers, the HP 9000 Model 375s provide connectivity for IBM and NCR point-of-sale controllers and pharmacy systems on their role as the external gateway to Wal-Mart's satellite network.

The HP-based in-store systems include applications for customer service, merchandise management, sales analysis, logistics and labor management.

Transarc Promotes OLTP Technology

Gains Industry Endorsement From HP, IBM And Others

HP, IBM, Stratus Computer, Sybase, Informix, Independence Technologies and JYACC joined in endorsing Pittsburgh-based Transarc Corp.'s OLTP technology as a foundation for commercial-grade transaction processing within open, distributed computing environments. Transarc's technology — a collection of modular software components — builds upon the OSF DCE and supports the client-server computing model for distributed processing.

Components of Transarc's transaction processing technology are transactional RPC, which enables intercomputer communication, a distributed transaction service, which coordinates work on multiple networked servers and Transactional C, which provides application programmers with the interfaces necessary to use Transarc's client-server transaction processing technology.

Transarc's technology is designed to comply with evolving and existing standards including X/Open Distributed Transaction Processing (DTP) model and the XA interface. It builds upon several OSF DCE core services including the DCE Remote Procedure Call (based on HP Apollo's NCS Remote Procedure Call) and the Authentication Service (based on MIT's Kerberos and HP Apollo's PasswdEtc.).

STR Software Signs VAR Agreement

SD&G Utilizes FAX/3000 For Physician Reports

STR Software signed a VAR agreement with SD&G Health Care Systems. SD&G has integrated STR's FAX/3000 with its own IMAGES/3000 to provide immediate transmittal of radiology reports to referring physicians.

FAX/3000 allows transmission of data directly from an HP 3000 to any remote facsimile machine. An important feature of FAX/3000 allows multiple reports intended for a single destination to be grouped and transmitted with a single phone call.

Contact STR Software, P.O. Box 2441, Placerville, CA 95667; (800) 622-0630.

Circle 375 on reader card

IISI Teams With HP To Help Mainframe Users Downsize

Company Also Develops A Custom Information System

Innovative Information Systems Inc. (IISI) teamed up with Hewlett-Packard to help mainframe shops convert to smaller, more economical HP systems. In today's MIS environment, many organizations are recognizing savings and increased efficiency by downsizing MIS staff and CPUs. Many organizations are providing increased service to decentralized locations by offloading systems to localized minicomputers.

Working with HP and MIS, IISI will help MIS develop conversion cost analysis, conversion strategies and assist in the conversion of data and systems. Whether converting to UNIX or MPE XL, IISI identified and established relationships with third-party conversion utility vendors to help facilitate conversion.

In other company news, IISI has been contracted by Markel Services Corp. (Richmond, VA) to develop a custom information system. The system will be developed in SPEEDWARE, COBOL and OMNIDEX on the HP 3000 platform.

The system will contain modules to manage claims processing, financing, diarying and front end user interfaces.

Contact IISI, 63 Nahatan St., Norwood, MA 02062; (617) 769-7511.

For more information about downsizing,

Circle 376 on reader card

For more information about the information system,

Circle 377 on reader card

Rewritable Optical Drives for Hewlett-Packard Computers with HP-IB Interface

Set Your Sights on Optical – 650MB in One Small Cartridge

Model 7600 Rewritable Magneto-Optical Disk Drive

- Huge 650MB capacity per compact cartridge
- Quick, random access to large amounts of data
- Convenient, removable 5.25 inch cartridge
- Perfect for high security – take it with you or lock it up
- Increase capacity by adding a cartridge
- Economical archival storage with "online" accessibility
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- Easily installed, uncomplicated to use
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- No periodic media reconditioning required
- Available for HP 9000, 3000, and 1000 computers

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CIRCLE 106 ON READER CARD

HP And Computer Associates Develop UNIX Software

Focus On Systems Management, Database Management Applications

HP and Computer Associates Int'l. announced an agreement to codevelop software for HP 9000 Series 800 business computers running the HP-UX operating system.

The companies will focus on software based on a UNIX-based operating system for systems management, business applications and database management under CA90s: Computing Architecture for the 90s.

The first stage of the agreement identifies codeveloped HP-UX software that will benefit the systems-management area, including automated production control, automated storage management, security control and audit, data center administration and performance management and accounting.

The second stage will involve codevelopment of selected business applications for financial accounting, manufacturing, warehouse and logistics management and human resources.

Also included in the second stage is database management software. This technology, will serve the same function for the new HP-UX solutions. Consideration also is being given to future codevelopment of a standalone HP-UX database management system.

HP And Lotus Sign Agreement

To Develop And Market Lotus 1-2-3 For HP Apollo Workstation Family

HP announced a marketing and development agreement with Lotus Development Corp. to bring Lotus 1-2-3 software to HP's workstation environment.

Lotus 1-2-3 will be ported to the HP Apollo 9000 Series 400 workstation family and the HP 9000 Series 300 line.

Industries require workstation performance to run commercial applications, such as Lotus 1-2-3, include financial institutions, accounting, investment banking and stock brokerage firms.

Like Lotus 1-2-3 Release 3 and other Lotus cross-platform spreadsheets, the HP workstation product will provide users with advanced spreadsheet capabilities, including 3-D modeling, relational database performance, high-impact graphics and file reservation features.

The product also will make use of external data-access capabilities provided through Lotus' DataLens technology. With DataLens, users can access external databases directly from the Lotus 1-2-3 spreadsheet.

For Your Information

- Hewlett-Packard's board of directors raised its regular quarterly dividend two cents to 12-1/2 cents per share on the company's common stock. The dividend is payable April 10, 1991, to shareholders of record March 20, 1991.
- Cimflex Teknowledge Corp. a supplier of software products and systems for factory management and control, has been awarded Premier Solution Provider status for systems integration by HP.
- Innovative Information Systems Inc. (IISI) has been contracted by Cognos Corp. to design a custom system to compute sales commissions for Cognos representatives. (617) 769-7511.

HP Announces Software Development Products

SoftBench Now Available On Sun SPARCstations

HP announced that SoftBench, a software development product for CASE now runs on Sun SPARCstation computers. This is the first time that SoftBench has been available on workstations other than those made by HP Apollo.

SoftBench coordinates and controls the software programs that engineers use to design, build and test software products. Traditionally, programmers have had to transfer data from one program to another to work on each stage of this process.

SoftBench integrates tasks for developing software in much the same way that word-processing programs integrate dictionary, thesaurus and grammar-checker functions for writing documents. SoftBench links the various elements of the software-development process and provides a common screen appearance for all of them.

And, SoftBench integrates the data among the programs and makes it easier for programmers to make changes at any stage of the development process.

This announcement makes available a single integrated CASE package for software developers whose computer networks include SPARCstations and HP and Apollo workstations.

HP also announced the availability of the company's Encapsulator software on Sun SPARCstations. This product allows software engineers to customize SoftBench by adding CASE tools of their choice to their own work environment.

This announcement extends HP's CASEdge/Open Systems program. Under this program HP licenses its SoftBench and Encapsulator product to hardware-systems vendors, CASE tool providers, value added resellers and systems integrators. End users who want to customize their own software-development programs also may license SoftBench and Encapsulator.

THE ONLY TAPE DRIVE THAT PUTS 25GB ON A SINGLE 8MM TAPE.

Do you wish you could find a backup system with enough capacity, speed, and sophistication to backup unattended?

Could you recreate a document from scratch in the time it takes you to restore it?

FAST BACKUP, FAST RESTORE.

Introducing the CY-8500, the 8mm tape drive that gives you 25 GB on a single tape. And with transfer rates of up to 90 MB per minute, backup takes less time, frees resources, and makes frequent backup simple and convenient.

And that's not all. The CY-8500 offers fast file search capability. So you get the advantages of high capacity and fast transfer rates plus the ability to locate and restore your files quickly – about 75 times faster than normal speed.

CONFIGURATION FLEXIBILITY.

The state-of-the-art liquid crystal display gives you complete drive status information. Command under execution, transfer rate, tape remaining, and ECC are presented in a clear easy-to-read format. By offering such features as data compression – for five times the storage capacity per tape – and data encryption – giving you data access control – the CY-8500 adapts to your company's growing needs. We'll adapt to your site requirements too, with rack mounting options and cable lengths of up to 80 feet.

TRUE "PLUG-AND-PLAY" COMPATIBILITY WITH:

Alliant	DEC Unibus	PC 386/ix
Alpha Micro	Gould	PC MS-DOS
Altos	HP	PC
Apollo	IBM AS/400	Xenix/Unix
Arix	IBM Mainframe	Pertec
AT&T	IBM RISC/6000	Plexus
Basic-4	IBM RT	Prime
Concurrent	IBM S/38	Pyramid
Convergent	Macintosh	Sequent
DataGeneral	McDonnell Douglas	Silicon Graphics
DEC 3100	NCR	Sun
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Best of all, the CY-8500 offers peace of mind. 8mm helical scan technology, designed for data recording, gives you demonstrated performance and reliability. Not an adaptation of an audio recording format.

The CY-8500 is part of a complete family of tape backup products that range in capacity from the 150 MB ¼" cartridge streamer to the 2 TB cartridge handling system. All backed up by our in-house technical support group and 12-month warranty. For more information on how you can enjoy the best value in tape backup, call today at 804/873-0900.

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CIRCLE 112 ON READER CARD

International Insights

Unison Software Identifies European Customer Base

Continues International Expansion In Germany, Mexico And Australia

Identifying customer and prospect bases abroad is not a new idea — especially to Unison Software (Sunnyvale, CA), a data center management software company for HP 3000 systems. It recently expanded its international presence by opening a sales office in Frankfurt, Germany and adding distributors in Mexico and Australia.

Unison began its international expansion in the early 1980s, having identified a potential market while attending a user group meeting in Berlin, Germany. From these initial interests, Unison began an affiliation with European distributors. Its customer base grew and diversified to include the British Broadcasting Co. and Colman's Mustard. Having its major clients in England, and therefore no language barrier, Unison opened its first European headquarters in London.

The new office in Frankfurt serves as a base for operations in Germany, Switzerland and Austria. The new distributors include: Infosistemas Financieros in Mexico City, Mexico; and Mercury Computer Systems in Carlton, Victoria, Australia.

"We're enthusiastic about continuing to penetrate the European market," says Frank Pinkela, vice president of sales and marketing. "We're anticipating 35 to 40 percent of next year's revenues to be generated overseas."

Future plans include expansion to the Pacific Rim and Japan. —*Andrea Zavod, Assistant Editor*

Altered Image Joins Informix's InSync Program

To Participate At Trade Shows And Seminars

Altered Image Software (England), a developer of software that allows Informix users to take advantage of X Windows announced its participation in Informix's InSync program.

Altered Image now will participate in Informix trade shows, seminars and direct mail campaigns. The company's product Altered Image-SQL (AI-SQL) also will be included in the annual InSync catalog.

Altered Image-SQL is a suite of products designed to allow character-based applications to migrate to the X Windows environment without changes to existing software. By using AI-SQL, the complete range of Informix-SQL functions are available within an OSF/Motif GUI.

Pilot Acquires U.K.-Based Thorn EMI Software TECS

Agreement Increases Presence In Global EIS And DSS Market

Pilot Executive Software announced its acquisition of the TECS division of U.K.-based Thorn EMI Software. The TECS operations includes the Financial Control System (FCS) product line of decision support systems (DSS), consulting and professional services, research and development and worldwide sales and marketing.

Under this agreement, Pilot gives Thorn EMI software an undisclosed amount of Pilot stock. And, as a result of this acquisition, Pilot will grow to a $50 million company, employ 350 people and serve more that 2,000 customers worldwide.

With this acquisition, Pilot will complete the integration of FCS and Pilot EIS products. In addition, it will also provide multinational customers with direct access to a worldwide network of distribution, support and consulting services, since Pilot now will have distribution operations in 23 markets including Australia, Spain, Benelux and the Far East.

McDonnell Douglas Announces CAD/CAM Partnership

Fujitsu Second Japanese Distributor Of UNIGRAPHICS

McDonnell Douglas Systems Integration Co. (St. Louis, MO) and Fujitsu Ltd. (Japan) agreed on a marketing and technical partnership that will combine their respective strengths in a program for manufacturing CAD/CAM.

The agreement revolves around McDonnell Douglas' UNIGRAPHICS software and will allow Fujitsu to become the second distributor in Japan. Seiko Instruments also marketed UNIGRAPHICS and will continue under this new agreement. Seiko also will continue to market U-GRAPH on HP 9000 CISC and RISC-based systems, DEC VAX/VMS, RISC/ULTRIX systems; Data General and Sun Microsystems.

Fujitsu will have exclusive rights to UNIGRAPHICS software where it is supplied with their S-family of engineering workstations.

Secondary Storage Solution from ISA

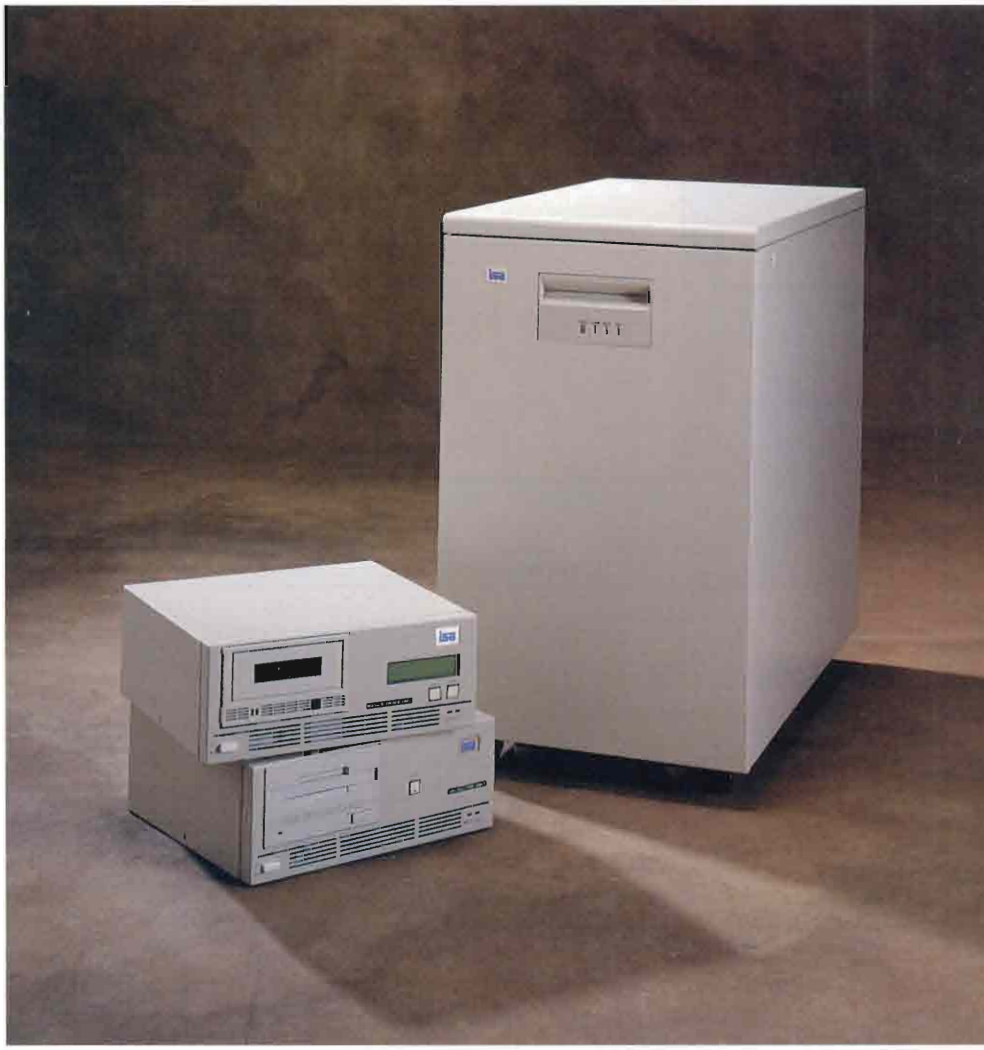
Full Range Secondary Storage Products

- 10 MByte Floppy Disk
- 2.3 GByte 8mm Tape Drive
- 1.3 GByte DDS Format DAT Drive
- 650 MByte Magneto Optical Disk Drive
- 13 GB ~ 97.5 GB MO Disk Juke Box

Compatible with HP1000, 3000 & 9000s

With SCSI or HP-IB interface

OEM enquires are also welcome.



ISA offers a range of state-of-the-art secondary storage devices that addresses the problems of archiving and data management.

If you think you are spending too much of your resources making backups or the size of your data archive is beginning to wear you down, it is time to think about an alternative to your secondary storage setup. ***Think ISA.***

With over 70 kinds of hardware and software products in our HP range, ISA can provide strong support to dealers who are interested in entering the 3rd party HP market. ISA welcomes enquiries from all over the world especially from ***U.S.A., Europe*** *and* ***Asia.***

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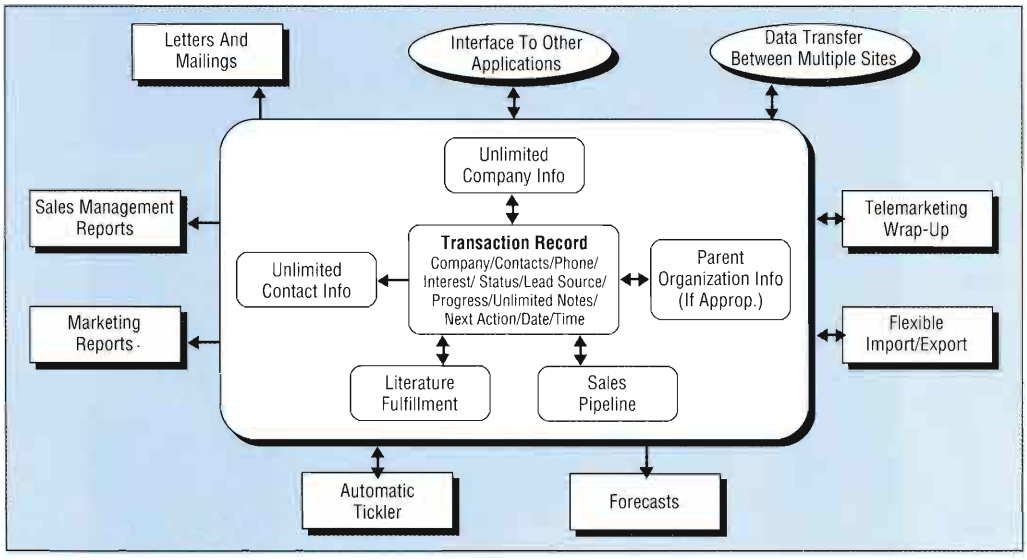
Sales Force



Marketrieve Plus Automates Sales Lead Tracking And Market Analysis

Sales automation involves computerizing most if not all aspects of a company's sales and marketing functions. Companies that have automated their sales and marketing efforts can boast up to a 30 percent increase in sales.

If you want to automate the process of lead tracking and market analysis to increase your sales productivity, consider Marketrieve Plus by Marketrieve Co. (Londonderry, NH) a sales force automation software application.

The software can share data with other applications, such as order entry, accounting systems and spreadsheets running on the same or other computers. Marketrieve Plus tracks a lead from the time of inquiry, through the sales process and after the sale to perform account management activities. It adapts from a small, central department to large, multinational branches communicating together.

Sales and lead tracking functions generate daily action lists, manage all prospects, customers and contact relationships and reduce paperwork. Data is all centrally available to increase management control. The system performs marketing effectiveness analysis, generates forecasts automatically, analyzes a salesperson's lead portfolio and provides management with salesperson activity information.

Marketrieve Plus is written in PowerHouse from Cognos and includes the QUIZ report writer giving users access to all information with standard or customized reports. Optional modules include Cognos' PowerPlay, a graphics reporting tool for managers, and Appointments Plus, an appointment scheduling module to schedule appointments within Marketrieve Plus.

A Pipeline file details where each prospect is in the sales cycle. It can be defined differently for each salesperson or product. A Literature Fulfillment file tracks which literature has been sent to which prospects as well as the date sent, who sent it and what, if anything, should be sent next. This feature includes a batch function that automatically generates coded labels for all literature sent on a given day.

With Marketrieve Plus, you can track multiple sales to the same company and multiple accounts in different offices within a national or international organization. This information is linked, so it needs to be entered only once. Updates are performed automatically.

Other features include letter writing capabilities, comprehensive data security, sales histories, company and parent organization relationships and lead source analysis.

Marketrieve Plus can be used by users with no computer experience. Documentation and online help screens are provided, and Marketrieve Co. also offers user training services. Marketrieve Plus runs on HP and DEC minis and on MS-DOS-based PCs and networks.

License fees start at $1,995 per user for the PC version and about $1,000 per user for the minicomputer version.

—George T. Frueh, Technical Editor

Marketrieve Co.
Londonderry Commons
46 Nashua Rd.
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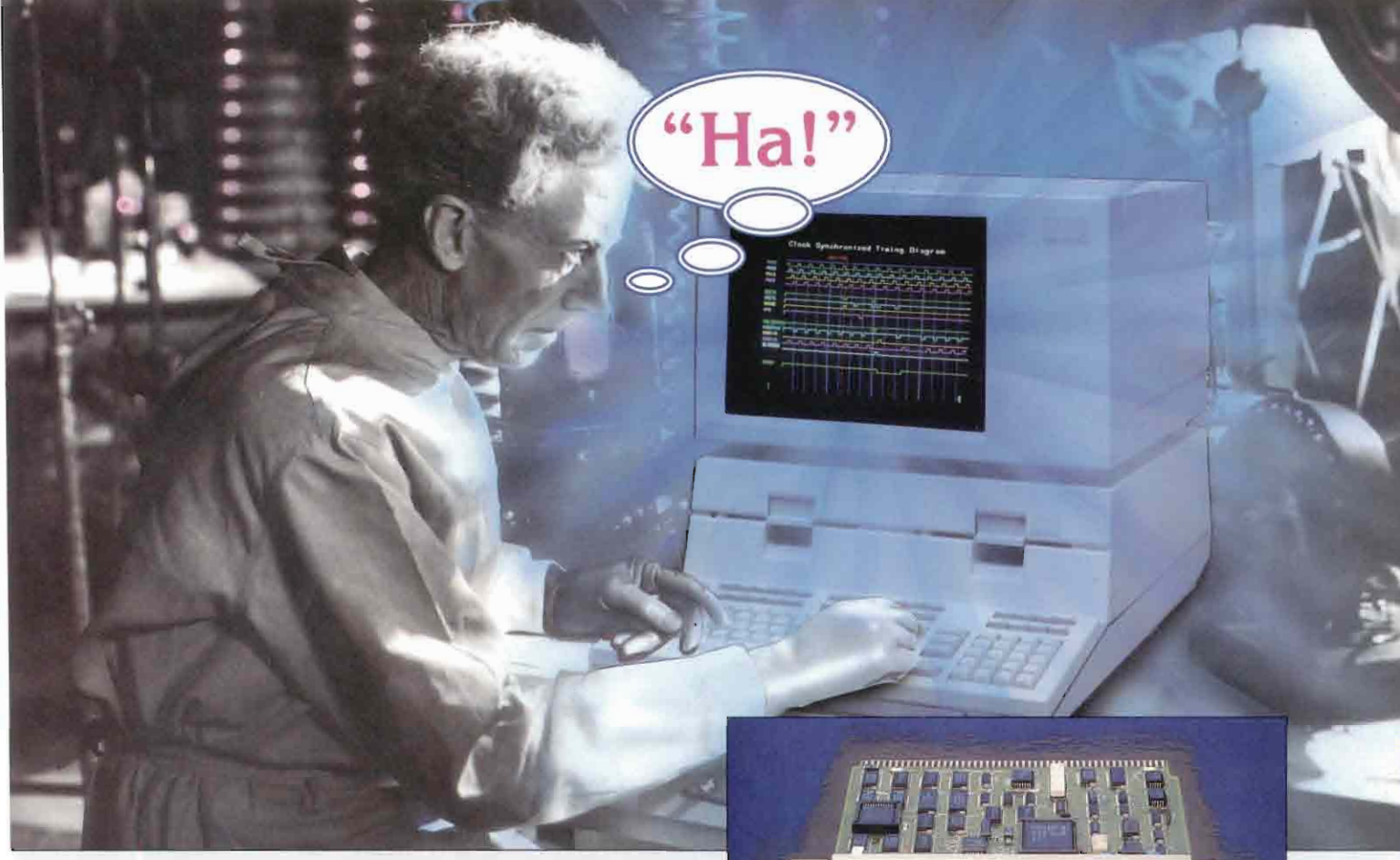
Londonderry, NH 03053
(603) 434-0442
(603) 425-2450 FAX

CIRCLE 302 ON READER CARD



"Let them laugh now. With Eventide's new Ether Board, I've turned this 'obsolete' Series 200 into an Ethernet workstation!"

At Eventide, we strive to maintain scientific objectivity no matter what, but the thought of all those "orphaned" Hewlett Packard desktop computers out there wouldn't stop haunting us. Finally, we called a special engineering meeting. "This world needs an Ethernet interface for Series 200 and older Series 300 HP workstations," we told our engineering brain trust, "...and it needs one in a hurry. Shared Resource Manager is just too slow. Sure, HP's SRM-ux software speeds things up by allowing users to run SRM over an Ethernet LAN. But with HP's SRM network cards, you need an extra SRM network card in the server—and an extra slot to put it in, which many servers don't have. To make matters worse, many Series 310 and 320 models and all Series 200s won't recognize LAN cards, so you'd still need to boot from a local disk."

Our supply of midnight oil nearly ran dry but, in the end, our engineering department came through with flying colors. Our new Ether Board solves *all* the problems mentioned above, plus a few more. It turns "outmoded" Series 200 and 300 computers into networked workstations—with Ethernet network performance, typically five to ten times faster than Shared Resource Manager. In addition, Ether Board comes with Eventide's proprietary BOOTROM that allows *all* Series 200 computers (along with older 310 and 320 models) to boot using a central server.

Ether Board is fully compatible and interchangeable with HP LANIC cards—just plug it into the DIO backplane bus of any Series 200 or 300. A ThinLAN BNC connector is included, so there's no need for the MAU (Medium Attachment Unit) required by HP cards. And despite its added capabilities, the Eventide Ether Board is far less expensive than HP's Ethernet card.

But does the Eventide solution *really* work? Every bit as reliably and as impeccably as the HP-compatible RAM products we've been supplying to FORTUNE 500 companies, government agencies and educational institutions since 1971. Call Eventide today for information on the Ether Board WLZ-320 Network Interface, and bring all your HP computers together on Ethernet.

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CIRCLE 116 ON READER CARD

NEWWAVE 3000 9000

Choosing The Right Storage Technology For Your Application

PLAYING MATCH

[BY ROGER STAGER]

The mass storage market is undergoing a rapid evolution. New tape and optical technologies with vastly increased capacities and ever smaller form factors are appearing. Robotic media handling systems for autochangers and jukeboxes are becoming more affordable. Given the variety of mass storage products currently available, it's often difficult to match a storage technology to an application. To choose the storage devices that best serve your needs, you'll want to examine the capabilities and the costs of today's technologies.

For the purpose of analysis, we've divided the applications that require storage devices into three general categories: backup, high-speed and archival.

Backup applications create multiple copies of data for insurance against loss of data. Many copies of the same data are typically created, resulting in a large total capacity requirement. To minimize data loss, it's a good idea to perform backups on a regular and frequent schedule. Frequent backups can protect your data, as well as your time and money, from user error or hardware failure.

Because you have to do it frequently, data backup is something you want to be able to perform quickly and easily. As the volume of data to be backed up becomes larger and the time during which backups can be performed decreases, high data transfer rates are of increasing importance. Because data is restored from backup media much less frequently than it's written, it's more important to optimize the backup process than the retrieval process.

To assure the integrity of your backup data, data files must be inactive during the copying process. For this reason, backups usually are performed during off-hours. Alternatively, file locking or transaction logging may be used to prevent data corruption.

Unlike backup applications, archival applications store data in its final form for the purpose of future reference. In this case, the data is typically accessed more often than it is updated, so retrieval time is more important than the time required to write the data in the first place.

Archival applications don't write multiple instances of the same data; therefore, the total storage requirements are lower than those required for backups. However, some archival applications do handle very large data sets. Some typical archival applications include storage of CAD drawings, scientific and engineering data sets, financial records, personnel files and legal documents.

High-speed storage applications are those that require quick access to data. Certain applications may benefit from high-speed

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mass storage because they require fast interactive response with a large data base, or they may need to quickly process large amounts of data from "random" locations. For applications like these, fast access time and high transfer rates are crucial. Some examples of high-speed applications include word processing, editing, code development, CAD, large and/or intensive database, scientific modeling applications, etc.

Mass Storage Technologies

THE MASS STORAGE TECHNOLOGIES in common use on workstations are 1/2-inch reel to reel tape, 1/4-inch streaming tape, helical scan tape (1/2-inch-3480, 4mm DAT and 8mm), Winchester disk, magneto-optical disk (also called erasable or rewritable), Write Once, Read Many (WORM) optical disk, and Compact Disk-Read Only Memory (CD-ROM). *Figure 1* lists typical specifications for each of these storage technologies.

Half-inch reel to reel tape drives are one of the older and more proven technologies. These drives offer relatively low capacities and performances at a relatively high cost. However, a few very expensive models have transfer rates in excess of 1 MBps. Half-inch tape drives are available in start-stop and streaming models. The start-stop models support the ability to update a tape record without affecting the data around it — provided the need to update is anticipated and extra large gaps are left between tape records. These drives were once the industry standard for data interchange and backup, and they still enjoy a very large installed base.

Quarter-inch streaming tape drives are another tried and true technology. These drives are relatively inexpensive, but they're limited by low capacities, slow performance and high media costs. Performance drops dramatically when the application cannot transfer data quickly enough to keep the drive streaming. Quarter-inch tape drives do not support the ability to update records.

Helical scan tape drives provide the highest capacities and bit densities of any media. The drives use a rotating head at an acute angle to the tape, which results in high data transfer rates at low tape speeds. The 1/2-inch drives exhibit the highest transfer rates and the lowest capacities. The 8mm drives are somewhat slower but have the highest capacities. The 4mm DAT drives are the slowest, offering intermediate capacities, but they are also the smallest and least expensive of the helical scan drives.

Half-inch (3480) drives support the ability to update records in place. Eight-millimeter drives offer limited update-in-place capabilities, and only some 4mm DAT drives have update capabilities. There are two competing standards of 4mm DAT drives: DDAT and DDS. Each standard has its own strengths, and only DDAT supports updating records.

The 3480, 4mm and newer 8mm drives support high-speed positioning to random tape blocks. Software device drivers and applications that take advantage of this feature now are becoming available. This feature makes these tape technologies competitive with other media.

Optical Options

THE OLD STANDBY WINCHESTER disk drives, just like the ones in your PC, are available in a variety of physical sizes, capacities and performance levels. Overall, they provide performance unmatched by many other storage technologies. But as far as disk formats go, the real excitement lies with optical technologies.

Magneto-optical disk drives provide the same functionality as Winchester disk drives, but offer the advantage of removeable media. Transfer rates during read operation are typically one-half to one-third those for write operations, because write operations usually require two to three passes. The transfer rates quoted in *Figure 1* are for read operations.

Because the magneto-optical media can be updated in place and is random access, standard operating system file systems can be used. However, it's highly desirable for device drivers to be able to deal with removable media.

Write Once, Read Many (WORM) technology has been around for many years but has had a difficult time capturing market share. The media format hasn't been standardized, so media from one drive is not interchangeable with a drive from another manufacturer. WORM performance is comparable to that of magneto-optical technology, although WORM has a much broader range of capacities. The write once characteristic makes WORM ideal for applications in which data must not be changed once it's stored. This is particularly useful for businesses or applications that require a secure audit trail. Long media shelf-life (100-plus years) also makes WORM a good choice when data needs to be retained for long periods.

On the negative side, WORM's write once characteristic is not compatible with the file systems of most operating systems. Consequently, WORM drives require custom file systems and, in most cases, custom device drivers. Fortunately, device drivers and custom file systems for WORM are available for most workstations from third-party vendors.

FIGURE

PRODUCT	DEVICE TYPE	ACCESS TYPE	ECC	UPDATE CAPABILITY	ACCESS TIME	TRANSFER RATE (Kb/sec)	SHELF LIFE (years)	MEDIA* CAPACITIES	MB PER CM^3	MEDIA COST PER MB	DRIVE COST	SIZE OF INSTALLED BASE
1/4" Cartridge Tape	Streaming	Sequential Write Sequential Read	Limited	No	~300sec	10-200	6	40-500MB	.3-5	$.07-7.77	$1,000-$2,500	L
1/2" Reel To Reel 9 TRACK	Streaming Start/Stop	Sequential Write Sequential Read	Limited	Yes	~300sec	40-1000	6	40-200MB	.03-.2	$.05-.25	$3,000-$30,000	L
1/2" Cartridge Tape (3480)	Helical Scan	Sequential Write Random Read	Excellent	Yes	~100sec	1000	6	250MB	1.3	$.10	$10,000-$40,000	S
8mm Tape Drive	Helical Scan	Sequential Write Random Read (new tech)	Excellent	No	~100sec	250-500	6	2.3-5GB	40-100	$.13-1.25	$6,000-$10,000	L
4mm DAT Drive	Helical Scan	Sequential Write Random Read	Excellent	No	~40sec	90-120	6	1.3GB	50	$.83-1.6	$5,000	S
Winchester Disk Drive	Fixed Hard Drive	Random Write Random Read	Good	Yes	~20msec	600-3000	N/A	10MB-2GB	.008-.4	$3.00-$30.00	$1,000-$15,000	L
Write Once Read Many Optical Drive (WORM)	Optical	Concentric or Spiral	Good	No (but can be simulated with software)	~100msec	120-1000	30-100	200MB per side-3.2GB per side	2-6	$17-25	$5,000-$50,000	M
Erasable/ Rewritable Optical Drives (140)	Optical	Concentric or Spiral	Good	Yes	~80msec	150-350	10	325MB per side-500MB per side	3-5	$25-33	$5,000-$9,000	M
CD-ROM	Optical	Spiral	Good	No	~250msec	70	10	600MB	3	$1500 to master $1.00 per platter to duplicate	$1,000	S

*Note: Capacities do not take data compression into consideration. Data compression typically increases tape capacity by a factor of 2.5 to 3.

Typical specifications for common mass storage technologies.

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The cost of media storage alone can be significant for low-density media or when storing very large data sets on any media.

CD-ROM is a different class of storage technology than the other disk formats discussed here. CD-ROM disks cannot be written but instead are pressed from masters in the same way CDs are produced for home audio. In this sense, CD-ROM isn't really a practical storage technology for the types of applications you regularly encounter. It is, however, often confused with WORM and magneto-optical technologies, so it's a good idea to know the difference. CD-ROM's capacity and low cost per megabyte make it an attractive media for data distribution.

Storage Requirements

THE THREE MOST IMPORTANT factors in comparing disk storage technologies are capacity, performance and cost. It's difficult to assign a single range of capacities, performances or costs to an entire storage technology format. For example, Winchester disk drives range in size from 1 to 14 inches with different ranges of performance and cost/MB for each size. Even for a particular size, 5 1/4-inch for instance, performances may vary by a factor of four and cost/MB by a factor of three or more. The specifications presented here are intended to reflect typical workstation configurations and should be used only to compare one technology against another.

Figure 2 shows a plot of system cost versus storage capacity for the various storage technologies. Each curve is plotted over the range of capacities that can be achieved on workstations. The higher capacities shown in each curve usually reflect the use of multiple drives and may not be achieveable on all workstations.

While there is much overlap, high capacities are achieved with Winchester, WORM and helical-scan technologies. The highest capacities can only be reached with WORM and helical-scan tape devices that use robotic handling systems.

Performance, on the other hand, is determined by the total time for a transaction— that is, the sum of the media change time (if required), the access time and the data transfer time:

$$Tt=Ct+At+Dt$$

where Tt is the transmission time, Ct the media change time, At the access time and Dt the time required to transfer the data.

Media change time is the total elapsed time between a request for a transaction and getting the media positioned to "load point," in the case of tapes, or "spun up," in the case of disks. This time is zero if the correct media is already in a drive, typically 10 to 90 seconds for robotic handling systems, and varies from minutes to hours if human intervention is required.

Access time is loosely defined as the elapsed time from completion of media change (if any) to the beginning of data transfer. In the case of tapes, this time is spent positioning a tape to the beginning of the requested data. If the tape hardware and software does not have the ability to position to random tape records, the access time will include positioning to the beginning of a tape file plus the time required to locate the beginning of the requested data within that tape file. Locating the beginning of the data within a tape file is usually done by reading the tape.

For disk drives, access time typically includes several disk accesses that are necessary to find the desired file within the file system. Therefore the access times quoted within this article bear little resemblance to the access times normally quoted for disk drives.

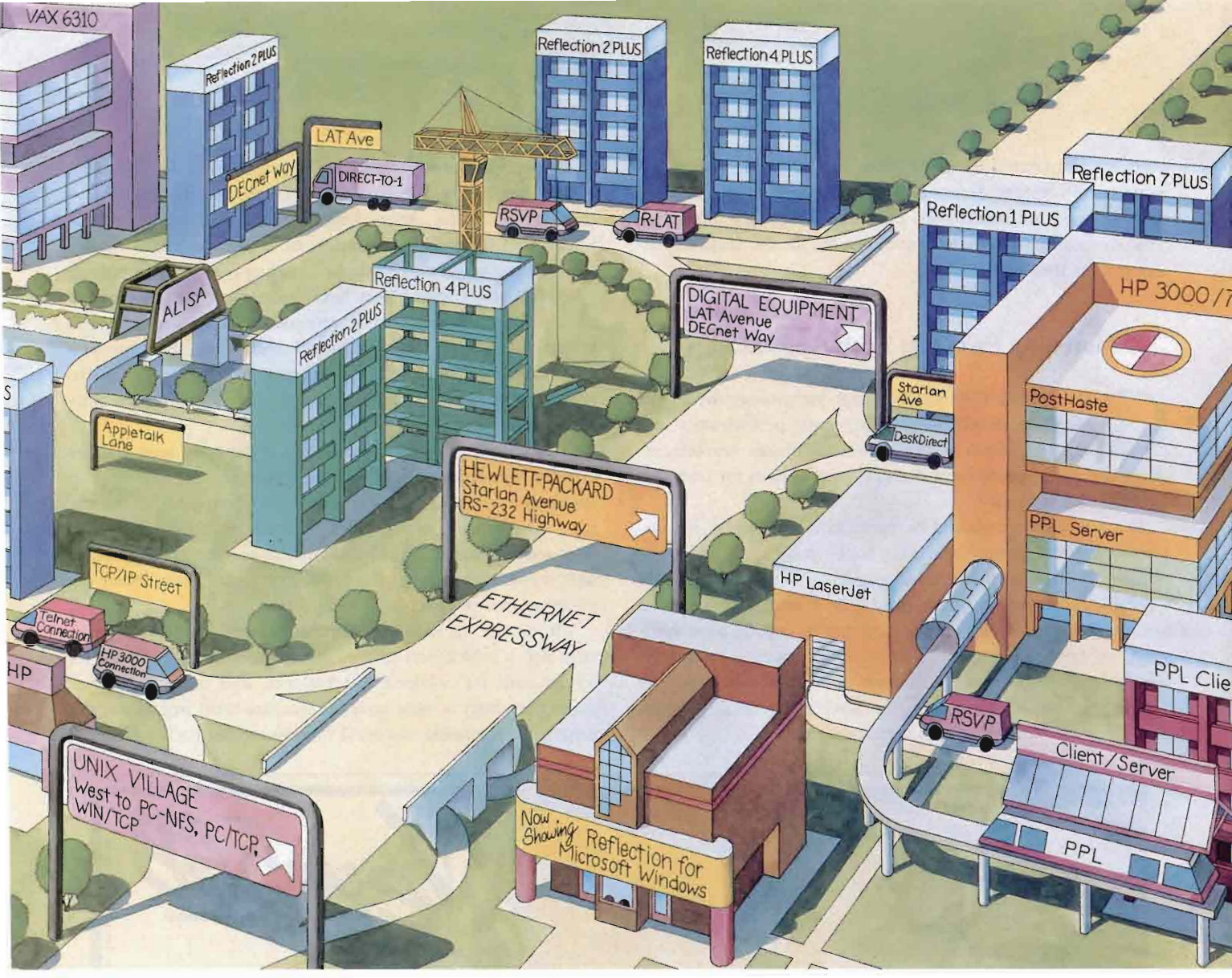
Transfer time is the time required to transfer the requested file(s) to or from the storage device.

Figure 3 shows the access and transfer times for the different storage technologies as a function of the amount of data to be transferred. For transactions involving small amounts of data, performance is dominated by the media change and access times. As the amount of data to be transferred increases, the data transfer time becomes dominant. For very large data transfers, even the media change time associated with robotic handling systems becomes of secondary importance.

Predicting the performance of various mass storage technologies for a particular application requires an in-depth understanding of the application in addition to detailed knowledge of the storage device.

For removeable media, the cost will reflect the cost of the drive plus the cost of media. For robotic handling systems, the price will include the cost of the robotics plus drive(s) and media. For non-removeable technologies, the cost will be the price of the drive only. The cost of media storage alone can be significant for low-density media or when storing very large data sets on any media. The megabytes/cm^3 column in *Figure 1* can be used to estimate total media storage requirements.

For applications requiring relatively small amounts of storage,



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costs are dominated by drive costs. However, as storage requirements increase, removeable media technologies become necessary and the media costs become increasingly important. The 4mm and 8mm helical-scan are by far the least expensive storage media.

Matching Products With Applications

CHOOSING THE BEST storage technology for an application involves balancing cost, performance and capacity. Each of the application classes (backup, archive and high-speed) have distinct requirements for cost performance and capacity.

Because backups should be performed frequently, it's important that storage systems make backups fast, easy and inexpensive. If less than the optimum solution is used, backups are typically performed less frequently than is desirable to protect against data loss. A backup storage system should have sufficient online capacity to perform backups without human intervention, a sufficient transfer rate to complete the backup during the available time, an inexpensive and reuseable media, and modest media storage requirements.

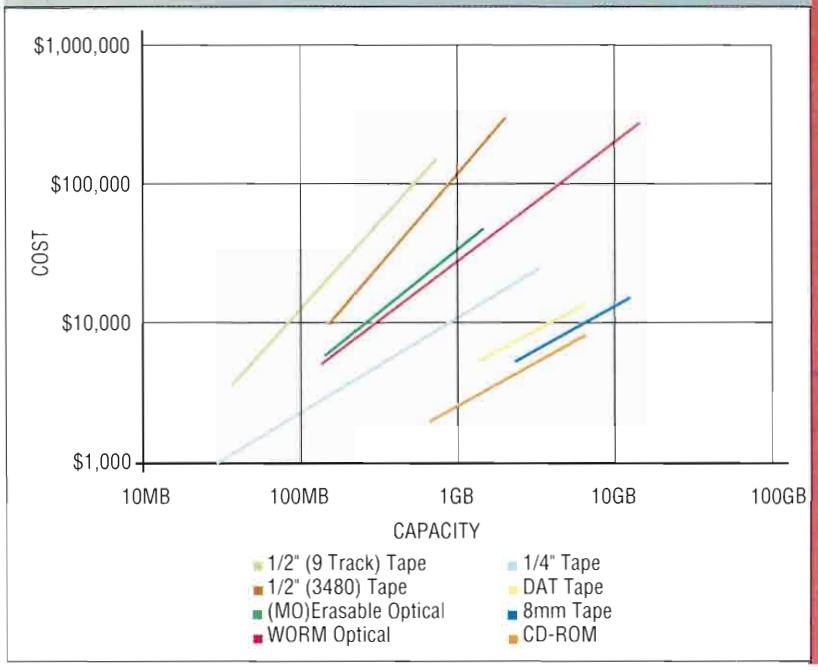
Because backups are used to insure against data loss, the backup media should also exhibit good data integrity and a reasonable shelf life. As the frequency and quantity of data being backed up increases, the cost of the media can dominate the total cost, even when robotic handling systems are involved.

Four millimeter and 8mm helical-scan tape technologies and their robotic handling systems provide the highest capacity and lowest system cost per MB. These technologies also provide a good match for the other requirements, providing moderate to high transfer rates, excellent data integrity and very high density storage.

The 4mm drives may not have a sufficiently high transfer rate for some backup applications, however, very few backup applications can take advantage of a drive offering higher transfer rates than is provided by 8mm technology. If higher transfer rates are necessary, the 1/2-inch helical-scan technology offers high transfer rates but at the penalty of higher costs, lower capacity and more expensive media.

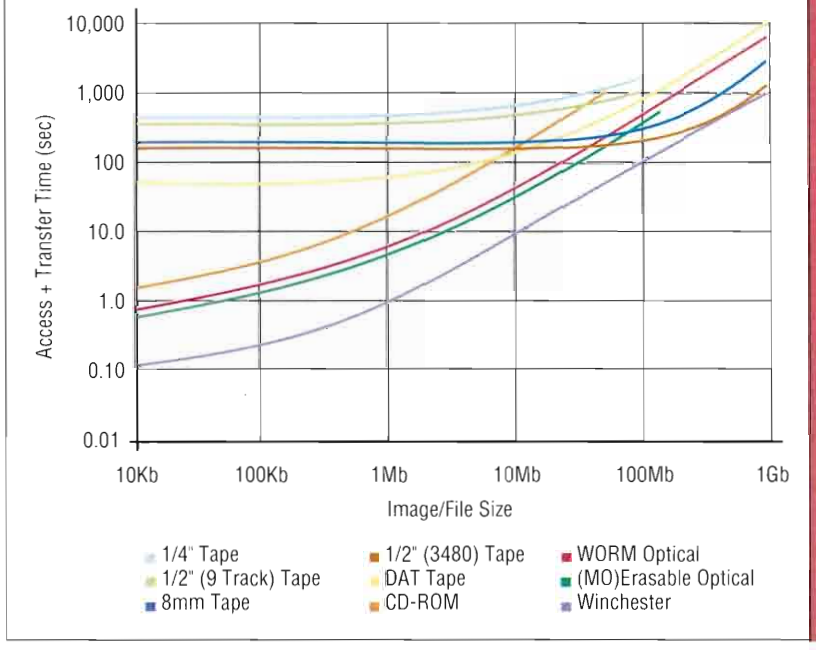
Other tape technologies are much more expensive. Drive costs for 1/2-inch reel-to-reel drives are relatively expensive. Media costs for 1/2-inch and 1/4-inch tape technologies become very high as time goes on. Perhaps most important, the capacities are usually too small for unattended backups requir-

FIGURE 2



Unit cost versus storage capacity.

FIGURE 3



Plot of access and transfer times for storage technologies as a function of the amount of data to be transferred.

ing operator time to change tapes during the course of the backup operation.

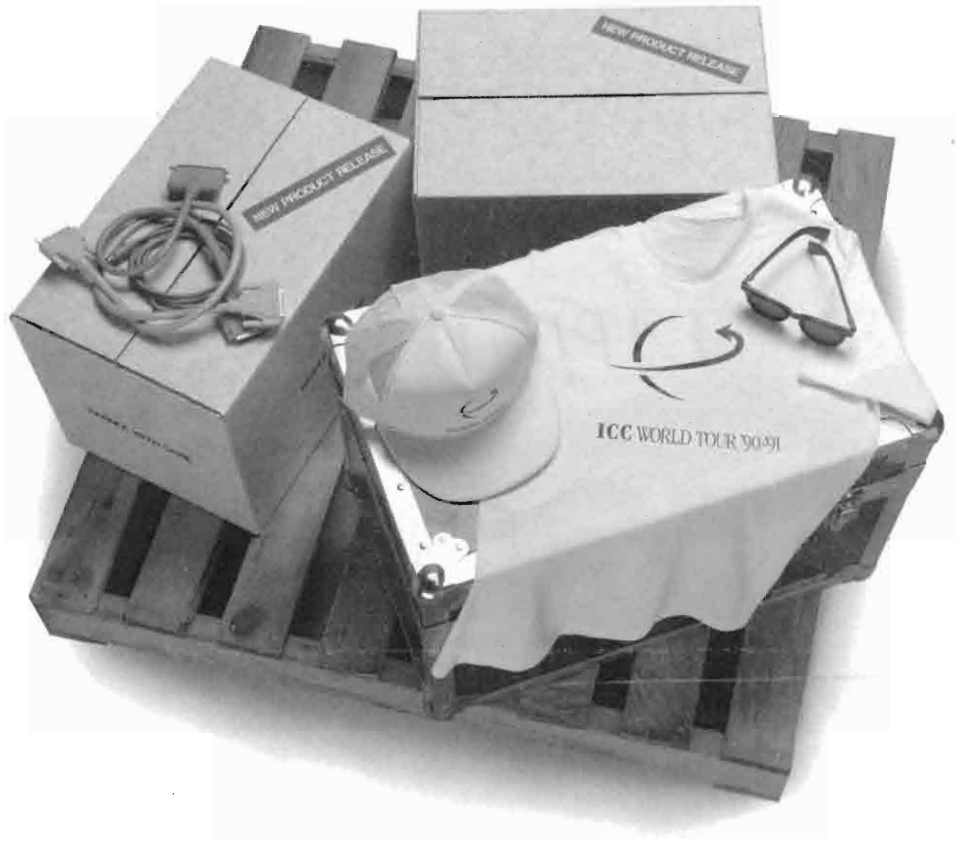
WORM and erasable optical drives are almost always poor choices for backup applications. The media costs are too high, the transfer rates during writes are very slow and sufficient capacity for unattended backups can only be attained with relatively expensive robotic handling systems. WORM also becomes especially expensive because the media cannot be reused.

Tape technology usually has retrieval times that are too long for archival applications. For relatively small archival applications, Winchester disk drives are the most cost effective. At higher capacities, magneto-optical or WORM drives with robotic handling systems are usually the technologies of choice.

For archival applications where very large data sets are being retrieved, or where funds are limited, the helical-scan technologies offer the possibility of a very low cost archival system. The faster access times of Winchester and optical become less important as the size of the data retrievals increase.

High-speed applications require very high performance. Therefore, Winchester disk drives are almost always the technology of choice. However, as capacities increase to over 10 GB, cost constraints and the inability to connect the needed capacity may demand the use of slower WORM- or magneto-optical-based juke-boxes with robotic handling systems.

The selection of an appropriate storage technology for a given application requires in-depth knowledge of the application, as well as a detailed understanding of the available storage technologies. When considering what media to choose for your application, no storage technology should be ruled out. The best solution is often not the obvious choice.—*Roger Stager is co-founder and vice-president of engineering of Delta Microsystems, Livermore, CA.*



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TAPE WARS:

8mm Versus DAT

Both Sides Would Like You To Believe Their Tape Technology Is Superior

The headlines jump from the pages of computer trade journals: One declares that 8mm tape outshines 4mm digital audio tape (DAT), another insists that DAT is the storage technology of the future. Headlines like these reflect the growing debate over which type of tape is best-suited for backup and storage of data. Most probably, comparisons between 8mm and DAT have occurred because both formats use the same type of tape media, come in similar cartridge packaging and use the same helical scan technology. Additionally, both 8mm and DAT were offshoots of technologies originally developed for consumer use. Also, both compete against other computer storage technologies such as Quarter Inch Cartridge (QIC), nine-track tapes and optical disks.

Ultimately, the 8mm vs. DAT debate boils down not to which one really is better, but rather, which one will capture a larger share of the market several years down the road. DAT, truth be told, only has become a contender within the past year,

[BY DEBRA SHEER HAVERSON]

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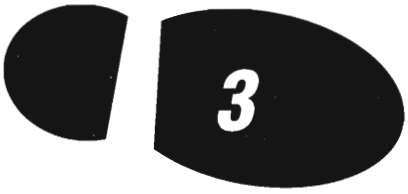

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TABLE 1

1990 DAT DDS MARKET SHARES

	% of Total Unit Shipments
Sony	26.0%
Hewlett-Packard	24.7%
WangTek	13.0%
Archive	12.7%
WangDAT	12.1%
GigaTape/GigaTrend	8.1%
All Others	3.4%

Information provided by DATA STORAGE CONCEPTS

Sony and Hewlett-Packard have captured nearly half of the 4mm technology market.

[TWO HELICAL SCAN TECHNOLOGIES]

Most traditional computer tape devices record along the length of the tape. Alternatively, helical scan tape drives record on tracks running across the tape diagonally to provide greater density of data and improved accuracy. The higher recording density provides the same data transfer rates while operating at a lower tape speed, which allows for gentler tape handling.

Helical scan technology comes from the audio (4mm) and video (8mm) tape industries and only recently has been adapted for use in data storage. Companies producing DAT and 8mm for data storage have created or overlaid new formats to insure the data integrity required by this new application.

Traditional tape technologies use a fixed head, with the tape passing over the head. In helical scan technology, the head is mounted on a rapidly spinning drum aligned diagonally to the track. As the tape passes over the drum, the head writes tracks of data in a diagonal pattern corresponding to the pitch of the head. This method produces densities of 1,000 to 2,000 tracks per inch.

Both helical scan technologies have quickly become popular with users of nine-track tape, half-inch tape and Quarter Inch Tape (QIC). Not only does each compact tape cartridge cost significantly less than other types of tapes, but also, it can hold much more data. For example, whereas 4mm and 8mm tapes hold up to 2 GB and 5 GB of uncompressed data, respectively, a nine-track tape has a capacity of 40 MB to 120 MB and QIC tape has a capacity of 65 to 140 MB. In addition to reduced media costs, the differences in size and capacity yield conveniences in media storage and the ability to perform unattended backup. Also, helical scan tapes have an archival life of 10 years, compared to three years for other types of tape.

when DAT drives became available in significant quantities. The 8mm technology is also a relative newcomer, with its first product introduced in 1987. However, within a few short years, it's become one of the most popular storage formats.

All 8mm technology comes from one company, Exabyte (Boulder, CO), which at last count boasted a rapidly growing installed base of 165,000 units worldwide. Exabyte drives are integrated into the products of more than 50 OEMs. According to Peter Behrendt, Exabyte's president and CEO, his company hasn't seen much competition from DAT and expects continued growth in 8mm sales. Analysts of storage technology trends, however, predict that DAT will begin to outsell 8mm within the next couple of years.

DAT Argues Its Superiority

DDS IS A FORMAT THAT overlays the basic audio format, providing the additional reliability required for data storage by organizing the frames of the audio format into a sequence of data groups on the tape. Numerous companies manufacture 4mm technology, with co-developers Sony and Hewlett-Packard capturing nearly half of the market so far (see *Table 1*).

With no real competition between DDS and the other DAT format, DATA/DAT, debate focuses on the differences between 4mm DDS and 8mm. The DAT DDS side clearly has taken the offensive. Except for HP's early claim that 8mm was an analog, rather than digital technology, the arguments for DAT have been effective. However, many industry analysts suggest that DAT's proponents inflate some of its advantages, while playing down its limitations. For instance, DAT supporters rarely mention that DDS DAT media currently have less capacity and lower data transfer speeds than 8mm. (HP's second generation 3 1/2-inch DAT drives use longer tape and data compression to address these problems. The new drives offer 8 GB capacity).

Exabyte has taken great pains to defend 8mm against the criticisms DAT vendors have publicized. When asked what he considers 8mm's most significant advantages, Exabyte's Behrendt points to product reliability and a large, satisfied installed base. The long-term extendability of the 8mm design, he argues, makes it the strongest of the tape technologies currently on the market. Also, because Exabyte is the only supplier of 8mm drives, Behrendt notes, it can guarantee a standard format. In fact, he claims, Exabyte 8mm is already a de facto standard in the tape storage market.

Exabyte's EXB-8200 tape drive, the company's original product, features a large capacity and high data transfer rate. The company's addition of the EXB-8200SX option and the 5 GB EXB-8500 expand the capabilities but remain compatible with the initial product. "The design point of these products is still very conservative," Behrendt says. "There's a clear migration strategy that allows 8mm products to move up in data rate

and capacity to levels that 4mm tape will never be able to match. Because 8mm is wider and longer, it has considerably more real estate in it."

Behrendt notes that DAT uses a much higher areal density, recording at 114 million bits per square inch of tape in order to achieve a 1.3 GB capacity. The EXB-8200 with 2.5 GB per tape records at 35 million bits per square inch. The EXB-8500 records at more than 70 million bits per square inch to yield 5 GB. This means, according to Behrendt, that 8mm still has room to boost up the areal density once again before hitting what Exabyte thinks is the upper limit of 120 to 150 million bits per square inch.

Husni Sayed, vice president of IEM Inc. (Fort Collins, CO), which markets both 8mm and DAT products, agrees with this assessment. "The 8mm is achieving its performance in a comfortable manner," he said. "The 4mm is sweating [in terms of areal density] to compete."

Behrendt also sees compatibility as an issue. All 8mm products, regardless of OEM, come from Exabyte, so they all work interchangeably. DAT, on the other hand, uses two different formats (DDS and DATA/DAT) and three data compression algorithms. It also comes from multiple sources.

It's questionable, however, whether this situation will be an important concern for users. First, DATA/DAT is likely to find a completely separate market niche from DDS when it does become widely available. Different compression algorithms don't pose a major inconvenience for MIS departments as long as the same documents/records always use the same algorithm.

DDS is also becoming a formal standard, and *all* DDS DAT vendors offer products that comply with this standard. HP spokesperson, Ruth Harlow, insists that industry commitment for DDS will ensure compatibility long into the future. Harlow, based in HP's Bristol, England, office (home of HP's DDS development) believes the number of vendors in the DAT market provides a measure of security. As Husni Sayed suggests, Exabyte's position as the only supplier of 8mm could be a disadvantage. "What happens if Exabyte goes out of business?" he asks.

Access Speed

DAT HAS ONE INDISPUTABLE advantage over 8mm: It provides significantly faster access to data during retrieval. DDS uses Sub-Code areas on the tracks to search at up to 200 times the normal read/write speed, making it possible to access any file on the tape within an average of

20 seconds and a maximum of one minute. Although Exabyte recently introduced an enhanced version of its popular EXB-8200, the EXB-8200SX, and the EXB-8500, both of which improve 8mm's access speed, DDS retains this advantage.

Rick Walsh, president of Herstal Automation (Berkeley, MI), says that DAT's access speed offers a clear-cut advantage. When 8mm products could take up to 18 minutes to find a file at the far end of the tape, you would probably rather be using a DAT drive when it comes time to search for a file. With its new products, Exabyte states that average access time is now down to 85 seconds. The maximum time now is closer to three minutes. Walsh, whose company markets a line of both 4mm DAT and 8mm products, says that although the difference in access time is still great, "how often do you retrieve? You do backup 95 percent of the time and retrieval five percent of the time."

Data Integrity

BOTH SIDES WOULD LIKE YOU to believe that their products offer greater reliability than the other's and will gladly provide users with technical descriptions of their error-correction methodologies. Both technologies use Reed Solomon error correction codes that account for slightly less than 30 percent overhead on the tape. This means that tapes store the advertised capacity plus the required error-correction codes. Whereas manufacturers of 4mm DAT specify a read hard error rate of 10^{15}, Exabyte specifies 10^{13}. Although mathematically 10^{15} is 100 times better, the difference for the user is negligible. Exabyte also states that the 4mm rate is based on projections, rather than actual tests and claims that its methods actually work better at correcting small random errors.

Both technologies also can use read-after-write methods to detect and rewrite parts of the tape where errors have occurred, although the methodologies differ somewhat. Buyers should beware, however. Only DAT drives with four, rather than two, heads have this capability. Hewlett-Packard's DDS DAT products feature an impressive list of 10 facilities (many optional) that contribute to data integrity, the most prominent being read-after-write.

The data integrity issue boils down to this: DAT companies like HP claim higher integrity, but Exabyte says 8mm product design delivers the same (or better) reliability without needing optional techniques that reduce speed and capacity.

Comparing Actual Capacity

AT PRESENT, EXABYTE'S 8MM products have significantly greater capacity than 4mm products do. DAT proponents, however, point to two factors that create a big difference between advertised and actual capacity. The DDS DAT technology currently supports use of data compression algorithms so that a tape can hold up to four times as much data. The first DAT products offered 1.3 GB of storage. Newer products offer 8 GB. The original 8mm product contains 2.5 GB of storage. The argument is that by multiplying DAT's 1.3 GB or 2 GB by three or four (the benefit of using compression), DAT compares favorably to 8mm in terms of capacity.

Exabyte's new EXB-8500 has a capacity of 5 GB without use of compression, however, and the company has signed a licensing agreement to use IBM's Improved Data Recording Capability (IDRC) algorithm. Although Exabyte does not have a product yet, it has announced that it will do so during 1991.

DAT proponents also charge that 8mm uses extremely long physical file marks, compared with its short, logical ones. Behrendt and Sayed say that DAT proponents exaggerate the significance of this. Eight-millimeter uses two types of file marks, both of which are longer than those used by 4mm. The very long file mark is needed only once at the very end of all data on the tape; the others appear at a file. Exabyte's new EXB-8200SX uses an abbreviated filemark.

TABLE 2

4mm DAT DRIVE vs. 8mm DRIVE
UNIT FORECAST
(Units In Thousands)

	1989	1990	1991	1992	1993	1994	1995
4MM DAT Drives	7.4	76.9	191.1	343.6	525.9	772.9	1048.2
Annual Growth	—	946%	149%	80%	53%	47%	36%
4mm DAT Installed Base	7.4	84.2	275.3	618.9	1144.9	1917.8	2966.0
8mm Drives	45.0	101.0	84.0	73.0	65.0	56.0	46.0
Annual Growth	—	124%	-17%	-13%	-11%	-14%	-18%
8mm Installed Base	64.0	165.0	249.0	322.0	387.0	443.0	489.0
Total Helical Scan Shipments	52.4	177.9	275.1	416.6	590.9	828.9	1094.2
Annual Growth	—	240%	55%	51%	42%	40%	32%
8mm & 4mm Installed Base	71.4	249.2	524.3	940.9	1531.9	2360.8	3455.0

Information provided by DATA STORAGE CONCEPTS

According to Sayed, 8mm file marks can erode capacity when backing up many short files using the store/restore utility on the HP 3000; however, users can remedy this problem easily by using different backup software for this function. He added that IEM easily remedied this situation; its product works with the HP utility and substitutes short logical file marks.

Eventually, stackers and other types of auto-loader devices for tape may make capacity less of an issue. These relatively affordable devices have already begun to multiply the number of 8mm and 4mm tapes users can employ for unattended backup. Exabyte recently shipped an 8mm stacker to its OEMs. Although HP has yet to announce whether or how it will acquire a DAT stacker, several companies have prototypes available.

Form Factor

WHEN IT COMES TO DRIVE SIZE, the question is not whether smaller is better now, but rather will users insist upon smaller form factors in the future. Lee Elizer, president of Data Storage Concepts (Boulder, CO), says the data in his firm's 1991 The Helical Scan Market Forecast Report shows users will switch to smaller forms starting in 1992.

"It's a difficult trend to combat, because the issue isn't whether a 5 1/4-inch works," he said. "By the time you package it, it just looks bulkier." The ability to move to the 3 1/2-inch form factor, along with price and performance, was an important reason why Hewlett-Packard developed DDS technology, according to Robert Hill, marketing manager for Hewlett-Packard in Bristol. "We knew that we could get the size of the mechanism down in the future," he said, "so that it would not just be workable with multiuser systems, but also with workstations."

Behrendt said Exabyte is also confident it can shrink its form, pointing to its announced agreement with Sony to jointly develop a half-height 5 1/4-inch 8mm mechanism with product available during 1991. He added that Exabyte now has the capability to create a 3 1/2-inch 8mm drive, but doubts the company will pursue this in 1991 because of low demand. Many in the DAT market, including HP, are skeptical of this claim.

The Marketplace

INDUSTRY ANALYSTS PREDICT that 4mm DAT will soon overtake 8mm in the marketplace *(see Table 2)*. Sayed, commenting on projections recently published by HP, said he had a hard time believing that 4mm will achieve such high sales because both technologies have good products. He added that Exabyte wisely corrected some shortcomings in its products for recent announcements at the Comdex show. Right now, Sayed said IEM's 8mm sales have not declined, but that IEM is selling an equal amount of DAT products, largely to Hewlett-Packard users who need to receive software updates. In some cases, users buy one of each.

Of course, it's difficult to predict trends in the computer industry. Often unexpected factors and developments can quickly alter trends. For example, Behrendt points to the large amount of R&D occurring in developing digital video products for the consumer market. Whether 8mm data storage can benefit from this technology and excel in the marketplace will likely depend on timing. For users, however, the whole question of 8mm versus 4mm may not be as ominous as manufacturers would like it to appear.

Both technologies are proceeding fairly smoothly through computer standards bodies and both are widely available and supported by many OEMs. More important, both are fairly affordable technologies, especially when compared to other methods of data storage. Regardless of which technology users select, they will get their money's worth before deciding to move on to something new. *—Debra Sheer Haverson is a freelance writer specializing in technology issues, based in Marlton, NJ.*

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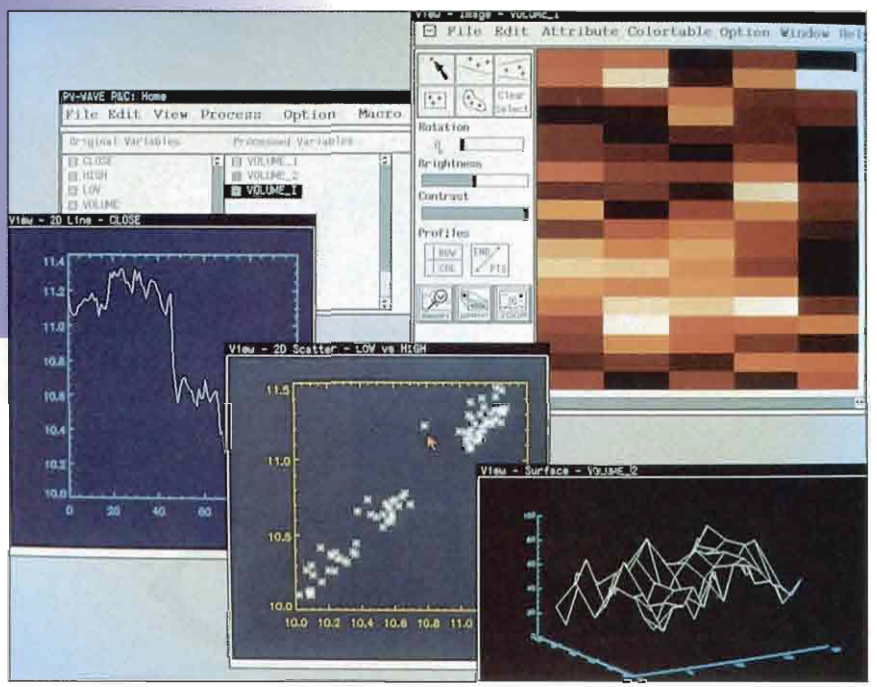

View, Manipulate And Animate Your Data With Precision Visuals' PV~WAVE

You need to calculate and visualize a surface plot of two 2-D floating-point arrays — one containing parabolic values and the other containing normally distributed random numbers. Perhaps you need to perform and visualize a fast Fourier transform on a signal dataset and use the results to define and design a signal filter.

What do you do? You could take the time and write the programs to perform these tasks in FORTRAN, but you needed the results yesterday, and FORTRAN isn't your specialty.

One piece of software designed to handle these and other data-intensive problems is PV~WAVE from Precision Visuals Inc. (Boulder, CO). PV~WAVE is interactive software for visualizing and analyzing vast amounts of technical data. It consists of high-level interpretive commands and procedures that provide data access, reduction and analysis.

Large, multidimensional datasets can be generated by such sources as satellite transmissions sending data about the earth and other planets, supercomputers producing data from engineering simulations, and sensor arrays producing multidimensional data from tests, simulations and experiments.

PV~WAVE takes these large, multidimensional datasets and transforms, manipulates and analyzes the data to create 2-D, 3-D, 4-D and dynamic graphics.

By George T. Frueh

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You can see how data flows through the course of various transformations.

PV~WAVE In Motion

We installed PV~WAVE version 3.0 on an HP Apollo 9000 Model 400t workstation with a color monitor. Installation instructions are provided, and there's a brief installation card for those who would rather not read the manual.

Logged on as superuser, we created the main PV~WAVE directory, **/usr/local/pvi** and moved into it. From here, the command **wave/wvinstall** runs PV~WAVE's installation script that leads you through a series of questions. Entering a softkey unlocks PV~WAVE, and typing **wave** invokes PV~WAVE.

Command Performance

After executing and signing on, PV~WAVE gives you the WAVE> prompt, where commands are entered.

PV~WAVE comes with a demonstration system that introduces you to its capabilities. Thirteen demonstration modules can be accessed simply by typing **demo**.

Among these modules is a medical image processing module that uses data from medical images of the brain. This module shows how PV~WAVE combines vector graphics, raster images and interactive input to analyze complex data.

Another module shows how PV~WAVE can be used to simulate dynamic animation by displaying multiple frames of data sequentially. This module shows elevation data of Pikes Peak redisplayed from a series of viewpoints.

PV~WAVE contains a useful set of commands that let you visualize data in 2-D, 3-D and 4-D. For example, Plot is the basic PV~WAVE command used for plotting data in the X-Y plane. First you define the data as a variable, then you plot it. The following commands plot a curve that slopes upward:

```
Temperature = [8.3, 13.5, 25.6, 50.3]
Plot, Temperature
```

PV~WAVE can plot 3-D data as contour or surface plots. When displaying a simple contour plot, the first step is to define a variable. For example, a large amount of elevation data for mountainous terrain could be collected over a given area. If this data was given the variable name Mountain, then issuing the command:

```
Contour, Mountain
```

would display a contour plot of the mountain area.

The Surface command draws wire mesh representations of functions of X and Y, just as the Contour command draws their contours. This command projects the data points into two dimensions after rotating about the Z axis, then the Y axis. Each point is connected to its neighbors by lines and all hidden lines are removed.

The following PV~WAVE commands will display a 2-D, zero-mean Gaussian function with a variance of 5:

```
Z = Shift(Dist(40),20,20)
Surface, Exp(-(z/10)^2)
```

PV~WAVE lets you visualize data as an image with the "Tv, image" command. An image consists of a 2-D array of data (pixels in this case) and can come from many sources. In this command, image is a variable or expression containing the image matrix.

Entering PV~WAVE commands on a line-by-line basis enables you to observe, transform and make decisions about data quickly. However, PV~WAVE also gives you the flexibility to write and use procedures to automate well-defined tasks.

For example, to animate a collection of data, such as displaying different viewpoints of Pikes Peak, you could write a procedure that recalculates and displays the new angle of view as many times as you want. How to perform this useful function is explained in the Overview Guide.

Documentation And Benefits

PV~WAVE comes with various manuals including a complete user's guide, the Demonstration System Guide, and the PV~WAVE Overview Guide. The user's guide contains the most technical information and provides a thorough breakdown of each command.

The Overview Guide explains the basics of PV~WAVE. A tutorial section takes you from the basics, such as reading in files, to writing procedures to producing animation.

PV~WAVE protects your software investments. Software currently used in your work can be built into PV~WAVE without writing additional code, compiling or linking.

PV~WAVE can read in formatted or unformatted data from many sources with no lengthy conversion routines required. Simple transformations and filters can be applied to quickly identify trends in your data.

Graphics produced in the PV~WAVE environment can be printed easily on most common printers and plotters to produce high-quality hardcopy for publications and presentations.

PV~WAVE is as impressive to use as it is to watch. Producing 2-D and 3-D images with your data and applying animation to the final image results in a unique view of your data and a more accurate interpretation of it.

PV~WAVE

PLATFORMS: HP 9000/3XX/4XX, DEC, Sun, Silicon Graphics (4-D series) workstations and multiuser systems running UNIX, ULTRIX or VMS.

PRICE: Floating single-user license is $4,500 per user. Multiuser licenses based on CPU range from $4,800 to $31,500.

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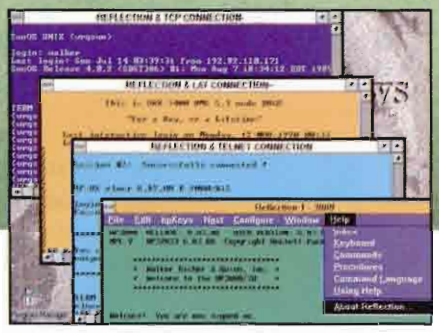

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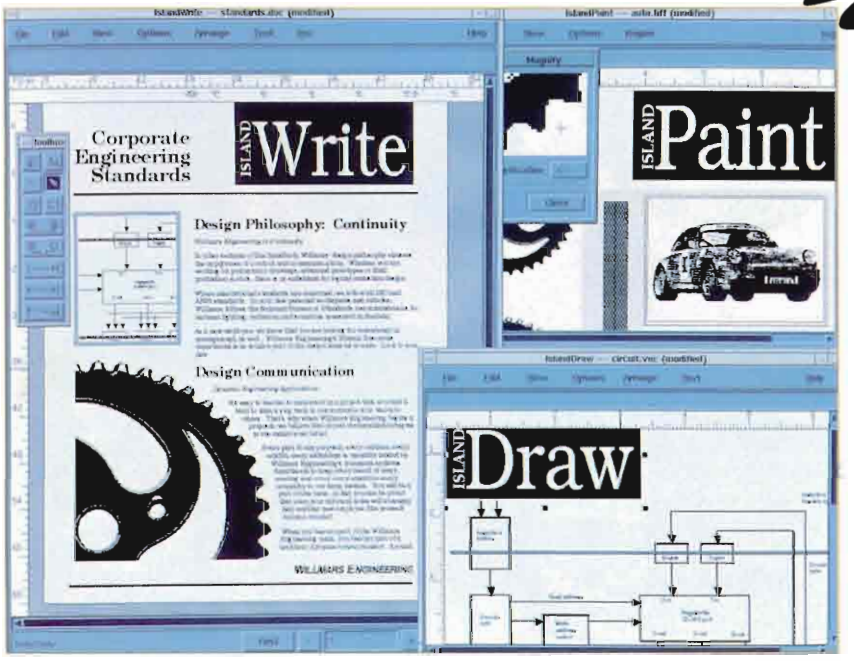

Write, Draw & Paint — Island Graphics' Complete Document Production Tool For The HP 9000

The Write, Draw & Paint package from Island Graphics Corp. (San Rafael, CA) turns your HP 9000 Series 300 workstation into a complete desktop publishing system with writing, drawing and painting tools. Layout tools let you integrate text and graphics easily, and you can create illustrated presentations for overhead projections. Like most desktop publishing packages, Write, Draw & Paint all support HP LaserJet printers and the PostScript Page Description Language from Adobe Systems.

Although fully equipped to produce professional documents, Island Write, Draw & Paint could also prove to be an important resource for your routine office communication. Write, Draw & Paint — known collectively as The Island Productivity Series — can help you produce memos and reports integrating text and graphics. In fact, it's like having an Apple Macintosh inside your workstation.

IslandWrite is a WYSIWYG word processing and page layout program. It provides you with the tools you need to create documents, from simple memos to illustrated newsletters and reports.

IslandDraw is a graphics editor for creating resolution-independent illustrations and diagrams that include Bezier curves and text. The images and text you create print smooth and clear. IslandDraw images can be printed and

By George T. Frueh

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saved in Encapsulated PostScript (EPS) format. IslandDraw objects also can be cut or copied, then pasted into IslandWrite.

IslandPaint is a graphics editor for creating illustrations and editing clip art and scanned images down to the dot or pixel level. IslandPaint images also can be brought into IslandWrite or IslandDraw, or printed directly. You can save IslandPaint images as Tag Image File Format (TIFF) files. IslandPaint regions can be cut or copied from IslandPaint and pasted into IslandWrite.

We installed Write, Draw & Paint Version 2.1 on our HP 9000/345 workstation. The program IslandInstall produced a welcome banner on the screen and a menu containing installation options. Note: IslandInstall isn't available for users of net licensing.

We used the Quick Install option. You can use this option if you plan to install Write, Draw & Paint for a single user, on only one machine, and at the default location (**/usr**).

Impressive Documents

To start one of the applications, a window displays the work area where you create your documents and images. At the top of the window is a menu bar with pull-down menus, which include the options: File, Edit, View, Options, Arrange, Text and Doc. (Help is also available, and each option is detailed in the user's manual.) A mouse moves the pointer around to select items within the pull-down menus and to shape and resize the window as needed.

If you're familiar with the OSF/Motif windowing structure and use of the mouse, you'll immediately be ahead of the game. Otherwise, the user manual has a complete chapter titled, "Using OSF/Motif."

When starting IslandWrite, you can simultaneously open an IslandWrite document. Specify a document and it appears as the current page. If you don't specify a document, the current page will be blank.

A Tool Palette appears in a separate rectangular box next to the work area. In IslandWrite, the work area is referred to as the page, IslandDraw's work area is the tablet and in IslandPaint it's the canvas.

Your choice from the Tool Palette determines the action you can perform on the current page. For example, to enter and manipulate text, choose the Text tool. To select and manipulate containers, choose the Selection tool. A container is an object that can contain text or graphics. Containers can be rectangles, polygons or columns. Text is the default mode on the Tool Palette.

The insertion point is where text appears when you type, paste or import text. When you start a new IslandWrite document, the insertion point appears at

the beginning of the column on page one. IslandWrite uses automatic wordwrap.

Pictures Set To Words

Starting Draw and Paint is similar to starting Write in that you can simultaneously open a Draw or IslandPaint document. Draw's Tool Palette is equipped with an assortment of drawing tools that enable you to draw Bezier and freehand curves, lines, regular and irregular polygons, regular and rounded rectangles, ellipses and arcs.

Although the series includes the three separate applications, we found all three very similar in operation. Learning the Write application enabled us to quickly learn Draw and Paint.

You can also change the line style and weight. By clicking on the Flip Vertically or Flip Horizontally icon, you can turn your drawing upside down or rotate it by 90-degree increments. There's also a Free Rotate icon that lets you rotate your objects to any orientation.

Paint's Tool Palette contains many of the same tools as available in Draw. As its name implies, Paint includes a Brush tool to use for painting. A Brush Palette is included to let you choose new brushes and access the Brush Editor.

The Brush Editor is for modifying the shape of a brush. The edit area displays a magnification of the pixels that compose the brush's shape. Change the colors of the pixels to black or white using the tools in the Editor dialog box and the brush takes on a shape of your own design. The ability to change your brush shape on a pixel basis lets you create virtually any type of brush style you desire.

The Pattern Palette provides choices for new patterns and leads you to the Pattern Editor. All painting tools except the pencil use patterns for lines or fills.

With Write, we created several documents and added our own drawings and paintings created with Draw and Paint. Although the series includes the three separate applications, we found all three very similar in operation. Learning the Write application enabled us to quickly learn Draw and Paint.

The user manual devotes a part to each of the three applications. Each part has a table of contents followed by a complete description of the application and an extensive tutorial for creating your own documents or designs.

If you're looking for a complete desktop publishing package for your HP 9000 workstation, IslandWrite, Draw & Paint offers a wide variety of writing, drawing and painting options. You'll be pleasantly surprised with its diversity and usefulness.

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PLATFORMS: HP 9000 Series 300/400/800; Apollo Series 2500-4500; DECstation 2100, 3100 and 5000; IBM RISC System/6000; Intel-based PCs with SCO Open Desktop; Silicon Graphics IRIS workstations.

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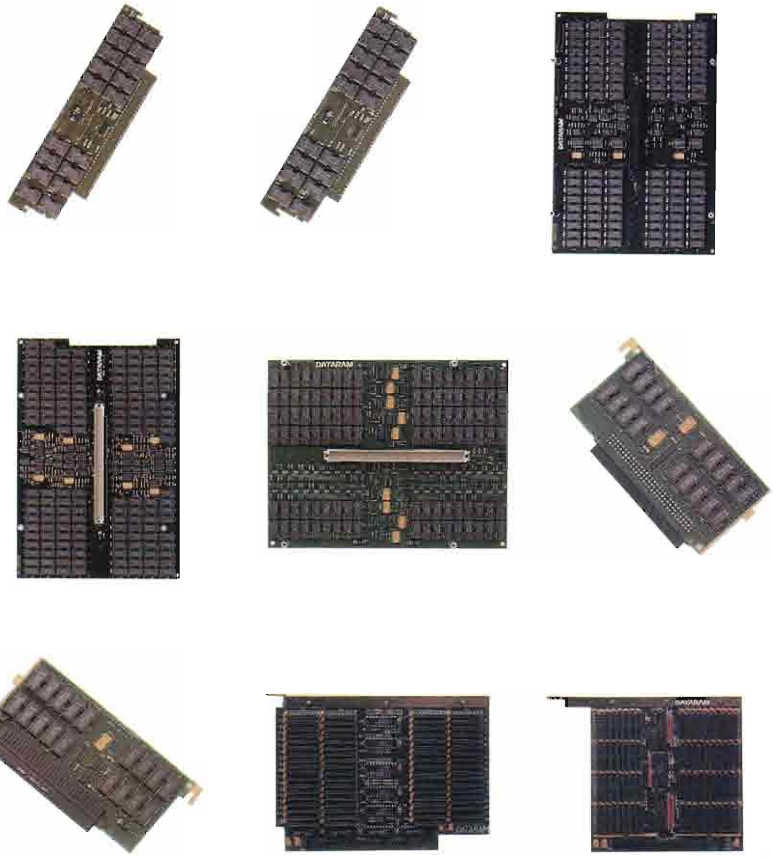

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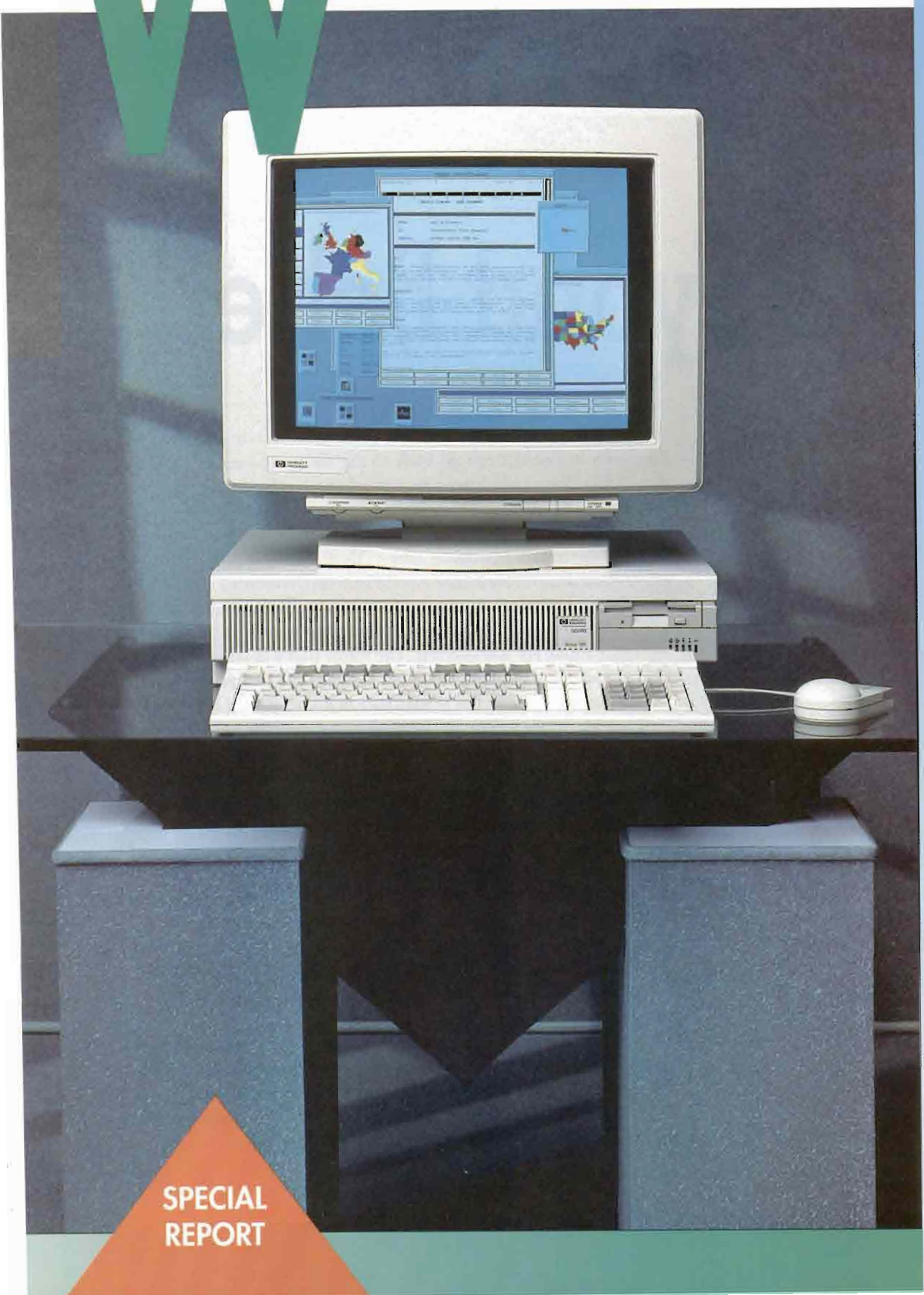

As The HP Apollo Series 700 Rewrites Workstation History, Apollo Domain Users Prepare For The Future

SPECIAL REPORT

Beyond Belief!

BY BILL SHARP

HP Combines Apollo Savvy And PA-RISC To Build The Workstation Of Your Dreams

SOMETIMES YOU KNOW WHEN you're having a dream, and you just smile at yourself and go back to the vision and enjoy it. I had just such a dream not long ago, one of those ridiculously improbable fantasies that stretches reality beyond belief to the point where it gets funny.

HP Professional's Managing Editor, Don Marks, and I were in an immaculate demo room at HP's Apollo Systems Division in Chelmsford, MA. On a table before us were two workstation computers. One was a Sun Microsystems SPARCstation 2 screaming along at 28.5 mips, and the other a new HP workstation. The funny part was when the engineer running a performance face off between the two products said, "Okay, now we'll give the SPARCstation 2 a 30-second head start."

That was when I woke up, laughed hysterically for a moment and then immediately went back to sleep. Nobody can give Sun a head start in performance and hope to catch them. But the dream resumed, and after the SPARC 2 had seared its way into a tough CAD application for half a minute, the engineer started up the HP workstation—and smiled. At this point, the dream got totally absurd because the HP system not only caught up with the SPARCstation 2, but just plain blew it away—no contest. The dream HP workstation in a real-world application performed at several times the pace of the SPARC 2 system.

And gradually I realized that I wasn't dreaming. SPARC 2 had just been left in the dust by HP's new RISC workstation. I'm not sure what I said about that speed, but I'm sure we couldn't print it here—congratulations, HP.

What we saw in early February were the new performance champs in the UNIX workstation business—the HP Apollo 9000 Series 700 PA-RISC workstations. First the basics. There are three models:

■ Models 720 and 730—Both are desktop systems in a modest-sized,

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vanilla-looking chassis (the tasty stuff is on the inside). The Model 720 processor is a 50-MHz version of the new PA-RISC chip set, while that for the model 730 zips along at 66 MHz. That is the fundamental difference between these two models. Both come standard with 16 MB of ECC main memory, expandable to 64 MB. Both provide 128 KB of instruction caching and 256 KB of data caching (more on this later, it's a big deal). Prices start at $11,990 for the Model 720 and $19,990 for the 730.

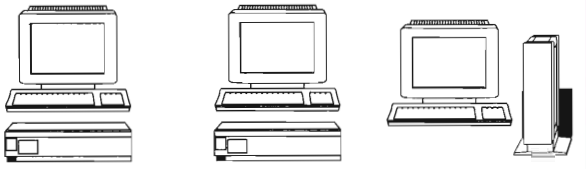
■ Model 750—This has the same chip set and performance as the Model 730, but is a deskside model designed for server use and much greater expandability. Main memory is the same standard 16 MB, but is expandable to 192 MB. Caching grows to 256 KB each for instruction and data. Prices for the Model 750 start at $43,190.

But the biggest news can be found in these numbers: Mips benchmarks are 57 for the 720 and 76 for the 730 and 750. SPECmarks are 55.5 for the 720 and 72.2 for the 730 and 750. Double-precision mflops benchmarks show 17 for the 720 and 22 for the 730 and 750. These benchmarks are at least twice the latest figures available for comparable competitive products—not too shabby. By the way, HP is very proud of the performance it has produced, and is more than willing to share all the information needed to replicate the results. (See *Figure 1* for more details on all three models, and check out the product review in this section by Andy Feibus, who took a Model 720 for a test drive.)

Depending on how you count them, based on performance, HP either has the best two or the best three workstations in the marketplace. HP also now offers the best RISC-based price/performance by a wide margin (see *Figure 2*). But just what is the real-world performance of these products? Is it five times better than SPARC 2 as in the HP demo, or closer to two times better, as in the benchmarks? The demo's five-times difference in speed was exceptional, though real enough for that particular CAD application. (The software used was from McDonnell Douglas, and it was not altered for higher performance on the Series 700.) Other applications might produce a slightly less spectacular result, more like a two- or three-time difference. But who's going to complain about that?

FIGURE 1

HP Apollo 9000 Series 700
PA-RISC Workstation Family



	Model 720	Model 730	Model 750
Package	desktop	desktop	deskside
Processor	50 MHz PA-RISC	66 MHz PA-RISC	66 MHz PA-RISC
Main Memory (ECC)	16-64 MB	16-64 MB	16-192 MB
Cache Size	128K-inst/256KB-data	128K-inst/256KB	256K-inst/256K-data
System Performance			
SPECmarks	55.5	72.2	72.2
Mips	57	76	76
Mflops (DP)	17	22	22
Mass Storage			
Internal Storage	up to 840 MB	up to 840 MB	up to 2.6 GB
Max. Disk Storage	up to 10 GB	up to 10 GB	up to 400 GB
Removable	CD ROM 4mm DAT	CD ROM 4mm DAT	CD ROM 4mm DAT
Standard Interfaces	Ethernet RS-232 Centronics HP-HL	Ethernet RS-232 Centronics HP-HL	Ethernet RS-232 Centronics HP-HL
Expansion Bus	SCSI-II EISA (1 opt.)	SCSI-II EISA (1 std.)	SCSI-II EISA (4 std.)
Base Configuration			
U.S. List Price	16 MB RAM GRX graphics 19-inch monitor diskless $11,990	16 MB RAM GRX graphics 19-inch monitor 200-MB disk $19,990	16 MB RAM CRX graphics 19-inch monitor 660-MB disk $43,190

IN YOUR DREAMS

YOU MIGHT BE sitting there thinking yeah, all this sounds pretty good, but is it really that great, or did they put one over on Marks and Sharp? I can understand how you might feel that way. The guy says

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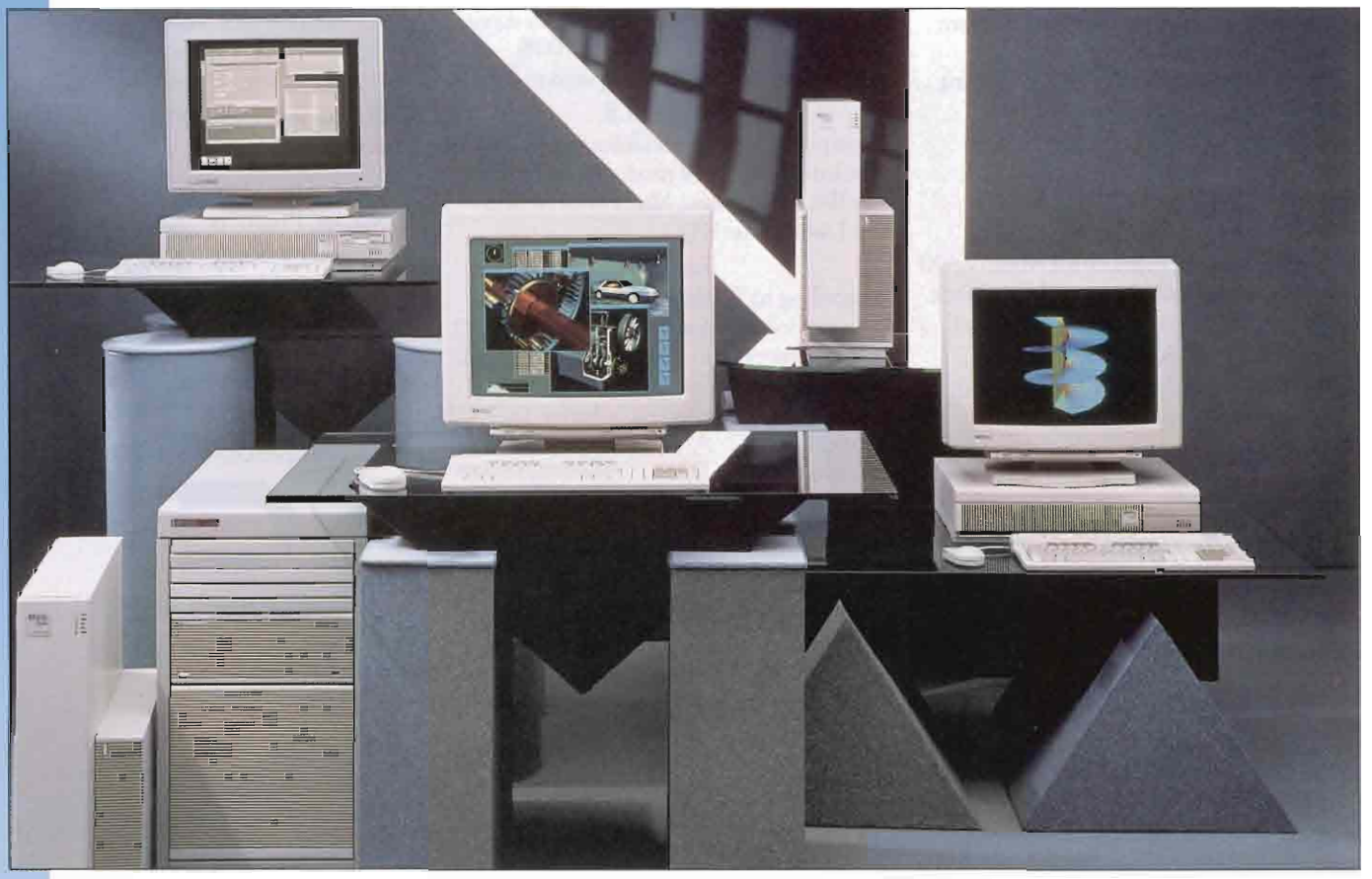


The HP Apollo Series 700 PA-RISC workstation family.

take your pick of 57 or 76 mips when everybody else is somewhere below 30 mips—right! I appreciate your skepticism. I stayed with mine as long as I could. To help make you more comfortable with the facts, I've asked some other folks who have seen the products to offer their opinions right up front:

■ "This will shake up the workstation market," says Charles Casale, president of the Aberdeen Group, a Boston-based consulting and market research firm. "HP has anticipated what the other vendors will do and has price/performance to spare. I didn't expect anyone to have this kind of price performance until 1992. This will be the year of the HP Series 700."

■ "HP has a time-to-market advantage [with this performance] of at least six months," says Chuck Barney, lead analyst for WorkGroup Technologies, (Hampton, NH). "I was very impressed. "Everybody is coming out with new RISC workstations this year, but I don't think they'll get the performance or the caching scheme that HP has."

■ "The performance is really outstanding," says Randy Betancourt, workstation marketing manager for SAS Institute, a Cary, NC-based applications software vendor. "It's hard to believe something that small can be that fast. It really puts HP back in the RISC UNIX marketplace." The comments from SAS are particularly convincing as SAS recently ordered 400 to 500 Series 700 workstations and servers.

■ A team of normally very tough and dour General Electric engineers was excited enough after viewing the new workstation that they broke character, said an observer. "Their jaws were on the floor. Then they actually joked and laughed with us."

ABSOLUTE LEADERSHIP

WHAT HP INTENDS IS nothing less than the dominant position in the workstation market. They say as much, and HP is not a company to make such statements unless there is reason for confidence. HP already claims the number one position in worldwide RISC market revenue, thanks to the HP 3000 and 9000 minicomputers. A January 1991 edition of *RISC Management Newsletter* shows HP with 31 percent of RISC market revenue, followed closely by Sun at 30 percent, while MIPS trails at 15 percent and IBM at 10 percent. HP believes its new workstations will widen the gap between itself and Sun (see *Figure 3*).

Many analysts agree that, for 1990, HP was number one in

UNIX market revenues, with $2.8 billion. They were closely followed by Sun at $2.7 billion, and not so closely trailed by DEC (at $1.6 billion). Unisys and IBM both clustered around $1 billion each. This market is growing, and HP has the potential to dominate it. Even before the Series 700, HP looked mighty tough in both RISC and UNIX.

However, when measuring the workstation market in terms of total units shipped — RISC and CISC combined — HP comes in second to Sun by a significant margin. As measured by International Data Corp. (Framingham, MA), Sun has 39 percent, HP 20 percent, DEC 17 percent and IBM 4.5 percent. This market clearly will be affected by the new 700 series. In fact, many analysts believe HP is already gaining on Sun with the success of the Motorola-based Series 400, which reportedly is selling much better than expected.

HP seems well aware that taking control of the workstation market will require more than just a great product. What they exude this time around is confidence—not just mild optimism as in the past. "This is the announcement that is going to get the attention during 1991," asserts Barry Crume, HP's worldwide product launch manager for the Series 700. "Customers expect fine products and four-hour support response time from HP. This [type of product] is not what you expect from HP. This will change perceptions about HP."

Indeed, it has been tough for HP to gain respect in the area of RISC-based workstations. The HP 9000/834 was a powerful and reliable machine, but too large and expensive to be competitive. For many, lack of that market entry made HP look like they weren't a player in workstations at all. Before the Series 700 arrived on its doorstep, even SAS, which has used Apollo systems for many years, was about to switch to Sun. The new systems arrived in the nick of time.

WHAT KEPT YA?

SO WHY THE BLEEP didn't these products, or something else in RISC, arrive sooner? The HP company line is that these products are not late, that they were planned for this moment several years back and finished right on schedule. Realistically, what else would you expect them to say? There is, however, some evidence that the statement is true—as far as it goes. The performance that has lots of folks staring open-mouthed depends on a non-standard CPU design using very large Static Random Access Memory (SRAM) chips to speed data on its way here and there. The SRAM simply wasn't available in volume up to now. Crume says the introduction was timed to coincide with SRAM availability.

Still, that doesn't answer the question of why, when HP and Apollo each had very high-end RISC workstations such as the DN 10000 and Series 800 products, they chose not to introduce a competitive RISC workstation sooner. We can probably blame the same superb engineering that made the Series 700 possible in the first place. HP's design implementations had managed to milk enough performance out of the Motorola CISC family. It wasn't forced to push the RISC alternative until relatively recently. By the time Sun's RISC-based SPARC architecture began to look more appealing than Motorola 68000 technology, HP Apollo was on the march with PA-RISC, but delivery took time.

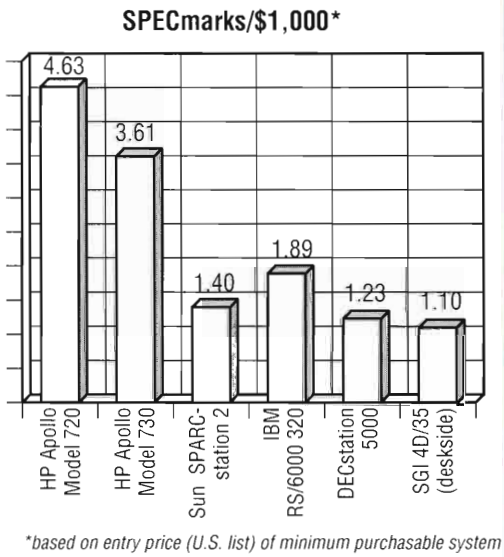
HP waited longer than was wise, but kept the 68000-based Series 300s and 400s competitive with design and optimization efforts. It also worked to preserve and build its Motorola business further. While many customers will quickly move to the new RISC-based 700s, the Motorola family is far from dead. Many customers will stay with their software investments for now, and HP says it will continue adding to the 68000 lineup.

Meanwhile, HP did manage to zero in on a RISC workstation. "It's a question of design focus," says Bob Weinberger, product marketing manager for HP's Apollo Systems Division, Chelmsford, MA. "HP did not put its mind to this [bringing a RISC workstation to market sooner]. When HP puts its mind to something, it is unbelievable what it can do. It only did that fairly recently."

And when HP got serious, RISC workstations got more powerful. It goes without saying that when you leave Sun's newest model back in the weeds somewhere, you are also capable of doing the same to the best that any other workstation vendor has to offer today. But let the benchmarks speak for themselves.

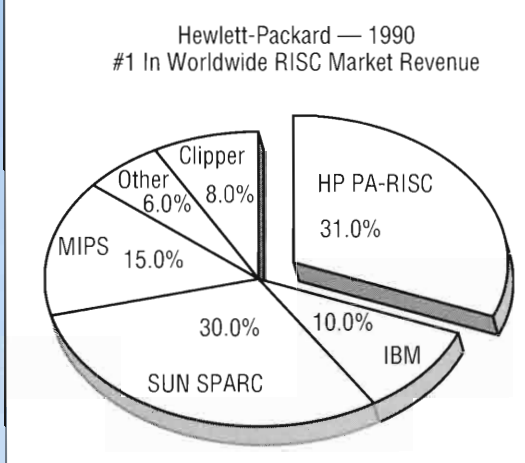
In workstation systems under $20,000, everybody else clusters around 30 mips—but HP Apollo's Model 720 provides 57 mips.

FIGURE 2



*based on entry price (U.S. list) of minimum purchasable system

FIGURE 3



Measured in SPECmarks, the DECstation 5000 has 18.5, SPARCstation 2 has 21.0, IBM model 320 has 24.6—and the HP Apollo Model 730 has 72.2.

Looking at price performance measured in SPECmarks per $1,000, the best competitors are the DECstation 3100 at 2.34 and the IBM model 320 at 1.89—but HP comes in at 4.63 SPECmarks per $1,000 with the model 720. These numbers are from HP, and all are based on minimum purchasable configurations.

NO CHEAP CHIP SHOT

IF YOU WANT TO UNDERSTAND more about what goes on inside HP's new computers, there is no better place to figure it out than right at the heart of things. So step down here into the central processing unit and let's look around. First, CPU is a misleading term, making it sound as though this part of the computer is set apart—it is not. The components that follow are on the computer's motherboard, along with some other items. These just happen to be very closely tied together with fast circuitry so they behave as a unit.

Most other workstations, and PCs, too, have CPUs organized with a large chip that does most of the dirty work. A separate floating point processor speeds up number-crunching tasks, and is optional in lower-performance products. To keep today's processors properly fed with instructions and data, computers use storage areas where instructions and data wait in a queue. This queue is called a cache. Most computers use a small cache that is part of the processor chip itself, called an on-board cache. On-board caches vary in size, though 8 KB is typical. Off-chip caches provide additional seating for impatient data, though mixing on-board and off-chip caching is awkward.

Okay, got that? Great, because that is not what HP did—I just wanted you to understand what is typical. What HP did was to design a four-component CPU that is more than a bit off the beaten path. First is an instruction processing unit (IPU), a 1.4 cm by 1.4 cm chip including 577,000 transistors. This is the HP-designed and built chip. This is the major magic component—HP's second-generation PA-RISC. The stuff on here is so tightly packed I can't see it, so we'll get more details on this as they become available. Next to the PA-RISC chip sits a floating point unit (FPU) that was co-designed by HP and Texas Instruments. The HP/TI chip is 1.3 by 1.3 cm, with 640,000 transistors. Neither of these chips is huge by today's standards, but they are fast.

"It is not the number of transistors that is the news with these chips," says HP's Crume. "It is the fact that both use submicron design and run at 50 to 66 MHz." HP pushed less on transistor count and more on clock frequency, designing for a faster-running chip set. To keep the chip set running in a smooth, synchronized fashion, HP includes a system clock in ECL logic that runs at 100 MHz. This is not unique to HP, but is a smart idea to avoid wasted processing effort.

Running faster created the need for even more caching, however. This is where HP departed from what's been done lately, perhaps ushering in a new cache-rich computing economy. They took all caching OFF the main chip, moving entirely to off-chip caching, and lots of it. Where most instruction caching is a few kilobytes, HP's off-chip instruction cache is 128 KB.

If the needed instruction cannot be snagged and taken off to work in the processor right when needed, additional time is taken for that instruction, slowing system performance. This is the origin of RISC discussions about cycles per instruction. By using a larger instruction cache to make the instructions more available, HP brings clock cycles per instruction down lower than they've been before. When an instruction is not ready for the processor, it is called a "miss."

"Most systems have about 8 KB of cache and have misses," says Crume. In fact, HP's research shows misses can occur as much as 25 percent of the time, wasting computing speed. "A 128-KB cache means fewer misses and faster recovery when we have misses. The Model 750 has a 256-KB instruction cache for its use as a server."

An additional cache award awaits 700-series users. A separate data cache provides storage for temporary answers, constants and just scratch space for computations. Using the same logic with data caching, HP provides 256 KB of data caching capacity on all its models. This is two to eight times the data caching that other manufacturers are offering today, says Crume. HP competitors can be expected to follow suit in this department, but for now they will have to play cache up.

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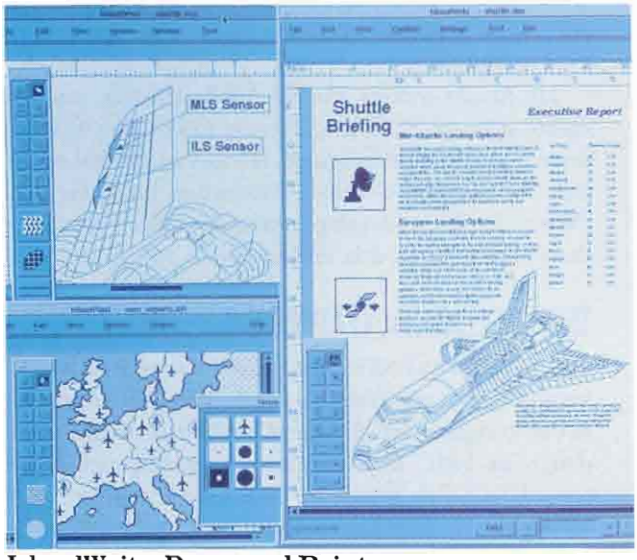

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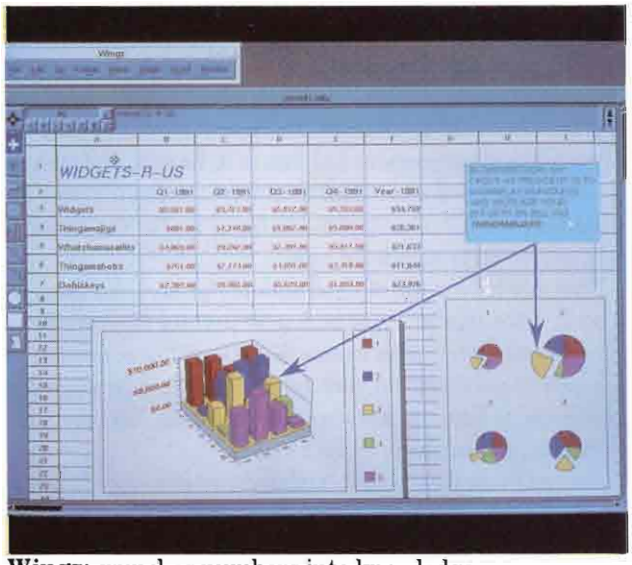

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CIRCLE 278 ON READER CARD

"Most people don't realize that PA-RISC is a damned good architecture. This is a good-sized jump, and it will definitely hurt the competition. Other vendors don't have much room"

Charles Casale
Aberdeen Group

These are the items that make up the new CPU, all operating at 50 to 66 MHz. This sounds pretty blazingly fast until Bob Weinberger, product marketing manager for HP's Apollo Systems Division, adds a footnote. The processor can only go as fast as you can feed instructions and data to it, he says, and HP's chips can actually run as fast as 100 MHz. Unfortunately, the static RAM (SRAM) vendors can only provide the chips for the cache at 50 MHz and 66 MHz speeds for now.

"But we have a lot of head room," he says, for later speed growth. "We should see at least a 30 percent improvement by going to 100 MHz." This means that HP will later provide even faster versions of the 700 with relatively little new engineering investment as faster SRAMs become available. Weinberger and HP Apollo will be ready to cache in.

Analyst Barney gives HP lots of credit for its cache. "They have a wider vision, it seems, than the other vendors. They took a look at how the architecture is evolving and very realistically predicted where they were going over the next three years or so. Some of the competitors are going to run out of steam."

The IPU chips were developed and are produced in HP's Fort Collins, CO facility. An additional fabrication facility for the chips is about to start up in HP's Corvallis, OR, facility.

GETTING GRAPHIC ABOUT IT

NOT ALL OF THE DESIGN advances are in the CPU by any means. A memory and I/O controller executed as an application-specific integrated circuit (ASIC) contributes not only to memory and I/O, but to graphics as well. HP workstation graphics guru Andy Barlow is officially one of HP's product managers on the 700 family these days. He says the controller provides graphics scan conversion, color interpolation and block moves, while the CPU crunches through 3-D transforms and clipping functions.

These are functions that used to reside in special transform engines and scan converters in add-on boxes "because vendors couldn't build CPUs powerful enough to handle both normal and graphics processing," says Barlow. "Now we can reduce the cost of graphics and achieve a million vectors per second."

Graphics performance highlights include:

- More than one million 2-D/3-D vectors per second.
- Up to nine times faster X windows performance than similarly priced competing workstations.
- More than 30 frames per second speed memory to display.

GRX is the basic grayscale monitor for the family. CRX is the low-end color system. Both of these are tuned for performance with the 700 series products and are new. Personal VRX and TurboVRX graphics systems have been moved over to the 700 series from the 400 family with slight modifications.

Graphics options include grayscale, 2-D color, 3-D wireframe, 3-D solids and rendering and advanced 3-D solids and rendering. All system monitors are 72-Hz flicker-free types with 1280 by 1024 resolution.

HP Apollo systems, like the Apollo DN line, support the industry standard EISA bus. Because EISA's slower speed might impede graphics performance, HP uses an internal connection it calls the Standard Graphics Connection (SGC) for these links. (Watch for this to develop over time.) EISA is standard on both the 730 and 750 models, and an option on the Model 720.

TECHNOLOGICAL LEAPFROG

OVER THE PAST SEVERAL years the press has abounded with verbiage about one company leapfrogging over another. As soon as one company gets the jump on the competition with a new design or RISC implementation, another comes back with something a little better. HP now has a computer frog that can seemingly leap from Kiev to Calaveras County without touching ground. Is it truly a huge leap, or does is presage a new era of larger leaps to come from all the amphibian vendors in the silicon swamp? It's probably too soon to tell, but that won't stop some of us from asking.

"Most people don't realize that PA-RISC is a damned good architecture," says consultant Casale. "This is a good-sized jump, and it will definitely hurt the others. It will hurt Digital the most because they don't have the profit margin to do massive price cutting. They have to either subsidize lower prices or do something else. They don't have much room."

New systems based on MIPs processors will not reach market until 1992, predicts HP Apollo's Weinberger. "Until late this year

you will see HP in a class by itself. Our Model 720 exceeds the performance of IBM's just announced model 550, which costs $130,000. Sun has been struggling like crazy just to reach 28.5 mips, and they are just shipping now.

"Our whole idea was not just another leapfrog announcement. We want to make a major impact, not only to beat everything in the market now, but to withstand their next announcement to boot, and we feel we will be able to do that," says Weinberger.

How long the leap will last is what WorkGroup Technology's Barney calls "The 64-bit question." "Already HP has gone beyond what the others will introduce this year," he says. "By the time the competitors get their second try ready, HP will have integrated more functions on the chip. This quiet, big company is going to catch a lot of people by surprise. They ought to be able to keep that six-month advantage for a while."

WHO? HP? LEARN TO MARKET?

SOME FOLKS JUST CAN'T get respect nohow. Even in the weeks prior to HP's full announcement of the Series 700, with rumors flying about the product, HP's negative-leaning press exposure continued. Some articles gave the company hefty swats upside the head for being late to the workstation RISC market and failing to make good use of its Apollo acquisition. "Has the Apollo-HP Merger Stumbled?" questioned a *Boston Globe* headline.

HP's forte has always been to design strong, reliable products. Aggressive marketing and sales show up only here and there in the company, such as in the LaserJet printer program. For the most part, the HP plan continues to be: Design a better electronic mousetrap and leave out plenty of baskets next to the door to catch all the money. One long-standing quip is that if Hewlett-Packard tried to sell sushi, it would market it as "cold, dead fish." Marketing types are said to wander the hallways, repeatedly mumbling, "Underpromise and overdeliver."

But perhaps the mold is beginning to break, or at least crack. If so, a large debt of thanks is owed to the gang at Apollo. Quite a few folks are coming to the surface there who do not fit the cold, dead fish picture of HP, and they are encouraging others.

"We've got a marketing plan in place that matches the products," says Weinberger. "We are going to cause a stir. My opinion is that HP has got some great technology and hasn't made anywhere near enough noise about it. We are the number one company in RISC and number one in terms of UNIX shipments. How many people know that?"

"We will do an Apollo-style introduction with an HP budget," says Crume. He says that thanks to the strengths of the product, customers would tend to take note of the 700s even without increased marketing expenditures. "You can say 72 SPECmarks under your breath, and people will hear it."

"By the time the competitors get their second try ready, HP will have integrated more functions on the chip. This quiet, big company is going to catch a lot of people by surprise."

Chuck Barney
Workgroup Technology

Analyst Barney agrees that the message about the products is a fine one, but cautions that a strong message is not enough. "HP has laid the foundation for a leadership position, but they have to articulate that position," he says. Articulating means: "They have to market the hell out of this."

METHODICAL WORLD-BEATER ENGINEERING

FINALLY, WE CAN ASK, how come HP Apollo managed to introduce a product this good when other folks out in the workstation market seemed to be way ahead? The answer may in part be that HP made a choice a while back to do most of the engineering itself. The first result of that action was a delay in getting a competitive RISC workstation to market as HP Apollo got its engineering efforts lined up for the task. Second, once HP Apollo got started, its excellence in design took over.

Once the design was underway, the project moved to the testing phase, for which HP is uniquely well-suited. It after all is not only a computer vendor, but the largest electronic instrument maker in the world. "We tested the heck out of this system every step of the way to ascertain where the performance bottlenecks were and correct them," says Crume.

Come to think of it, the success of these systems probably boils down to real boring stuff: Methodical, world-class engineering—the stuff for which both HP and Apollo are justly famous.

Apollo's Future

How To Survive Domain's Decline

BY FRED MALLETT

HOW CAN YOU PLAN for the future with both your current installed hardware and operating system becoming obsolete? Frankly, I feel that the future for users of Apollo systems isn't as grim as many people believe. Despite what I read "between the lines" of HP Apollo's policy statements, I think DN systems and Domain/OS can still play an important role in almost any computing environment.

At this point, it's pretty clear what's in store for your existing hardware. Just like any other computer systems, most Apollo workstations have been superceded by newer, faster machines. As far as HP's plans are concerned, Apollo DN models running up to SAU6 will be supported only as far as they are currently — SR10.x will be their last Domain release. The DN models beyond that will move to SR11, which buys them some level of OSF network interoperability. Exactly what degree of interoperability that will be is a debate still raging within the walls of HP.

The DN 5500 and other models that have been upgraded to the 68040 processor are projected to make it to OSF/1, which is the future path for Domain/OS. The HP Apollo 9000 models also will be going the OSF/1 route. The new PA-RISC systems will be the first to migrate, with the Series 400 following shortly thereafter.

The question remains: What do we do with our obsolete hardware? There are a few scenarios, and the one you choose should depend upon your computing needs. If you're a software development house, you

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CIRCLE 281 ON READER CARD

Performance and standards are two issues up for discussion. Sometimes, as you are probably learning, performance isn't as important to the vendors as adhering to a standard.

probably need the latest hardware to develop the latest software. In this case, your only option is to take the trade-in value of your old hardware and buy new systems.

If you're not tied to the latest releases, so much the better. You have more options and greater flexibility. You can continue to use your existing hardware and software applications as long as they meet your needs. As you purchase new hardware, you can choose new software, perhaps even a new port of your existing software, to run on it. This way you can be sure to provide a path for converting data from one level of software to another as it becomes needed.

Most application developers offer, at minimum, the option of data conversion. Frequently they provide data compatibility from one release to the next, as well, giving you a simple migration path.

APOLLO'S NETWORK NICHE

AS YOU PURCHASE NEW MACHINES running a standard operating system (OSF/1) and new applications, you should have at least a degree of network compatibility to your older machines running SR11. If your network design is such that you must have the power of the new machines, you don't have any choice in the matter. Again, the only thing to do is take the trade-in option and make the upgrade. But if at least part of your network can still be productive with lower performance, you may have a more attractive alternative.

On any network, there are some workgroups that interact primarily with each other. In a large, mechanical design environment, for example, there's usually a technical documentation group that needs, mainly, to share documents among its members. Where a design group may have an urgent need for the fastest new hardware, the documentation group may find the performance of a DN 4000 perfectly adequate. Given that the maximum trade-in value for a DN 4000 is about $3,400, the best value might be to keep it producing pages for another few years. No need to purchase a new Series 400 when a supposedly "obsolete" DN 4000 could still serve as a solid, workhorse system for your technical writing staff.

To maximize their performance, these DN 4000s could be kept on a subloop on a token ring network. Their network compatibility would enable them to interact with the new machines that, eventually, will run OSF/1.

Another often overlooked role for older workstations is to use them as servers. A DN 3000 with 3 MB of memory and a 70-MB disk—that you may find useless for anything else— makes a great print server node. You can run it diskless — all it has to do is serve the serial laser printer — and dump print files to the disk mounted as **/sys/print**.

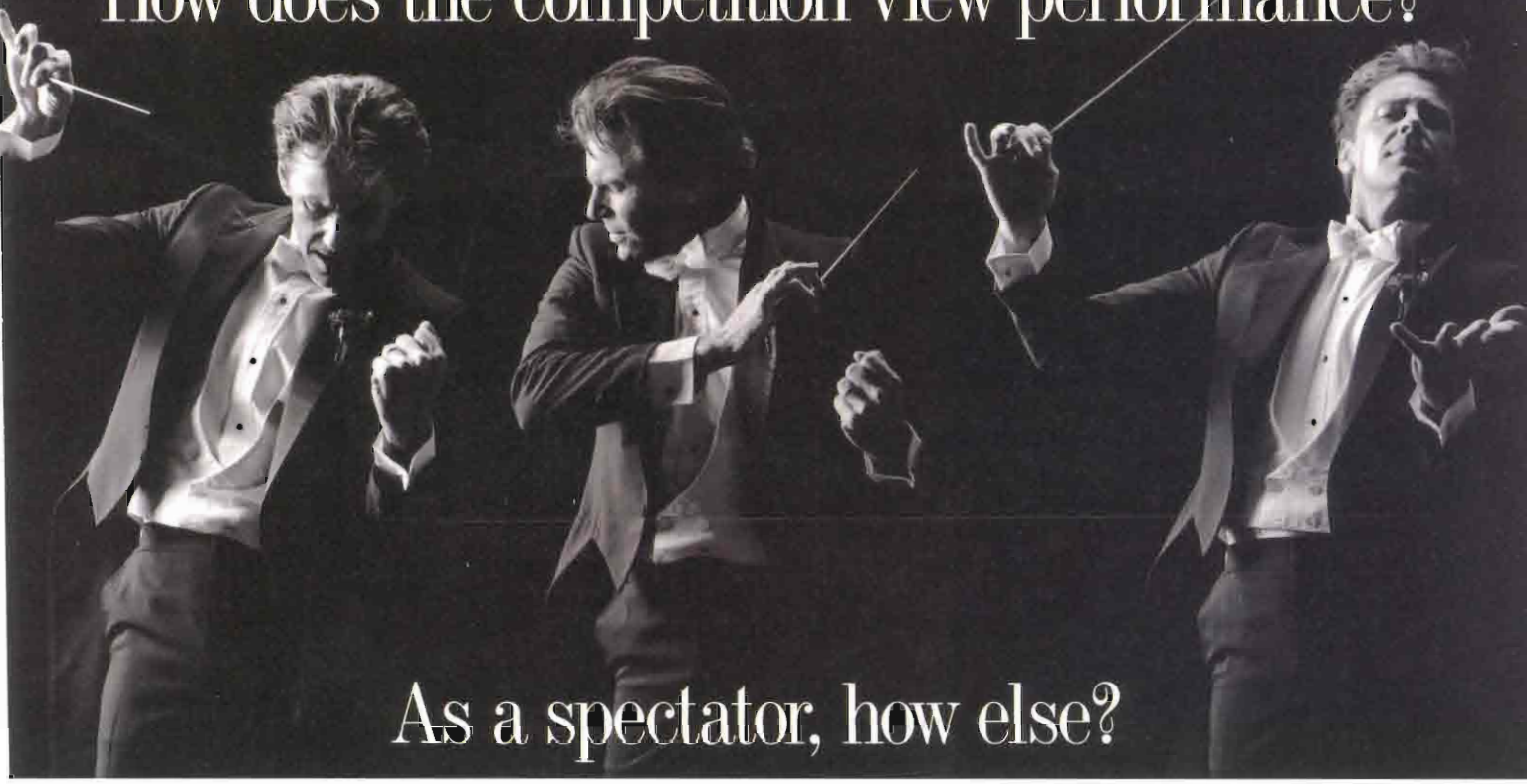
With a price per node less than that of almost any network printer, using the DN 3000 as a print server makes good economic sense. What's more, you don't have to put up with the poor system response typically associated with serial print devices attached to your workstation node. Although the print node is running diskless, you're using the mounted disk as the print queue. Consequently, there's no noticeable performance degradation on the partner node when you send a document to print.

DN 4000s and DN 3000s also make great dedicated gateways, and DN 5x0Ts make excellent CAD viewing stations. Thanks to a high degree of interoperability between software releases, your old hardware may become obsolete, but not unuseable.

NETWORK STANDARDS

COMPARING THE FUNDAMENTAL network technologies old and new, we have the old Apollo Token Ring on one hand and the industry standard, Ethernet, on the other. The two issues up for discussion as far as networking goes are performance and compatibility (standards). Sometimes, as you are probably learning, performance isn't as important to the vendors as adhering to a standard. Ethernet with its overlaying protocol to support functionality (TCP/IP) is a case in point.

How does the competition view performance?



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Facer Info	61-2-484-3979	Infosys	49-41-012-5037	Sages	32-5641-8399	Teamco Nordata	46-9-103-9480
CANADA		**FRANCE**		**DENMARK**		**ISRAEL**	
Giles Shipper & Assoc.	416-889-9526	ARES	33-16-9-866-4008	Unique Partners	45-86-173-666	Softkol	972-3-348938
ENGLAND		**ARGENTINA**		**SAUDI ARABIA**		**NETHERLANDS**	
Bradmark U.K. Ltd.	44-0223-460-731	Software Plus S.A.	54-1-826-2322	Alsufiani Computers Est.	966-26-611176	Quant Systems	31-250-340334
TAIPEI, TAIWAN, R.O.C.		**SWITZERLAND**		**WEST MALAYSIA**			
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On a multivendor network with no design workgroup databases in common, Ethernet is almost always the best answer. But, as is the case with most design networks, there will be workgroups that run the same application on the same hardware accessing the same database with huge amounts of network traffic. These groups present a clear case for token ring's superior throughput capability.

In a study done by HP, Ethernet came out with a maximum sustained throughput of 3.0 Mbps, which is 30 percent of bandwidth. This is probably not attainable on a "normal use" network with a high load of traffic, because the number of collisions that occur increases with demand. In the same study, the Apollo Token Ring maintained a throughput of 7.2 Mbps, which is more than 60 percent of bandwidth. This level of throughput is attainable because the token passing protocol is orderly under any network load.

Still, the problem remains, what good is a fast protocol that's incompatible with network standards? One solution to this problem is to put your Apollo DN systems on a token ring network in workgroup/data sharing groupings with gateways to an Ethernet backbone. This allows full interoperability with the Ethernet network, yet helps improve the network speed without the expense of intelligent routers. You can do the same with the HP 9000 Series 400s, as well. The current HP plan is to continue to support Apollo Token Ring into OSF/1.

Compatibility with Ethernet is required in most computing environments, but that doesn't mean it's always the most desirable option. With HP as your hardware vendor, you have a choice. Perhaps the ideal network design would consist of token rings of workgroup nodes tied into an Ethernet backbone. This design could take advantage of both Ethernet and token ring technologies. Also, it could provide intelligent routing as part of the network design, rather than as an afterthought added by means of a box on the network bus.

THE END OF AN OPERATING SYSTEM

IT'S AMAZING SOMETIMES WHAT people throw away — just ask any land- fill picker. Apollo users were blessed with one of the best operating systems workstations have ever seen, but because of one major flaw, it's being thrown on the trash heap.

I'm referring, of course, to Domain/OS. The loss of Domain bothers many Apollo users to no end. Supposedly, the only significant flaw of this otherwise superb operating system is its proprietary, "non-standard" character. That may have been an accurate criticism of Domain SR9, but it's not necessarily true of SR10. Many of the people complaining that Domain is non-standard didn't evaluate the new implementations of industry standards supported by SR10. The way I see it, OSF/1 may be the future of Domain/OS, though it isn't actually a clear-cut step ahead as far as operating system technology is concerned.

I've attended several conferences lately and listened to speeches about the operating systems of the future. People talk about designing advanced operating systems in an object-oriented manner. They talk about building network interfaces at the kernel level. They talk about building virtual memory access to LAN file systems, and they talk about fully distributed operating systems. They're talking about Domain/OS — but they don't know it.

Operating system experts treat these capabilities as the frontiers of the future. Yet many of these services were implemented in 1981 with the advent of the Aegis OS. To be sure, I think UNIX and Ethernet are great for timeshare systems and data processing. But Apollo users already have a high level of interoperability and transparent data access between dissimilar workgroups. The great part of both UNIX and Ethernet is their adherence to standards. The sad part is that Domain (and Apollo Token Ring) already offer many of the capabilities the standard technologies promise for the future.

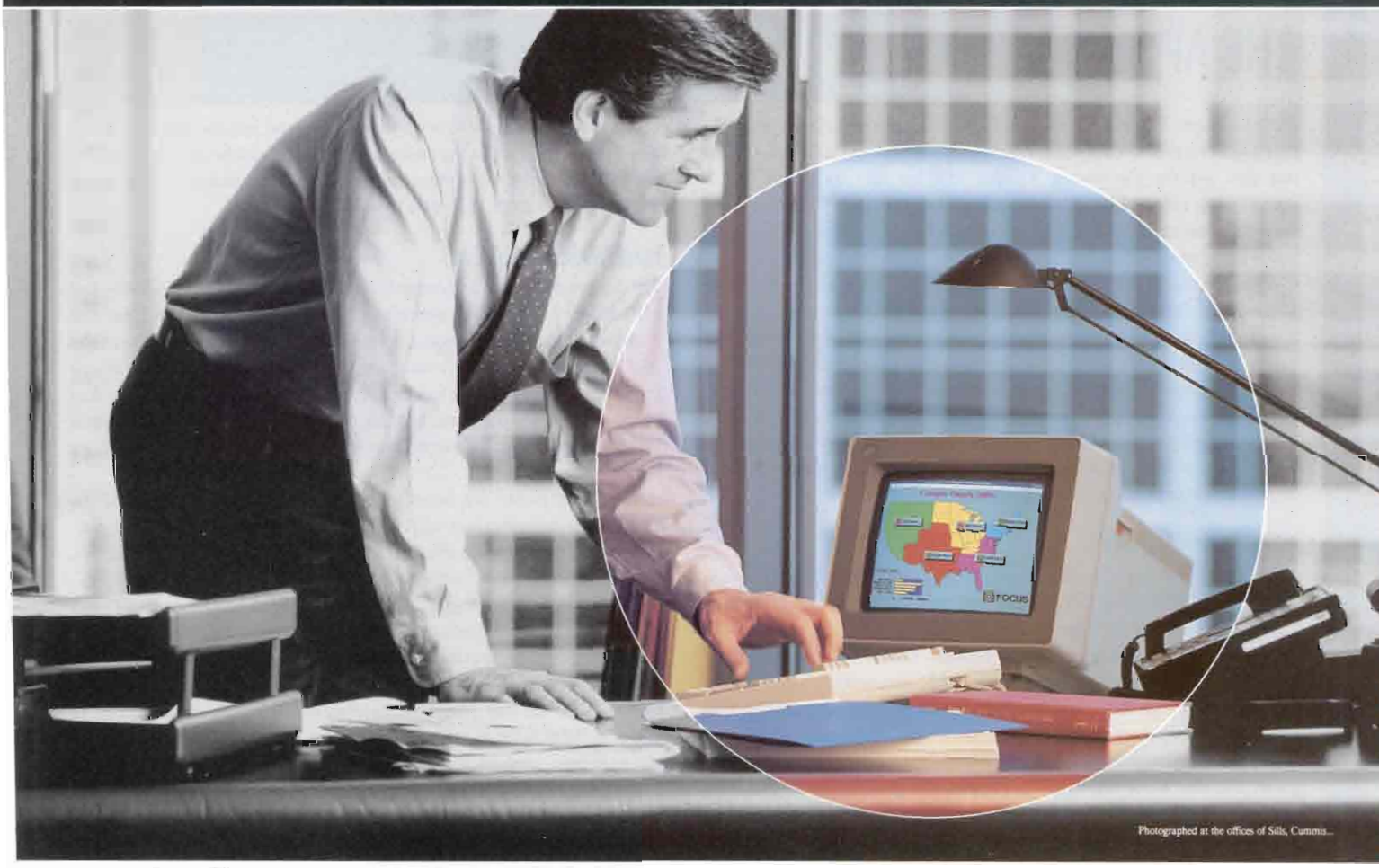
Instead of moving standards forward to embrace the level of functionality that Domain/OS has achieved, UNIX has drifted along with only slight improvements from release to release. To its credit, OSF has grabbed this situation by the horns and attempted to come up with a solution. Unfortunately, big vendor politics plays a hand in limiting the progress that can be made in a single step. Nonetheless, OSF/1 does combine advanced operating system technology (including features that Domain has had for some time) with UNIX-like functionality and compatibility.

Some of OSF/1's features that resemble Domain/OS capabilities include:

- Loadable kernel modules (Domain Libraries).
- An extendable loader (Domain Shared Libraries).
- The Distributed Computing Environment (DCE). This is much like, and in fact is based on, Domain's NCS and distributed file system.
- The Distributed Management Environment (DME). This promises to provide most of the services Domain/OS has performed with distributed system management tools.

Undoubtedly, OSF/1 will be a great step forward for many HP-UX and other UNIX users. For Domain/OS users, however, it probably will entail a mild step backwards in technological capabilities. You don't have to worry too much, though; most of the important functions you already enjoy with Domain, i.e., Network File System, NCS, shared libraries, will be supported. The one important way in which OSF/1 *will* be a giant step for Domain/OS users is its support for standards and vendor interoperability.—*Fred Mallett, Apollo Editor.*

If you have the need to know, but still can't access the data...



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THE APOLLO LEGACY

HP has caught heavy doses of grief from many sources almost from the first day of its deal with Apollo. "Where is the fruit of this union? What did you get for purchasing Apollo? HP has lost its touch and is squandering a chance in the workstation marketplace." These were the kinds of comments still floating around among users and in the press just a few short weeks ago.

Surely some of the criticism is well deserved, but just as surely much of this cat-calling is nonsense. Veterans of the Apollo past strain at the reins in HP, frustrated at the measured methodical pace of this intelligent pachyderm of a corporation. As one who finally left HP, tired of waiting for the freedom to get things done, I can well identify with the frustration. But I can also appreciate what the patient pacing has accomplished.

I can give you no scientific analysis, merely subjective reactions to what I see and hear. And there is a *lot* to be seen and heard at HP these days. The news is good, and getting better.

A SHOT OF ADRENALIN

Without making a big deal of it, I make a deliberate effort to gauge the spirit of HP when I talk to people there. The emotional climate at a company is at least as important as who the boss is these days, or the stock price or the quality of the new models. Emotional health feeds all the other ventures we undertake, both public and private, and without a moderate to high level in that energy, even the best engineering will fail to reach its potential.

When HP bought Apollo, it purchased the technology, the physical plant, and the work efforts of its people, along with the hopes of its customers. The Apollo technologies created the workstation market. They pioneered the technology for this market when, frankly, HP was still thinking mostly of instrument control and Sun was still a SPARCle in someone's eye. The growing success of the OSF effort to broaden open systems owes a lot to Apollo technology that underlies some of its best offerings.

HP is at times much too sedate, too measured, and just too damned slow. The melding of Apollo people into HP brought with it an infusion of impatience, a sense of urgency that has been badly needed. The aggressive style of Apollo's marketing and sales staffs has pushed HP at the same time that it has frustrated the Apollo folks. The result of this has been some movement of HP toward a more aggressive style that fits more closely the needs of today's faster-paced computer market.

This is one of the most important gains from the HP Apollo union. The HP pachyderm has to learn to think more nimbly and move a bit faster. It needs to get closer to its computing customers and work more than ever to serve their needs, but to do it with more ferver than has been HP's tradition. The toe-tapping pace at Apollo is a boon to speeding the elephant's efforts, and a more successful, happier HP Apollo herd will result.

When I call, people are happier, now—more excited about the work they are doing, laughing more, and enjoying their work more. There is no question that HP's Apollo Systems Division is still a place apart from the rest of the company, with more drive and impatience. But that is good. There is more polite pushing and prodding to be done to keep that pachyderm on the move. And there are signs that others elsewhere in HP are learning to push and prod as well.

HARDWARE HEIRLOOMS

HP designed its first small computers that fit on top of desks in 1969. But HP's marketing folks just weren't wild and crazy enough to imagine that these might become personal computers or workstations. Other folks had to come up with these ideas and run away with the markets, at least for a time. The road back to being a major force in the market has taken some hard, awkward years, but this new workstation introduction sees HP Apollo jointly at a point neither would have reached as soon without the other.

To drive home the benefits to HP and Apollo customers of the continuing contributions of Apollo, I asked a long-time Apollo guy, Apollo Systems Division Product Marketing Manager Bob Weinberger, to enumerate some of them.

- Compilers—The compiler team at Apollo has worked closely with Kuch Associates to develop advanced Fortran compilers for the DN 10000. Better compilers mean software moved to the 10000 performs far more effectively than it would otherwise because it's optimized for performance on that particular hardware. After seeing the success of better compilers for the 10000, the group added the Series 700 to the program and pushed it through. "We saw a tremendous boost in performance," says Weinberger.
- Graphics—That standout performance you see on the entry level grayscale and low-end color graphics for the Series 700—you know, the million vectors per second for $12,000? That's Apollo work, developed in Chelmsford. To appreciate it better, compare the X Windows performance of the Model 720 with anything else on the market.
- PA-RISC, version 2.0—Apollo folks joined HP too late to help shape the beginning of this chip set, but the PRISM RISC team had lots of influence on the program once they got involved, says Weinberger. "What logic was put down on the chip, compound instructions, register file implementation and incorporating graphics primitives in the main CPU were all ideas moved over to PA-RISC from the DN 10000 program."

At Apollo, says Weinberger with obvious pride, "We've always had a workstation focus. That focus has been very valuable in complementing HP's efforts at specifically targeting workstation products." HP's acquisition has made it possible, he says, to combine technologies and deliver them using Apollo's "tremendous heritage of delivering economic workstations with great technology. We were able to come in and, in specific areas, augment what was already a high performance product."

Finally, as a last clue to the importance Apollo's contribution: All HP Apollo workstations, whether based on PA-RISC or Motorola chips, are now assembled at Exeter, NH—Apollo's manufacturing facility.

—Bill Sharp, Technical Editor

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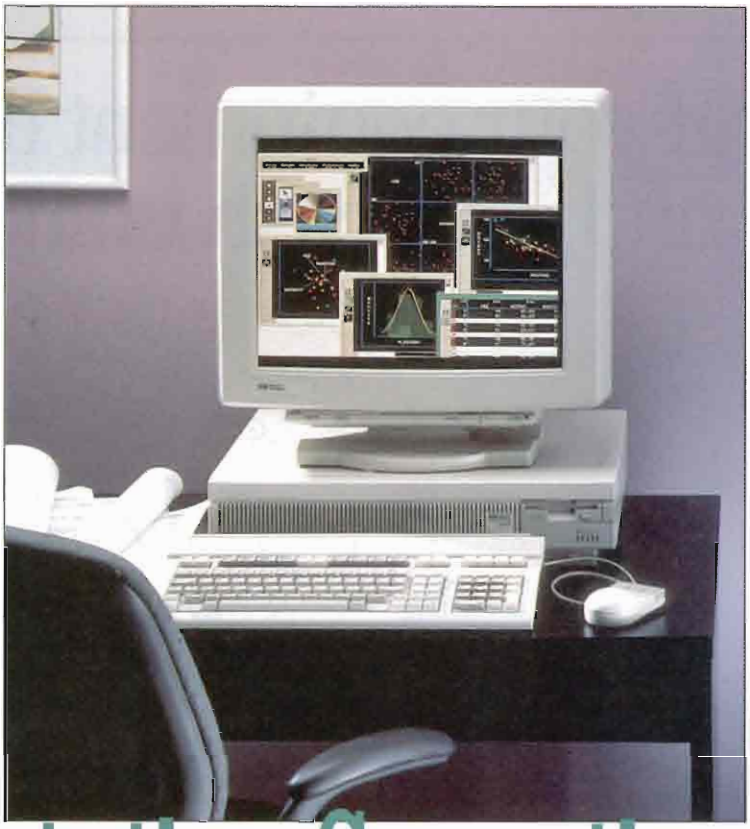

Workstation Sensation

BY ANDY FEIBUS

HP's New Series 700 Systems Supply "Kick-Butt" Performance

I HAD BEEN HEARING THE RUMOR since November: "HP is coming out with a workstation running 50-plus mips for less than $25,000." I heard it from an HP systems engineer; I read it in the trade press. I even spread the rumor myself, to the folks at *HP Professional*. So when I was asked to go to HP Apollo in Chelmsford, MA, in early February to review this new wonderbox, I jumped at the chance.

For once in this industry's history, rumor fell short of reality. What HP has created are three new RISC-based workstations that can't be beat: the HP 9000 Models 720, 730 and 750. I hate to sound like a cheerleader, but these workstations are fantastic. In fact, I would go so far as to say that with these new systems, HP has completely redefined the workstation market.

FIRST, THE SPECS...

THE MODEL 720 AND 730 SHARE the same 4 1/2 inches high by 20 inches wide by 18 1/2 inches deep cabinet and can be configured either in a desktop or a deskside manner. Both models sport a SCSI-II interface with up to 6 MBps transfer rate (compare this to the HP-IB interface with no better than a 1 MBps transfer rate), Ethernet 802.3 thick (AUI) and thin (BNC) network connections, a Centronics parallel interface, and an RS-232C serial port.

Both systems support up to 64 MB of user-installable RAM and up to 840 MB of internal disk storage (up to 10 GB using external disks). Additionally, an internal removable storage device (either 4mm DAT, CD-

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ROM, or 3 1/2-inch floppy) can also be installed. On the Model 730, a single EISA slot (with 33 MBps bandwidth) is provided; on the Model 720, this slot is optional.

The Model 750 shares the same 24 inches high by 8.7 inches wide by 23.4 inches deep cabinet as the HP 9000 Series 400 deskside computers. Up to 192 MB of RAM and 2.6 GB of internal disk storage (and up to 40 GB using external disks) are supported. Four EISA slots are included with the Model 750, along with the same standard interface ports found on the Models 720 and 730.

All three systems use 19-inch monitors having 1280 by 1024 pixels. Five graphics options are provided: the GRX, the CRX, the PersonalVRX (the P3 option for the Series 400), the TurboVRX T2, and the TurboVRX T4. If you're interested in rendering, realism or solids modeling, the PersonalVRX or TurboVRX options are designed for you. These graphics options were first introduced with the Series 400 last year.

For those who just want the fastest possible X Windows or PHIGS performance — as well as the ability to display over one million vectors per second — either the GRX or the CRX options are for you. The GRX provides 256 shades of gray; the CRX provides 256 colors (from a palette of 16.7 million colors) as well as eight extra planes for double buffering.

By the way, you read that correctly: Either graphics card is capable of displaying 1.15 million 2-D or 3-D vectors per second. Additionally, under X Windows (known to slow down an application or two), either graphics option can display up to 910,000 vectors per second. The X11 Perf benchmark rates the 720 at 8044 and the 730/750 at 9500; compare that to the Digital DECstation 5000, which only rates 2640.

These workstations use a new CMOS-based, PA-RISC chip that incorporates a floating point processor and large instruction and data caches. The Model 720 has a clock speed of 50 MHz and the Models 730 and 750 use a clock speed of 66 MHz. HP has already successfully tested 100 MHz versions of this chip.

The processor board is amazingly bare. Basically, it consists of three chips, a timing crystal, and the memory connectors. Each memory board contains 8 MB of ECC RAM using surface-mounted, 4 Mbit chips.

The design of the system is incredibly modular: Every component of the system — from the memory boards to the power supply — is removable and replaceable with very little work. For added security, the internal disks can be removed in one minute with a standard screwdriver. Customers should, without HP assistance, be able to install additional RAM or upgrade their graphics option.

Overall, the system looks and feels solid. I only got to see the Model 720, but the Model 730 is essentially the same design. The Model 750, assuming it has the same box as the Series 400 deskside computers, is awkward to carry around and has a goofy door that's difficult to latch. (Well, two out of three ain't bad, and to be fair, HP may have corrected the problem with the door.)

Initially, HP is supplying only HP-UX Version 8.0 with the Series 700. When OSF/1 is available, Series 700 systems will be the first HP computers to support it.

NOW, THE NUMBERS...

YOU MAY HAVE NOTICED that I haven't discussed the part about price and performance. First, the performance numbers:

Model	Mips	Mflops	SPECmark	Clock Speed
720	57	17	55.5	50Mhz
730	76	22	72.2	66Mhz
750	76	22	72.2	66Mhz

If you compare the PA-RISC clock speed with the number of instructions executed each second, you may notice that the number of instructions executed each second is greater than the number of clock cycles each second. In essence, the chip is doing more than one instruction per clock cycle. (If you want to know more about the performance of these systems, this month's HP-UX column provides some live benchmark numbers.)

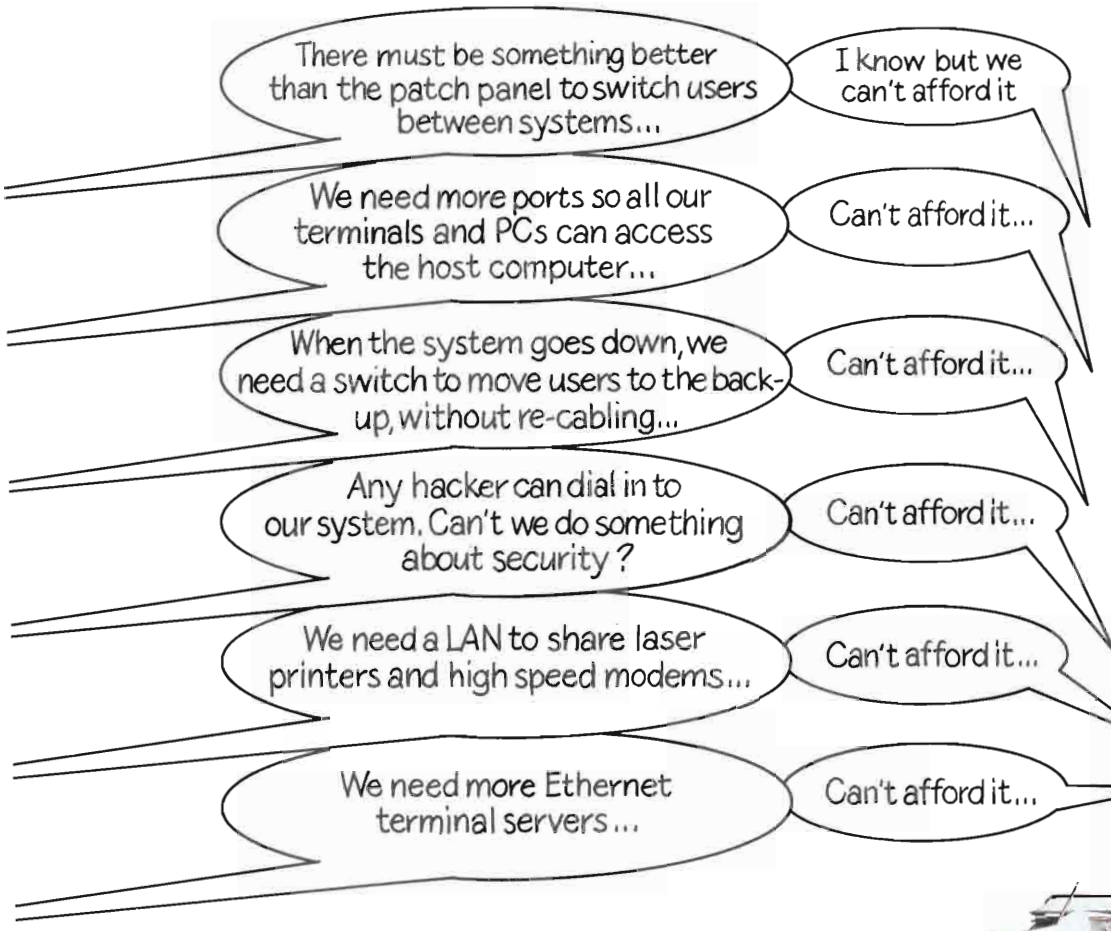
Now for the price: HP is configuring the base Model 720 as a diskless workstation with GRX graphics (and monitor) and 16 MB of RAM for $11,990. The base Model 730 includes a 200 MB disk, GRX graphics (and monitor) and 16 MB of RAM for only $19,990. The Model 750 includes CRX graphics (and monitor), 16 MB of RAM and 660 MB of internal disk storage for $43,190. To upgrade the Model 720 and Model 730 to CRX graphics, add $7,000.

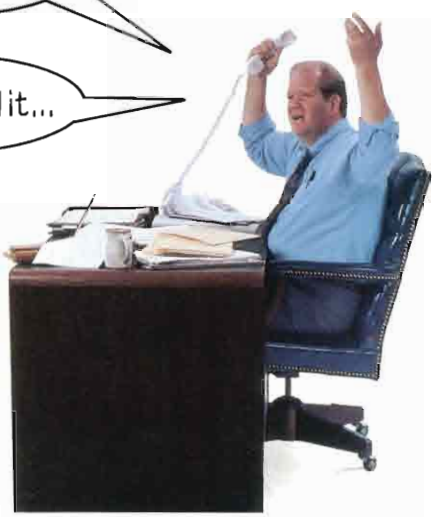
The Model 720 performance is about two-to-three times the performance you can attain with the Sun SPARCstation 2, the IBM RS/6000 Model 320 or the DECstation 5000 for about the same price! What's more, for just $8,000 more, you could buy a Model 730 and increase your performance by another 30 percent. Now you understand why I believe HP just redefined the workstation market.

HOW FAST IS IT REALLY?

APART FROM THE BENCHMARKS that I ran for my column, I also ran four benchmark tests using geographical imaging software that had been compiled on an HP 9000 Series 800. In other words, this was non-optimized code that didn't take advantage of the new features in the Series 700 processor. I ran the benchmark tests on the Model 720, a Digital DECstation 5000, an IBM RS/6000 Model 520, a Sun SPARCstation 2, and an HP 9000 Model 425.

The machine providing the closest performance was the Sun SPARCstation 2 running an optimized version of the code. And the SPARCstation 2 only matched the performance in one of the





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tests. In the other tests, the Model 720 was 50 to 100 percent faster than the SPARCstation 2.

The most telling test involved displaying a 24-bit raster graphics file in an 8-bit X Window (using a technique to reduce the 24 bits down to 8 bits). The fastest X Windows server I've worked with (until now) was the DECstation 5000. The Model 720 displayed the same information in one-third the time of the DECstation.

Another telling comparison: The Model 720 provided speeds between 100 and 400 percent faster than either the RS/6000 or the DECstation 5000. In general, the overall performance of the system was astounding.

BUT WHAT ABOUT SOFTWARE?

YOU'RE PROBABLY WONDERING whether this new platform will offer any applications at introduction. As I alluded earlier, code compiled for the Series 800 should be 100 percent compatible with the Series 700. HP is claiming more than 2,000 applications on the Series 800 and about 500 more expected by the end of this year. You should expect most of these applications to run on the Series 700 without needing to be recompiled.

The tests I ran using the geographical imaging software ran without problems and without recompiling. The benchmarks I created for my HP-UX column were originally compiled on the Series 800; on the Series 700, these benchmarks ran without fail (and a whole lot faster!). I also compiled the benchmarks on the Series 800 using the Series 800 optimizer and then ran them on the Model 720: No problem. In fact, the Series 800-optimized benchmark code ran just as fast on the Model 720 as optimized code produced by the Series 700's own compilers.

HP claims that the Series 700 compilers can improve the speed of an application by about 20 percent. I did not observe this improvement with my benchmarks; however, HP provided me with some other independently run benchmarks where this improvement was evident.

The HP 9000 Series 700 workstations are ground-breaking machines. No other workstation vendor can provide this level of performance for less than $40,000 (and HP is providing it for less than $20,000). And — prediction time — no other vendor will deliver this same price/performance ratio in 1991. ▲

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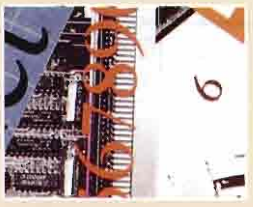


NETWORKING

Tim Cahoon

Shooting For Trouble

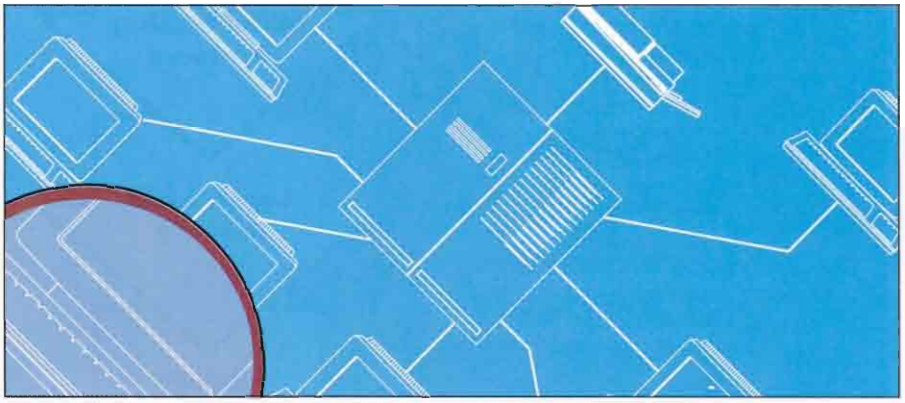
Editor's Note: HP Professional *welcomes Tim Cahoon as Networking Editor. Cahoon works for Federal-Mogul Corp. at its World Headquarters in Southfield, MI. He handles HP technical support and wide area networks for the manufacturing organizations within the company. His networking column will continue to appear monthly.*

Keeping your network up and running is critical to your company's success, but it's sometimes easier said than done. Problems do occur and you've got to resolve them quickly. Not long ago, network outages were a minor annoyance. Today, a communications breakdown can cost millions of dollars. Without network access, your company may fail to meet customer expectations or may fail to function entirely.

The first step in solving a problem is to understand it. Many times your first indication that there is a problem comes from a (sometimes irate) user. Like it or not, you must listen carefully to users and ask questions. Your conversation usually provides "clues" to identify the real problem with the network. In these cases, don't rely on secondhand information. Too many times I've chased ghosts because a user's story became garbled when relayed by a third person. Also, when you talk to the user, make sure you understand not only what he can't do but what he can do, too.

Here's a good real-life example of identifying "clues" from a user. A user called and said the network was down. A quick glance told me that his lease line was up, so I knew that the most likely culprit was not the cause. I asked him to explain what he meant by "the network was down." He said he could communicate with host A at location X but not with host B at location Y. This told me the WAN was working and the physical network connections for host A and my user were still functioning.

Using the software tools I had at my disposal, I discovered that host B was *up* and currently passing data to host A. This meant the problem was probably not with the WAN but in the TCP/IP software higher up in the stack. Some research uncovered that two copies of the interface software were running concurrently on the gateway. This created several problems, the most obvious of which was that it made the network appear to be down.



Once you understand what the user is telling you, it's time to look at your network and pinpoint the problem. The actual problem could be what the user described, or it could be a symptom of something much bigger and nastier. Its seriousness and how fast you can solve it should be measured by the rank of the manager standing outside your office.

Methodology First

To minimize downtime (and user complaints), you have to develop a problem-solving methodology. A methodology can be defined as a way of accomplishing a task in a logical structured fashion. You must define for your network or subnetworks the best-and most efficient way to detect, define and solve problems.

Once you have such a methodology developed, and you have the proper tools, you can solve problems more quickly. Having the best of tools but a poor methodology will leave you running around in circles. This wastes your time and can cost your company in lost sales or productivity.

In developing a methodology, you must first document all the little pieces that make up your network and how devices hook up to it as well. Ask yourself the following questions:

- How are hosts connected to your network? What protocols are they using?
- Into what boxes are these hosts connected? How are these boxes configured? Do these boxes have ports with special configurations?
- How are networks connected across floors of buildings or between buildings themselves?
- How are workstations connected to your network and what is their address?
- Are there any special modem configu-

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rations or setups on the WAN? How is dial backup configured?

Completing the documentation will create a map of your entire network. You want it to be as detailed as possible, providing a complete inventory of what you have. This map will give people other than yourself knowledge of how things are put together—a great service to your company and your social life. Many questions now can be answered by people other than yourself, eliminating those late night phone calls.

Also, you won't waste time pulling new wire or replacing equipment because you forgot about a device hidden under the floor. Defining how all your equipment is installed keeps life simple and eliminates unnecessary headaches.

Documentation By Sight

If you think that your documentation is complete, think again. Now, it's time to document the operating characteristics of your network. Using the tools at your disposal, you must create a picture of the way the network looks when it's running correctly. How many times when working on a problem do you forget how things are supposed to work? Do you ever find yourself having no idea if what you are looking at is good or bad? If so, then you can see the importance of documenting the normal operating characteristics of your network.

A case in point is the integration of our HP 3000 SNA traffic into our X.25 WAN. Using a software tool to view the SNA traffic, I documented what it looks like when the HP SNA is down, when it's up, and when the IBM mainframe is down but the HP SNA is up. A printout of the screens for each of these conditions provides a reference point when tracking problems. If what I see matches the printout, I know it's good. If it doesn't, it gets me one step closer to solving the problem. Another good thing to document is what hosts are generally active and which hosts are always down. Why waste time trying to bring up a host that's normally down?

Now that you know what equipment makes up your network, how it's tied together and what activity looks like on a normal day, you can develop your own methodology for problem solving. Every network needs its own special tools and methodology. If you were just working with one type of network, Ethernet vs. X.25, life would be simple. When you get many different types of networks connected together life isn't simple anymore. No matter what type of networks you have interconnected, they can be broken down into three areas for problem resolution.

■ ***The physical connection***. Check for the simple things. Is the host plugged in to the network? Is the lease line to the remote site up? Is there power to all parts

of the network needed by this user? Is the remote host or server online? Does the user have his software loaded?

When you troubleshoot a network, you're checking to see if the physical connection is working from point A to point B. Look for power outages in remote telephone closets or devices under the floor that may have come unplugged.

■ ***The link layer.*** Is there data coming from the user's host? Is data making it through all the interfaces in the network? Is data reaching the remote host?

The important thing here is to see that something is coming out of the user's machine and making it to the remote host. X.25 has a frame level and the frames have a special format. Are frames being rejected at a high level? Is the frame format correct? On serial networks look for the RD and TD lights blinking on your breakout box.

■ ***Packet or application level.*** Some networks have a packet level, like X.25, and others don't. If a packet level is appropriate, make sure the correct format and information is in the packet being received. What's left is then passed up to an application such as TCP/IP. Here you're going to have to break down the packet to verify the format and the data it contains.

If it's an X.25 network and the packets are being received correctly, you'll have to break down the data portion, as well. If you're running TCP/IP over X.25, make sure those headers are correct. Many times you'll find the problem is with bad addresses at this higher level.

Get An Education

Education, documentation and contacts with other network administrators will allow you to expand and improve your methodology. The best way to get all three is to participate in a user group. At the Interex Conference in San Francisco held in 1989, I attended an X.25 session led by Kimberly Weinmann of HP. This seminar, entitled "Procedures For Gaining Control Of An X.25 Network," was top-notch. Weinmann defined specific methodology for problem resolution on an X.25 network.

Also, she passed out an HP Application Note (#425) written for the HP4952A and HP4951C protocol analyzers, which I've found to be a valuable document. It's so good, in fact, that it should be part of the standard documentation included with the X.25 software for both the HP 3000 and HP 9000 lines. Unfortunately, this is one of those examples where the right hand doesn't know what the instrument division is doing. To get your hands on a copy you'll have contact the instrument division people at your local HP office.

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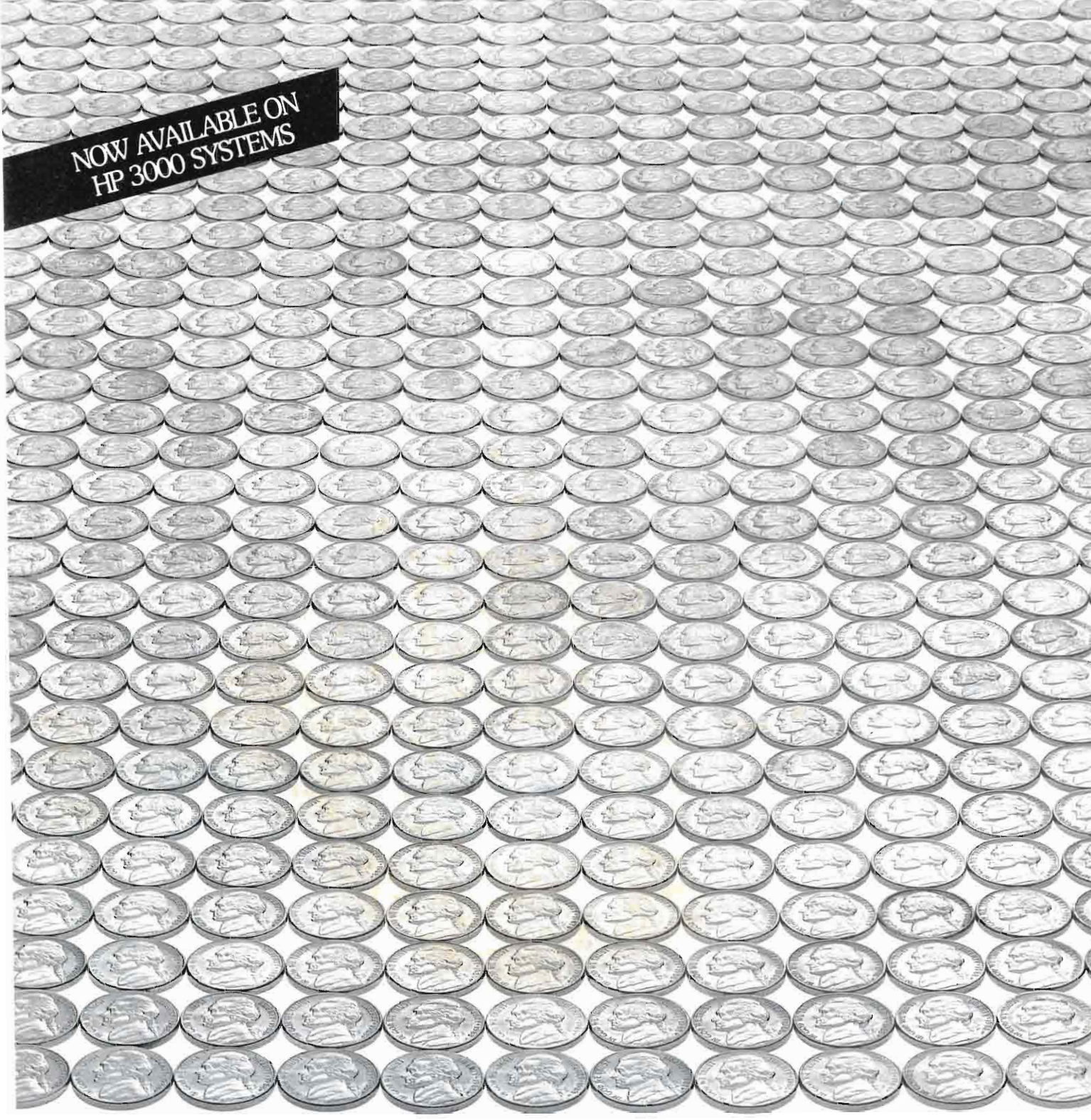

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Benchmarks And Speed

Andy Feibus

In most product literature, the vendors describe workstation performance in terms of mips (millions of instructions per second), mflops (millions of floating point operations per second), and a SPECmark rating. To the prospective customer, these terms mean about as little as the ingredient information on a box of cereal. You may think riboflavin is good for you, but you don't really know why. Likewise, you're probably asking yourself: What do all these benchmark ratings really say about my system?

The Meaning Of Mips

The mips rating is perhaps the best known index of workstation performance. Mips is a rough indicator of the computer's CPU speed. In general, RISC-based systems (e.g., HP PA-RISC systems) have more mips than CISC-based systems (e.g., Motorola 68040-based systems), because RISC processors usually execute a single instruction in one clock "tick" (the MHz rating of a chip specifies the number of million clock ticks a chip receives each second). CISC chips usually require more than one clock tick to perform an operation; however, one CISC instruction usually performs much more than one RISC instruction. Because of this difference, the mips rating should only be considered useful when comparing computers having similar architectures and chip sets.

Incidentally, because multiple RISC operations may be required to perform a single CISC operation, RISC code tends to be larger than CISC code (PA-RISC code is about 40 percent larger than 68030 code). Some of the speed provided by a RISC chip may be lost, because you have to load more code to run an application (and loading code requires time).

Mflops are another important yardstick used to measure performance. An mflops rating indicates the number of floating point arithmetic operations it can perform each second. Unless your particular application performs numerous floating point computations, this measurement may not provide any insight into how fast a workstation will perform your particular application.

For example, database applications do very few floating point computations; but a graphical application may perform millions. And, mflops don't specify the number of integer operations you can perform each second; if your application performs only integer arithmetic, mflops don't provide any insight into how fast your application will perform.

SPECmarks The Spot

One benchmark that workstation vendors and buyers alike are beginning to put more faith in is the SPECmark. The SPEC (Release 1.0) benchmarks are a series of CPU- and computation-intensive tests designed to test workstation speed. The SPECmark rating is the normalized geometric mean of the individual tests and is an indication of how "fast" the tests complete. These tests don't measure graphics performance, disk access or transfer rate, or multiuser activity. *Table 1* shows reported "speeds" of some currently popular workstations.

The new HP 9000 Model 720 workstation is rated at 57 mips, 17 Mflops and

TABLE 1

System	mips	mflops*	SPECmark
DECstation 5000	24.0	3.7	18.5
IBM RS/6000 Model 320	29.5	7.4	22.4
Sun SPARCstation 2	28.5	4.2	21.0
HP 9000 Model 425	22.1	2.6	11.0

**The mflops values are for double precision computations only.*

Reported speeds of some currently popular workstations—before the 700 Series.

TABLE 2

System	I	II	III	IV	V
DECstation 5000	15	56	256	122	23
IBM RS/6000 PS 520	17	16	168	123	51
Sun SPARCstation 2	17	55	149	83	N/A
HP 9000 Model 425	38	87	263	202	54
HP 9000 Model 720	9	19	73	64	15

Benchmark results compiled using optimizing code.

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has a SPECmark rating of 55.5. The Model 730 and 750 are about 30 percent faster. Pricing is similar to the SPARCstation 2 and the IBM RS/6000 Model 320 and less than the DECstation 5000.

The Full Picture

Is HP the new "king of the hill"? If your application does a lot of computations, the answer is yes! However, what if you need the workstation to perform mostly disk I/O operations or X Windows graphics? What then? Vendors don't place as much emphasis on graphics performance as they do on the CPU.

To see how your favorite workstation's graphics measure up, I devised five benchmarks that test graphics performance. My benchmarks are designed to measure the following:

I. Time required to add one million integers (stored in an array) 100 times.

II. Time required to add and multiply one million double precision floating point numbers (stored in an array) 100 times.

III. Time required to place one million bytes (from an array) into a file (one byte at a time). This tests a platform's efficiency when performing sequential disk writes.

IV. Time required to read the file (one byte at a time) into a single chunk of memory created at run-time (as opposed to being preallocated, which would be faster). This tests a platform's efficiency when performing sequential disk reads.

V. Time required to create a 512 x 512 X Window (8 planes) and display the data (pixel-by-pixel using XDraw-Point(3X)) in this window from a precreated memory area. This test measures the speed of a system's X Windows implementation.

I compiled these tests using optimized code, and ran them on leading workstations from major vendors. The results, shown in *Table 2*, are measured in seconds of real time on a lightly loaded single-user system.

Notice the differences between the "standard" benchmark results and the results of my tests. The machines with the best mips/mflops/SPECmark numbers may not necessarily be the fastest machines for a particular application.

Also notice that although the IBM RS/6000 Model 320 is "rated" to perform floating point operations much slower than the HP 9000 Model 720, my floating point benchmark ran slower on the 720 (than on the IBM Model 320). The reason for this is that HP tuned the Model 720 in a way that makes this particular test slightly slower.

Are these tests "fair"? Maybe. At least they measure what I describe, which is better than most benchmarks. However, these tests may not characterize the kind of performance your applications need. That's always the problem with someone else's benchmarks: Unless they represent the way your applications run, the results are useless. The best benchmarks are those that you run using your own particular set of applications.

Most vendors claim their graphics hardware can display eleventy zillion or so vectors per second. That's the performance you might get if you're communicating directly with the graphics hardware using their specially tuned graphics library. But can their X Windows server or your application programs take advantage of this additional graphics acceleration hardware? In some cases, no. Also, if your application is raster-oriented (i.e., similar to the test performed for Benchmark V), the graphics accelerator is probably useless. Finally, some vendors have taken to tuning their system architecture and compilers to provide great numbers for the "standard" benchmarks, but that may not perform as fast for other tests (e.g., I/O or X Windows). This is the best reason to run your own benchmarks on any platform you're interested in purchasing.

The moral: Know what a benchmark measures before you put your money on it.—*Andy Feibus is an interplatform systems consultant based in Atlanta, GA. He is also author of UNIX, QUICK! available from Professional Press Books.*

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PC TIPS

Miles B. Kehoe

OS/2 Command Processor

When you start OS/2, you normally begin in Presentation Manager (PM), the OS/2 equivalent to Microsoft Windows on an MS-DOS system. Through PM, you can run your applications, perform utility tasks, and accomplish anything the average user needs to do in OS/2.

I don't know if it's a habit, or if I'm just slow to catch the wave, but I still like to do most of my system maintenance work at the command line. When I'm at a computer, I like to press [Enter] a few times, just to make sure it's still running. Not only that, but I think it's far easier to do most routine file management at the command prompt rather than use the PM File Manager.

Luckily, you can start an OS/2 command interpreter from PM. In fact, you can run OS/2 commands in full-screen mode, or even in a window. I use full-screen mode most of the time, but if I'm doing two or three different things, it's nice to see all of them happening at once.

Once you're in a command window, you're actually running the OS/2 version of COMMAND.COM that works very much like the command interpreter you know from MS-DOS. Nearly all of the MS-DOS commands you use are available in OS/2, and they work the same way. This is true not only for the standard built-in commands like DIR, COPY and DEL, but also for many other standard DOS commands. OS/2 retains several of the same utility programs you know from MS-DOS like CHKDSK, FORMAT and SUBST.

By the way, if you've installed OS/2 and DOS to give you the dual-boot option, be sure you don't mix the programs in either the same directory or in your PATH. Even though they share the same names, and perform the same functions, the utilities for MS-DOS and for OS/2 are different programs and generally aren't interchangeble.

One difference between OS/2 and MS-DOS is that batch command files, which use the file type .BAT in MS-DOS, have the file type .CMD in OS/2. Both files are ASCII text files, however, .BAT files won't run in OS/2 until they are renamed.

I/O Redirection

Although many of the OS/2 utility commands work the same way as their namesakes do in MS-DOS, some of the OS/2 commands offer additional capabilities. To understand these OS/2 capabilities, you have to know something about two features you may have seen if you've used MS-DOS: pipes and redirected I/O.

Pipes and redirected I/O both take advantage of the fact that, for some programs and most utilities, input and output are treated as if they were streams of ASCII characters. In simple terms, the keyboard is the default standard input device, and the screen is the default standard output device. However, both MS-DOS and OS/2 provide the ability to change the source of the input stream, as well as change the destination for the output stream.

Normally, when you type a command to OS/2, your output displays on the standard output device, the screen. However, by adding the "greater than" character (>) and a filename at the end of a command, you can redirect the output stream to the file whose name is provided. Thus, to create a file which contains a list of all files on a particular flexible disk, enter:

```
DIR A:*.* > LISTA.TXT
```

You can use two greater than symbols together (>>) to append the output to an existing file rather than create a new one. To add all files on a second flexible disk to the above file, enter:

```
DIR B:*.* >> LISTA.TXT
```

Note that, if you use a single greater than symbol and give the name of an existing file, the new information will overwrite the contents of the file.

In addition to redirecting the standard output stream, you can redirect standard input. This allows programs to accept input from a file rather than the keyboard. Usually this is used for things like sorting files or to facilitate complex tasks like entering program patches via a debugger.

To specify that a program should accept standard input from a file, use the "less than" character (<) on the command line:

```
SORT < FILE1
```

This causes the sorted contents of FILE1 to display on the screen. You can even combine input and output redirection on a single line:

```
SORT <FILE1> FILE2
```

You also can send the output of one command or program into another by using what is called *pipes*. A pipe is a temporary logical link between two or more programs, and is represented on the command line by a vertical bar (|).

One of the best examples of using a pipe is the MORE utility. MORE is

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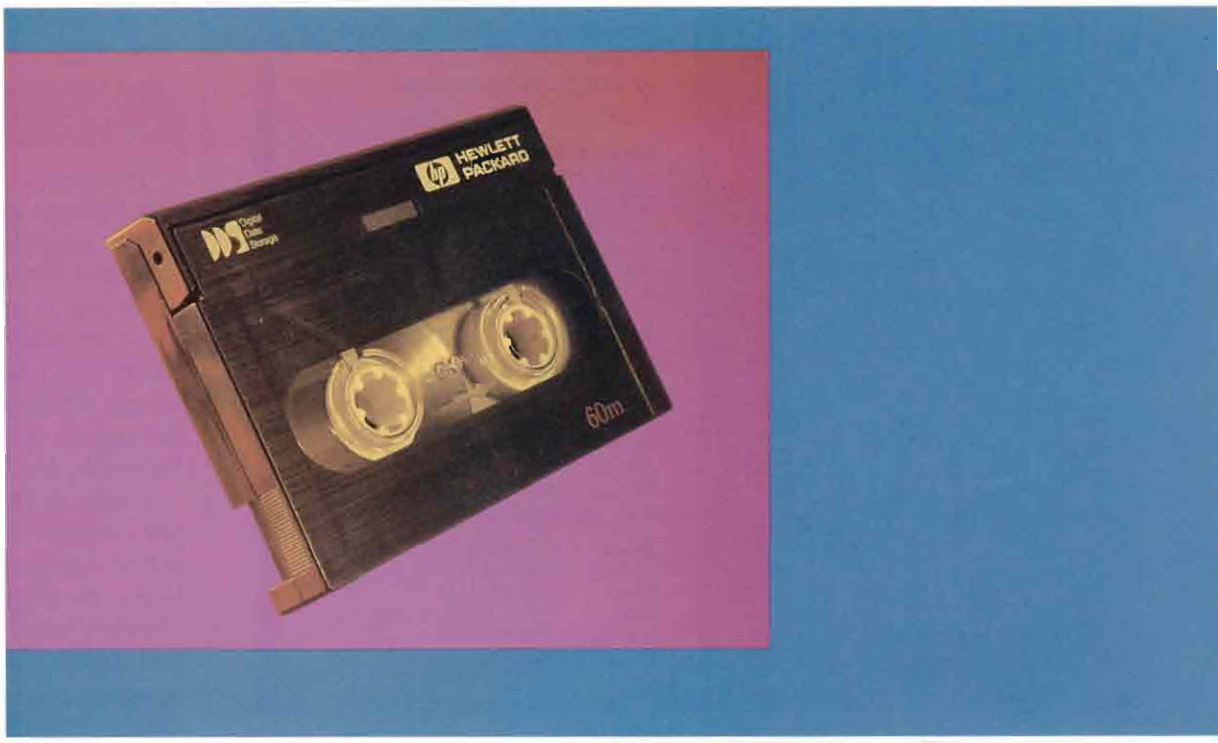

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a program shipped with MS-DOS and OS/2 that lets you view one screen of data at a time. Combining the TYPE command, a pipe, and the MORE command, enter:

```
TYPE CONFIG.SYS | MORE
```

This line will type the contents of your CONFIG.SYS file. Rather than display the contents directly on the screen, the output from TYPE will be sent into the MORE program, which will pause after every screen of text. If your original file is less than a screen, you won't see any evidence that MORE even ran, although it's MORE and not TYPE that displays the file.

Finally, in OS/2 as in MS-DOS, you can combine almost any number of utilities with pipes and I/O redirection as long as the program accepts input from "standard input" and outputs to "standard output". Consider:

```
DIR *.* | SORT > SORTED.DIR
```

The directory listing from the DIR command is piped into the input for SORT. The SORT programs manipulates the data in the file, and sends the output to the file SORTED.LST.

Command Grouping

The features I've discussed so far are available in both MS-DOS and OS/2. However, OS/2 adds some additional capabilities called Grouping Symbols you may find useful. In addition to the other special symbols you've seen up to now, you can use any of several other command line symbols to help you better manage your system and command files.

The first of these grouping symbols is called the AND symbol, represented by two ampersands (&&). You might find it easier to consider this the "If and only If" symbol: This operator performs the second of two tasks only if the first completes normally. For example, suppose part of your batch file includes logic that copies a file from one directory to another. If the COPY completes with no errors, you want your batch file to de-

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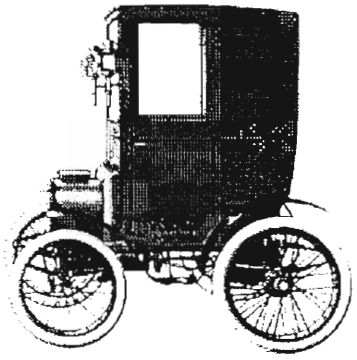

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CIRCLE 285 ON READER CARD

lete the original file; but if COPY does not complete, you don't want to delete the original file. A command line to perform this task might be:

```
COPY  ORIG.TXT  C:\SAVE\COPY.TXT
  &&  DEL  ORIG.TXT
```

In addition to the AND symbol, OS/2 includes an OR symbol, represented by two vertical bars (||). This symbol performs the second task only if the first task fails. You might use this when you want to create a directory, but only if it doesn't already exist. Consider:

You can use grouping symbols with any number of statements, as well as with I/O redirection and pipes.

```
CD C:\SCRATCH  ||  MKDIR C:\SCRATCH
```

The next grouping symbol in OS/2 is called the Separation symbol, represented by a single ampersand (&). This symbol causes commands or statements on *both* sides of the symbol to execute, left to right. If you want to type two files, you can use the command line:

```
TYPE FILE1  &  TYPE  FILE2
```

Remember, the & is called the Separation symbol; it isn't called AND, even though both the left and the right statement will unconditionally execute.

Finally, OS/2 has a character that "escapes" the character that it precedes. Consider the intent of the following command:

```
ECHO Enter a filename at the > prompt
```

Unfortunately, OS/2 interprets the greater than symbol as an I/O redirection, so when this statement executes you'll find a file called PROMPT that contains the string "Enter a filename at the".

The right way to accomplish the task is to have OS/2 ignore, or escape, the greater than symbol (>). Use this line:

```
ECHO Enter a filename at the ^> prompt
```

The carat forces OS/2 to interpret the greater than symbol as a character to be displayed, not as a I/O redirection operation.

Combining Operations

So far you've seen how the AND, OR, and Separator symbols can be used to affect the operation of any two statements or commands. In fact, you can use these symbols with almost any number of statements, as well as with I/O redirection and pipes. In fact, by using parentheses, you can control the precedence of several statements and commands. Consider:

```
( CD C:\SCRATCH  ||  MKDIR C:\SCRATCH)
  && COPY F:\*.*  C:\SCRATCH
```

This line, an adaptation of the example above, will change to a directory, and create it if it doesn't exist. If both of these operations complete properly, all files from the F:\ directory will be copied to the SCRATCH directory.

While some of these operations may seem unnecessary, if you consider that you'll be using most of them in generalized command files, they begin to make more sense. Often, one or more of the parameters will be values passed to the command file when it is executed. When this happens, you can use these Command Groups to help you write better and safer command scripts to make your system easier to use. —*Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.*

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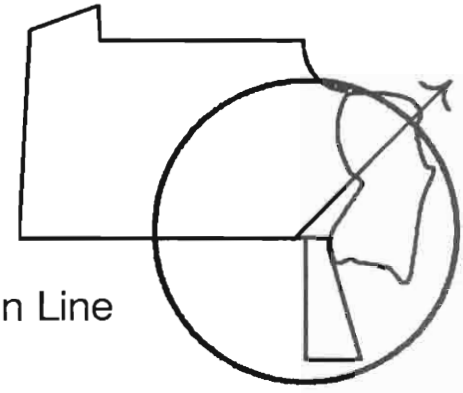

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NEW PRODUCTS

Ports Completed For M/VISION Materials Software System

The Advanced Products Group of PDA Engineering announced that it has completed ports of its M/VISION materials software system on Sun's SPARC family and HP's 9000 Series 300/400/800 UNIX workstations.

M/VISION integrates corporate materials data across engineering boundaries with evaluated material properties for metals (MIL-HDBK-5E), fiberglass (MIL-HDBK-17A) and structural composites (PMC-90).

M/VISION provides software tools to reduce data, select materials and model properties. By tailoring information to the needs of each discipline, test, design and analysis engineers can access images, graphs and tables from a central source. And, M/VISION adheres to government and industry standards for materials data.

Contact PDA Engineering, 2975 Redhill Ave., Costa Mesa, CA 92626; (714) 540-8900.

Circle 398 on reader card

Proactive Releases Flexibase Software

Proactive Systems released a new version of FLEXIBASE that enables HP 3000 users to optimize and manage IMAGE databases. New FLEXIBASE features include:

- Improved run-time performance, particularly on MPE XL systems where NM code now is used for all major functions and the software has been optimized to the MPE XL architecture.
- Quick capacity and automatic capacity functions enabling specified formulas for the intended new capacity.
- Completion of a capacity change, which uses tape work files at almost the same speed, when necessary.

Proactive Systems offers two new modules that can be purchased separately or as part of FLEXIBASE for database enquiry/reporting and database compression. The first module provides ad-hoc enquiry and reporting. The price range is $1,400 to $8,000. The second module provides database compression with read access still allowed thereafter, thus supplying data archiving and back-up capabilities. Price range is $950 to $4,500. Prices range from $2,300 to $12,000 depending on system configuration.

Contact Proactive Systems, 4 Main St., Los Altos, CA 94022; (415) 949-9100.

Circle 395 on reader card

GECOMO Plus Estimates Software Development Costs

GEC-Marconi Software Systems announced GECOMO Plus, a software product used to estimate costs in software development projects. GECOMO Plus is based on the COCOMO estimating tech-nique. Available on UNIX and VMS platforms, GECOMO Plus runs on Sun 3 and 4/SPARCstation, HP 9000/300, Apollo, IBM RS/6000, and DEC VAX/VMS workstations.

GECOMO Plus offers a variety of useful features, using the developments in software cost estimating. The GECOMO Plus cost estimating model supports both Ada as well as non-Ada projects. Additionally, GECOMO Plus provides an incremental model to estimate costs for projects developed in "concurrent stages," reflecting real world development methods found in both the defense and commercial sectors.

And, GEC-Marconi has added a staff assignment feature for estimating based on actual staffing levels rather than the "ideal" staffing levels provided by other models.

GECOMO Plus runs in a graphic environment based on the X-Windows/Motif standard. GECOMO Plus generates several Postscript reports including a project bar chart, milestone table, development effort table, staff histogram, and staff activity chart.

GECOMO Plus ranges from $4,000 for a single user to $12,500 for unlimited users.

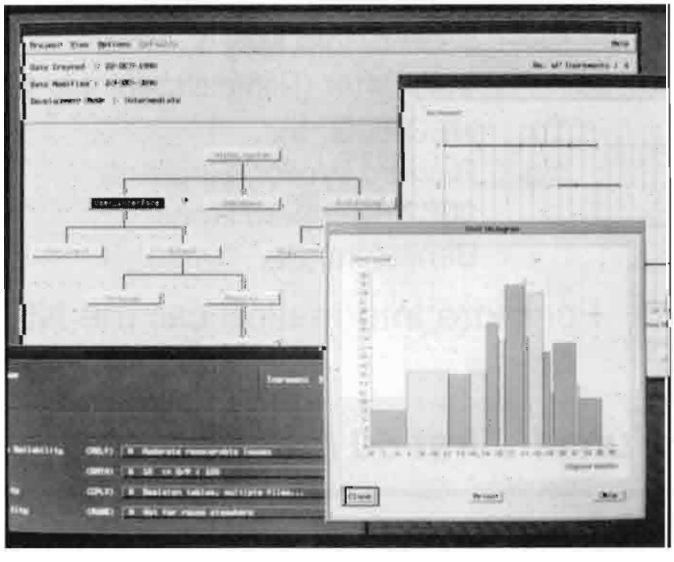
Contact GEC-Marconi Software Systems, 12110 Sunset Hills Rd., Ste. 450, Reston, VA 22090; (703) 648-1551.

Circle 379 on reader card

ORBiT Software Releases Tape Manager & Librarian

ORBiT Software announced the release of its Tape Manager & Librarian, a fully-integrated module of its BACKUP/3000 package.

The Tape Manager & Librarian performs all backup and tape management functions



GECOMO Plus is a cost estimation software package from GEC-Marconi Software Systems.

associated with system backups, including tape selection, expiration, scratching, usage and reliability tracking, and printing tape labels. Online reporting capabilities eliminate all paperwork and include the ability to determine the contents of any tape and to locate a specific file on all active backups. All benefits are provided automatically as a byproduct of regular system backups.
Contact ORBiT Software, 319 Diablo Rd., Danville, CA 94526; (800) 666-5463.

Circle 399 on reader card

RGB Spectrum Announces Video Window In Stereo

RGB Spectrum announced the application of its video windowing system for stereographic video displays. The RGB/View video windowing system is being used for land-based remote piloted vehicle (RPV) applications.

The objective of this RPV is to acquire intelligence or deliver firepower in a battlefield situation without risking human life. Cameras on the RPV transmit live video images via telecommunication links to a remote station, from which the driver controls vehicle movement.

Although the primary use of the remote vehicle control system is for defense, the use of stereo video for remote control has other applications, including space stations, nuclear power plants, hazardous waste disposal facilities off shore drilling, surveillance and drug interdiction.
Contact RGB Spectrum, 2550 9th St., Berkeley, CA 94710; (415) 848-0180.

Circle 393 on reader card

MiniSoft Announces MiniSoft 92 For Windows

MiniSoft shipped versions of its HP terminal emulation package supporting MicroSoft Windows 3.0.

MiniSoft 92 for Windows offers capabilities for executing multiple host sessions, each in its own resizable window. MiniSoft 92 also features the ability to run host applications in the background while a Windows spreadsheet, word processor, or database manager is in use. The ability to cut and paste between windowed applications is fully supported.

MiniSoft 92 for Windows provides a complete emulation of the HP 2392A and 700/92 block mode terminals. It also features: ASCII and Binary file copy for file transfers between the PC and HP 3000, 9000, or 1000 computer systems; the ability to redirect the output of most PC-based word processing, graphics, and spreadsheet packages to host-based printers; comprehensive command language to automate complex or repetitive tasks, such as logon routines and modem dialing; support for a wide variety of industry-standard LANs and WANs including Novell and HP ADVANCENET; and 132 column display for most PCs equipped with VGA or EGA monitors.

Price is $129 per copy. Quantity discounts and site licenses are available.
Contact MiniSoft Inc., 16315 N.E. 87th, Ste. B101, Redmond, WA 98052; (800) 682-0200.

Circle 394 on reader card

IBI Previews FOCUS For UNIX GUI

Information Builders Inc. (IBI) announced the availability of a graphical user interface (GUI) for the UNIX version of FOCUS, a 4GL for application development and end-user computing.

FOCUS for UNIX GUI places all elements of the FOCUS user interface for defining, modifying, and reporting against various data structures in an X Windows environment. The core of FOCUS for UNIX GUI is a tool that enables developers to build applications according to the standards of the user-defined GUI.

FOCUS seamlessly integrates application development, reporting and decision support tools with a database management system in a window-based environment for ease of use. Applications are portable between FOCUS for UNIX and versions for IBM mainframe and AS/400 systems, DEC VAX/VMS, Wang VS, HP MPE XL, Tandem, and DOS- and OS/2-based microcomputers.

FOCUS for UNIX GUI utilizes X Windows client-server architecture. FOCUS resides on the application module (client), while the presentation module (server), is responsible for workstation display. The FOCUS presentation module interprets description files provided by the application module, and presents a FOCUS application in the user's native GUI.
Contact Information Builders Inc., 1250 Broadway, New York, NY 10001; (212) 736-4433.

Circle 391 on reader card

DISC Adds Functionality To Its DBMGR

Dynamic Information Systems Corp. (DISC) announced that the new DBMGR version 2.03 is available for immediate delivery. The new version offers more features and a lower price. DBMGR can now be purchased for prices ranging from $495 on an HP Micro3000 up to $1,895 on HP's largest Spectrum CPU, the 980/100.

DBMGR allows you to manage data set capacities, repair broken chains, reload data sets, and other functions necessary for daily database maintenance. Features include an automatic data set capacity facility. In automatic mode, DBMGR can use a conditional IF statement to perform capacity management without operator intervention. For example, you can use DBMGR to automatically increase a set's capacity only when the capacity exceeds a predetermined level. This process may be scheduled on a periodic basis to assure adequate dataset capacity.

Other capabilities include item and data set deletions, a conditional FORM command, and a wildcard option to process all sets in a database with a single command.
Contact DISC, 910 15th St., Ste. 640, Denver, CO 80202; (303) 893-0335.

Circle 390 on reader card

Sedasis Offers Magneto-Optical Disk

Sedasis introduced a 650 MB magneto-optical disk that's supported under MPE V or MPE XL and offers direct access to stored information.

This unit is compatible with the HP Winchester disk, is interfaced in HP-IB and supports CS/80 protocol. This enables you to include the magneto-optical unit without any particular driver.

The SED6065 enables erasing and rewriting. Therefore, any recorded data can be erased without altering the support (guaranteed for 1 million cycles). For data recording, the SED 6065 uses 5 1/4-inch removeable magneto-optical support with a capacity of 650 MB.

You can use cartridges of 512 or 1024 bytes per sector, the interface emulating blocks of 256 bytes per sector, standard format for of HP 3000 machines.

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

Circle 370 on reader card

Robelle Releases Qedit Version 3.9

Robelle announced enhancements to Qedit, the full-screen editor for all HP 3000 computers. Qedit is a complete environment for programmers, interfacing with most software tools on the HP 3000. Qedit supports direct compile of the workfile (without saving), PREP, LINK, RUN, UDCs and Command Files, and allows you to hold tools like MPEX and Quiz suspended for instant access. Qedit also has a compatible line-mode, essential for batch editing jobs so you only need one text editor for all tasks.

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

Circle 389 on reader card

Series 950 Available For Disaster Recovery

Computer Solutions Inc. announced the arrival of an HP 3000 Series 950 for disaster recovery hotsite services. With the arrival of the new Spectrum machine, the company will offer the same range of services to users of the MPE XL operating system as are offered to the Classic 3000 users.

The Series 950, like the Classic systems, will be available in a standard configuration, along with additional hardware and communication options. X.25 network access and an OpenView workstation are standard. Subscribers may add memory, disk drives, DTCs, public networks, and many other options to suit their particular needs.

Contact Computer Solutions Inc., 397 Park Ave., Orange, NJ 07050; (201) 672-6000.

Circle 388 on reader card

SOTAS' Environmental Manager Integrates Financial Software

SOTAS International Inc. announced Environmental Manager, a series of software modules, providing seamless integration of the Accountable Solutions product line and managing the entire application environment.

Users can maneuver through any Accountable Solution system either through the menu hierarchy or by using the shortcuts of SOTAS Navigation. This allows you to go directly to any task within an application or to flow between applications. The Hot Link Inquiry provides you with linked inquiries so you can interactively analyze information from several different views simply by choosing function keys.

Contact SOTAS Int'l Inc., 192 Merrimack St., Haverhill, MA 01830; (508) 372-0770.

Circle 387 on reader card

James Associates Ships Image Transfer For HP 9000

James Associates announced Image Transfer, a software package that solves the problem of moving images back and forth between HP 9000 BASIC workstations, IBM PC compatibles and Macintoshes.

With Image Transfer, the HP 9000 user can view, print and E-mail these images in the same way as a PC user. Images can be monochrome, or up to 256 colors or grays.

Image Transfer includes three sets of programs, one set for the HP 9000, the PC compatible, and the Mac. It takes an image directly from the screen or from one of the popular graphic file types on each machine, and converts it to a common file type known as Graphics Interchange Format (GIF).

The GIF files are compressed to save disk space and transfer time. They can be converted back to screen images, printer images, or a wide variety of file types. Terminal emulators with Xmodem file transfer capabilities are provided for each machine to allow files to be moved between machines. Machines can be connected directly, or remotely via modem.

Contact James Associates, 7329 Meadow Ct., Boulder, CO 80301; (303) 530-9014.

Circle 384 on reader card

Convert RPG II To Native C In 60 Seconds

The Parkside Organization Inc. announced a software conversion service that automatically converts RPG II applications to native ANSI C applications. The service uses a program that has been developed to convert System 36 RPG II application source code, menus, screen formats, message members, OCL, DFUs, files (including file descriptions), and sort routines, to native (not emulated) C source code.

The compiled C source code will run on either a UNIX, AIX or MS-DOS platform. The C source code can be maintained by any C language programmer.

Contact The Parkside Organization Inc., 14900 Landmark Blvd., Ste. 400, Dallas, TX 75240; (214) 553-2839.

Circle 385 on reader card

SL Corp.'s Advanced GUI Development System Available

SL Corp. announced SL-GMS 4.0, an object-oriented graphical modeling system used to develop dynamic graphic screens for real-time applications in fields such as manufacturing and process control.

SL-GMS 4.0 offers features such as Xt widget integration, Hypercard-like screen management, and a data source manager for codeless connection between screen objects and data sources. SL-GMS 4.0 includes Graphical Interactive Screen Management Objects (SL-GISMOs), super-widgets capable of complex behaviors beyond Xt widgets.

With this upgrade, dynamic screens now are easier to create. SL-GMS 4.0 allows the user to create objects and attach them to external dynamic data with little or no programming required.

SL-GMS supports major UNIX, VMS and ULTRIX workstations, including SUN, DEC, IBM, HP APOLLO and MIPS platforms. Price is $12,500 for the development package and $1,500 for the runtime module.

Contact SL Corp., Ste. 110, Hunt Plaza, 240 Tamal Vista Blvd., Corte Madera, CA 94925; (415) 927-1724.

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MDSS Announces Lot Traceability Feature

Manufacturing Decision Support Systems Inc. (MDSS) added lot traceability as a feature of its software packages, MDSS, MDSS/Plastics and MDSS/Metals.

The function tracks the detailed movement of material from the vendor through multiple manufacturing processes to the end customer. A primary use is to determine the distribution of defective material. The manufacturer can trace back to the source of the material associated with the defect. Once the source is isolated, the user can determine where the material was used and what customer products may be affected.

MDSS is providing a structure or hierarchy for the lot characteristics. The user then defines and groups the materials so that specific data about each lot is retained. MDSS now runs on the HP 3000 series computers.

Contact MDSS, 300 E. Ohio Building, Cleveland, OH 44114; (216) 861-8100.

Circle 396 on reader card

N.E.T. Announces LAN/WAN Gateway And Terminal Server

Network Equipment Technologies Inc. (N.E.T.) announced the N.E.T. SPX/400 series of modular LAN to wide-area network (WAN) gateway and terminal server products. They enable organizations to connect their networks of DEC, HP and other UNIX-based computers to local and remote terminals through a high-performance global network.

The SPX/420 gateway and SPX/410 terminal server products combine the WAN bandwidth management, link recovery and dynamic routing of N.E.T.'s SPX networking multiplexer family with the high-performance, multiprocessor LAN architecture of the Datability VISTA VCP-1000 Communications Server.

The modular architecture of the SPX/420 gateway allows users to adapt configurations as networking requirements change. The backplane of the SPX/420 accommodates one network interface card providing connectivity to the LAN, and as many as four line or trunk cards providing connectivity to the WAN. Network interface cards are available to support TCP/IP, LAT, or both protocols simultaneously.

The SPX/410 is a local terminal server that connects terminals and other asynchronous devices to any computer running TCP/IP or LAT. Complementing the SPX/420, it delivers local terminal support for as many as 128 concurrent users per system. And like the SPX/420, it supports multiple concurrent sessions and computers.

Pricing for the SPX/420 starts at $5,700 and varies according to configuration. Pricing for the SPX/410 starts at $3,500.

Contact Network Equipment Technologies Inc., 800 Saginaw Dr., Redwood City, CA 94063; (415) 366-4400.

Circle 400 on reader card

Pantechnic's TEXTPRO Supports X.25

Pantechnic Inc. announced support for X.25 when using its full-screen word processor, TEXTPRO. Using standard HP terminals connected as HP PAD devices, TEXTPRO provides office automation for any user on the X.25 network. TEXTPRO also can be used as the HPDESK editor, and for full-screen source code development and maintenance. Slave printers, including all LaserJet models, also are supported off any X.25 terminal.

TEXTPRO also provides instantaneous automatic word wrap on non-X.25 MPE XL systems. This gives TEXTPRO the "look and feel" of microcomputer-based systems, while retaining the power and cost advantage of an HP 3000-based centralized system.

Options are available including, LaserJet support, and full database access. Pricing starts at $500 for Micro Series HP 3000s.

Contact Pantechnic, 89 Mountain View, Oakland, CA 94605; (415) 451-2381.

Circle 392 on reader card

Galileo Scientific Releases Upgrades For HP 9000s

Galileo Scientific released new versions of E-Z GRAPH III, FIT and E-Z DRIVER software for HP 9000 computers (Series 200/300/500 and HP Vectra w/Viper Card), and the availability of all Galileo programs for HP-UX running HP BASIC.

E-Z GRAPH III, a graphing SUBprogram with SCROLL/ZOOM, now allows easy control of the size, shape and location of the graph on the screen (or plotter), and to put more than one plot on the screen at a time. Price is $195.

FIT, a regression analysis SUBprogram, can now be used to specify the regression analysis menu choice in the CALLing line and to pass back the values of the fitted parameters to the Main Program, thus fully utilizing the power of a SUBprogram. Price is $70.

E-Z DRIVER now allows storing of the documentation for the data created with this program. This makes it the most economical Data File Management System with editing and (with E-Z GRAPH III) graphing capabilities for HP Series 200/300/500 computer running under Rocky Mountain BASIC. Price is $25.

Contact Galileo Scientific, 2731 Blairstone Rd., #175, Tallahassee, FL 32301; (904) 878-7450.

Circle 383 on reader card

Clary Expands Onguard PC Series

Clary Corp. expanded its Onguard PC Series of regenerative, online, sinewave UPS to include 1.0kVA and 1.5kVA models.

The Onguard PC-1.0k protects up to four LAN fileservers and weighs 39.5 pounds, measures 9.8 inches high by 5.9 inches wide by 15.7 inches deep.

The Onguard PC-1.5k protects sophisticated workstations, supermicros and minicomputers. The unit measure 9.8 inches high by 5.9 inches wide by 19.7 inches deep and weighs 59.5 pounds.

The PC-1.0k's price is $1,990. The PC-1.5k's price is $2,590.

Contact Clary Corp., 320 W. Clary Ave., San Gabriel, CA 91776; (818) 287-6111.

Circle 373 on reader card

OMNIDEX Training Session Upgraded

McKittrick Associates announced the release of the Omnidex Self-Paced Training System for versions 2.05 and 2.06 of the Omnidex Information Management System. This version of the training system includes information on the enhanced Omnidex utilities, the new ODXFIND, and all of the new features available with version 2.05 and 2.06 of Omnidex.

The Omnidex Self-Paced Training System makes use of audio tapes and an accompanying workbook that walks through all aspects of the Omnidex IMS, including design, implementation and programming.

Price is $800. Current users of the Omnidex Self-Paced Training System can order upgrades for a reduced price.

Contact McKittrick Associates Inc., 5547 S. Yampa St., Aurora, CO 80015; (303) 690-1550.

Circle 397 on reader card

uni-FLIST Eases UNIX Introduction

The Workstation Group announced its creation of uni-FLIST, a shareware program that provides free programs to make working with UNIX easier. The uni-FLIST utility is a UNIX file system management program that gives a full screen display of files in a directory and allows users to direct commands to a specific file through the use of PF keys that visually act upon that file.

Contact The Workstation Group, 6300 N. River Rd. Suite 700, Rosemont, IL 60018; (800) 228-0255.

Circle 381 on reader card

Unison Announces WatchMan For HP 3000s

Unison Software announced WatchMan, a programmable console manager that automatically detects and takes appropriate action to control system events and data center environmental conditions.

Based on user-defined criteria, WatchMan detects a wide range of data center events such as power failures, job aborts, job schedule conflicts, spooling function problems, security access violations, and peripheral or network failures. In addition, changes in temperature, humidity or the presence of smoke are monitored to control environmental conditions.

WatchMan controls up to eight external devices including power shunts and alarm systems. Upon detecting an event, WatchMan alerts data center personnel to the situation in several ways—telephone, beeper, speaker, or through terminal messages—and then takes the appropriate corrective action.

Contact Unison Software, 675 Almanor Ave., Sunnyvale, CA 94086; (408) 245-3000.

Circle 380 on reader card

HCS Releases OCTACOMM/DK

Houston Computer Services Inc. announced the availability of OCTACOMM/DK, a diagnostic kit for the HP Series 700/92 and 700/94 data terminals.

A plug-in printed circuit board that easily mounts into the CRT's ROM drawer, the diagnostic kit contains special firmware that temporarily reprograms the terminal to perform a series of hardware and operational tests. These tests help "prove out" the various parts of the terminal including the video display, communication ports and keyboard.

The kit includes many different tests. Some check for service-related problems with the terminal hardware. Other tests check the computer system, isolating problems to a failed unit (i.e., a bad cable). Additional tests are provided to check modems and printers attached to the CRT. Price is $195.

Contact Houston Computer Services Inc., Ste. 101, 11331 Richmond Ave., Houston, TX 77082; (713) 493-9900.

Circle 372 on reader card

Four MB Memory Available For HP 340 Computers

Intelligent Interfaces introduced MicroRAM 340 4 MB Memory Expansion Board designed for the HP 340 computers.

At $995, the board is a low cost option for UNIX, PASCAL, BASIC applications requiring up to 16 MB of memory.

Contact Intelligent Interfaces Inc., P.O. Box 1486, Stone Mountain, GA 30086-1486; (404) 381-9891.

Circle 378 on reader card

Borland Turbo C++ Supported On PC HP-IB Interface

Hewlett-Packard announced Borland Turbo C++ support for its HP 82335A PC HP-IB (IEEE-488) interface product for IBM-XT/AT compatible PCs.

The HP 82335A provides users with the ability to control HP-IB instruments and other devices from their PCs. The HP 82335A is 100 percent compatible with the IEEE-488.2 standard and conforms to the Standards Commands for Programmable Instruments (SCPI) standard.

This product also provides an HP-IB printer/plotter driver for COM and LPT port redirection. The additional support for Borland's C++ language brings the number of supported languages to 12.

Supported languages now include: HP Vectra PC BASIC versions 3.11 and 3.22; GW BASIC versions 3.11 and 3.22; BASICA versions 3.11 and 3.22; Microsoft QuickBASIC versions 3.0, 4.0 and 4.5; Microsoft Compiled BASIC versions 6.0, 7.0 and 7.1; Microsoft PASCAL versions 3.32 and 4.0; Borland Turbo PASCAL 4.0, 5.0, 5.5; Microsoft C versions 4.0, 5.0, 5.1, 6.0; Microsoft QuickC versions 1.01 and 2.0; Microsoft QuickC/MASM version 2.01; Borland Turbo C version 2.0 and Borland Turbo C++ version 1.

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[CALENDAR]

[MAY]

5/13-16: The Fifth HP User Group Conference for the South Pacific and Asian region is being held in Melbourne, Australia. Conference theme is "Riding The New Wave." Contact Mandy Bromilow, (613) 429-4322.

5/20-24: Swanson Analysis Systems Inc. is sponsoring the ANSYS Fifith International Conference and Exhibition at the Pittsburgh Hilton and Towers, Pittburgh, PA. Call Jennifer D'Orazio, (412) 746-3304.

5/20-24: HP's Manufacturing Productivity Division (MPD) is hosting its third annual User's Conference for users of MPD's manufacturing, financial and maintenance software applications at the San Diego Princess, San Diego CA. Call Silvana Torik, (408) 553-3812.

[JUNE]

6/10-12: The Computer Security Institute is sponsoring a conference, entitled, "The Security Impact Of Networks, Telecommunications and Office Automation," at the Denver Marriott City Center Hotel, Denver, CO. Call Philip Chapnick (415) 905-2267.

6/11-14: NECRUG is holding its Twelfth Annual Eastern American HP Users Conference at Trop World Hotel and Casino in Atlantic City, NJ. Call Randy Kauftheil, (215) 251-0736.

6/11-14: Cognos is sponsoring its first international conference, Cognition '91 at the Anaheim Hilton and Towers, Anaheim, CA. Call (800) 444-5986 or (617) 229-5641.

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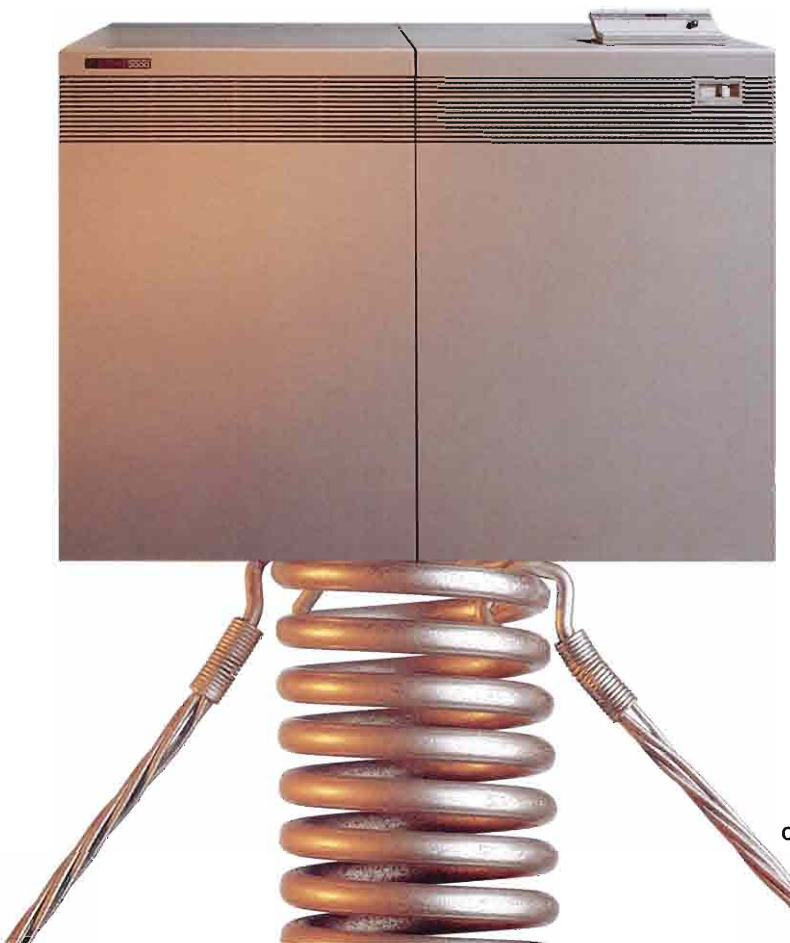

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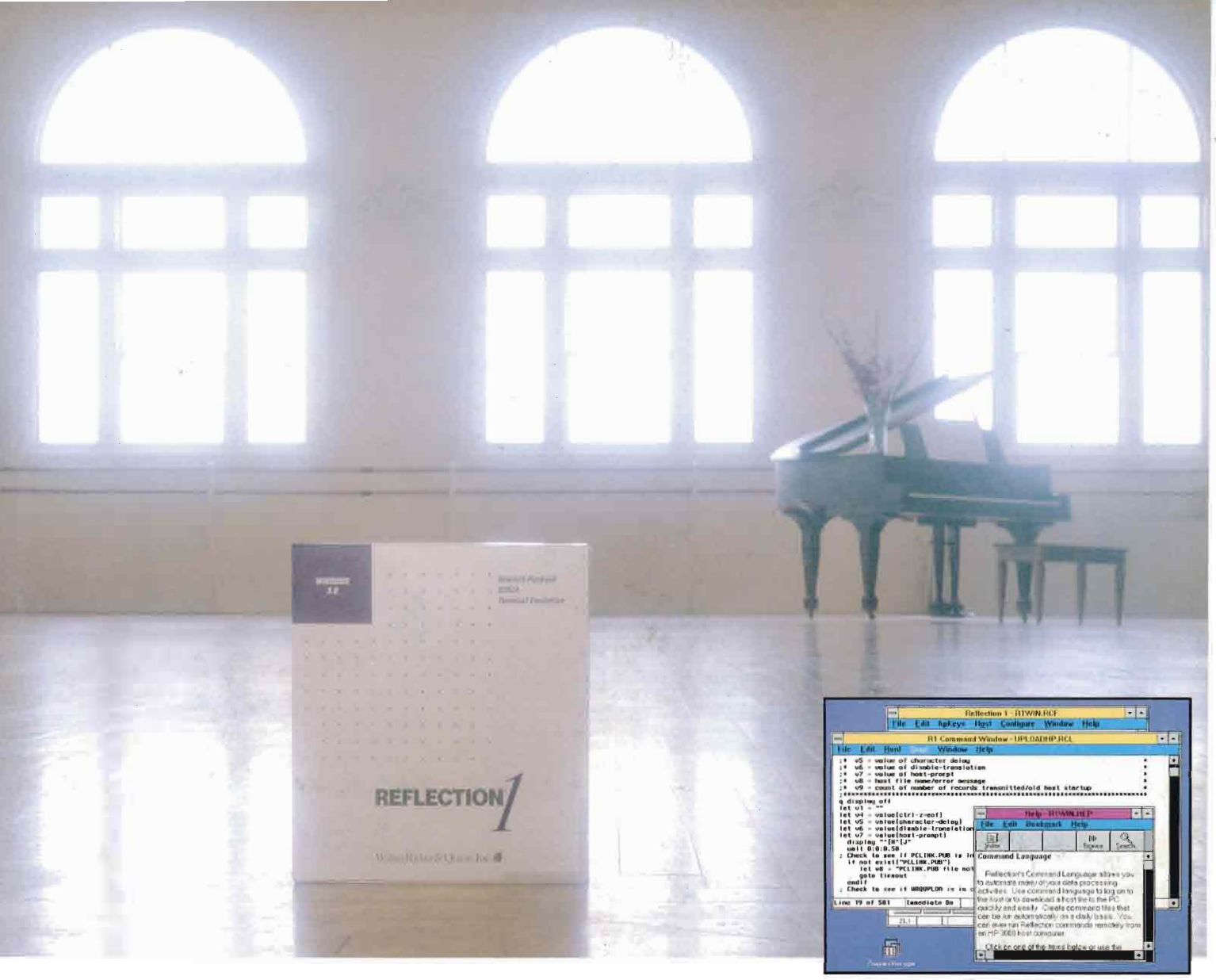

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