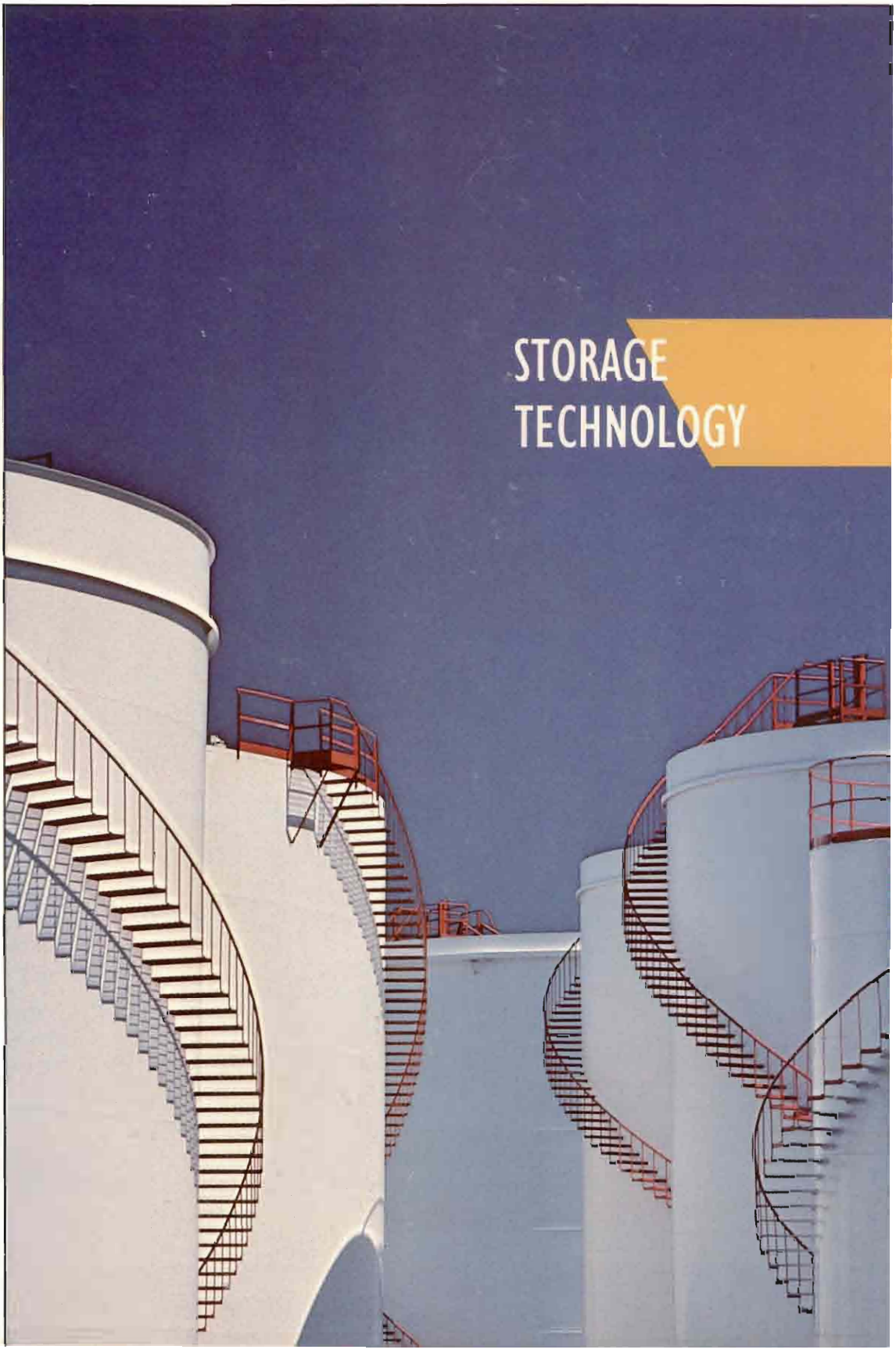
A Professional Press Publication

HP Professional

AN INDEPENDENT PUBLICATION FOR USERS OF HP COMPUTERS ■ VOL.4 ■ NO.12 ■ $4.00

DECEMBER 1990



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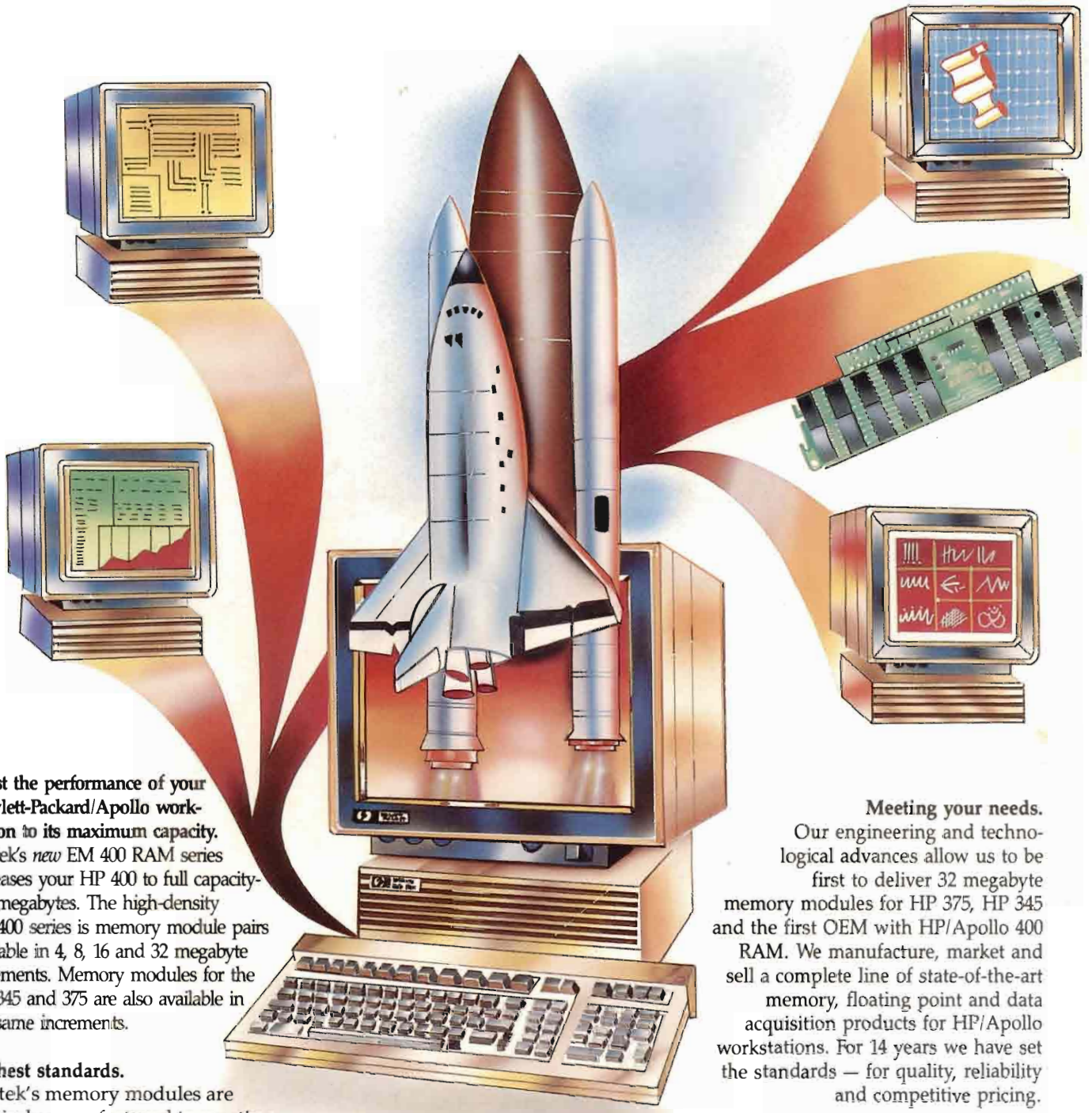

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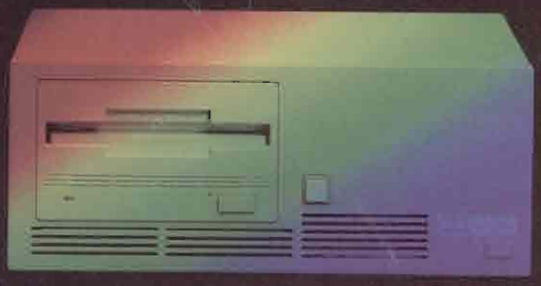

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HP PROFESSIONAL ISSN 9986145X is published monthly by Professional Press, Inc., 101 Witmer Rd., Horsham, PA 19044. Subscriptions are complimentary for qualified U.S. and Canadian sites. Single copy price, including postage $4. One year subscription rate $30 U.S. and Canada; $60 foreign. All orders must be prepaid. Second Class postage paid at Horsham, PA 19044, and additional mailing offices. POSTMASTER: Send all correspondence and address changes to HP PROFESSIONAL, P.O. 646, 101 Witmer Rd., Horsham, PA 19044.

September 11, 1990

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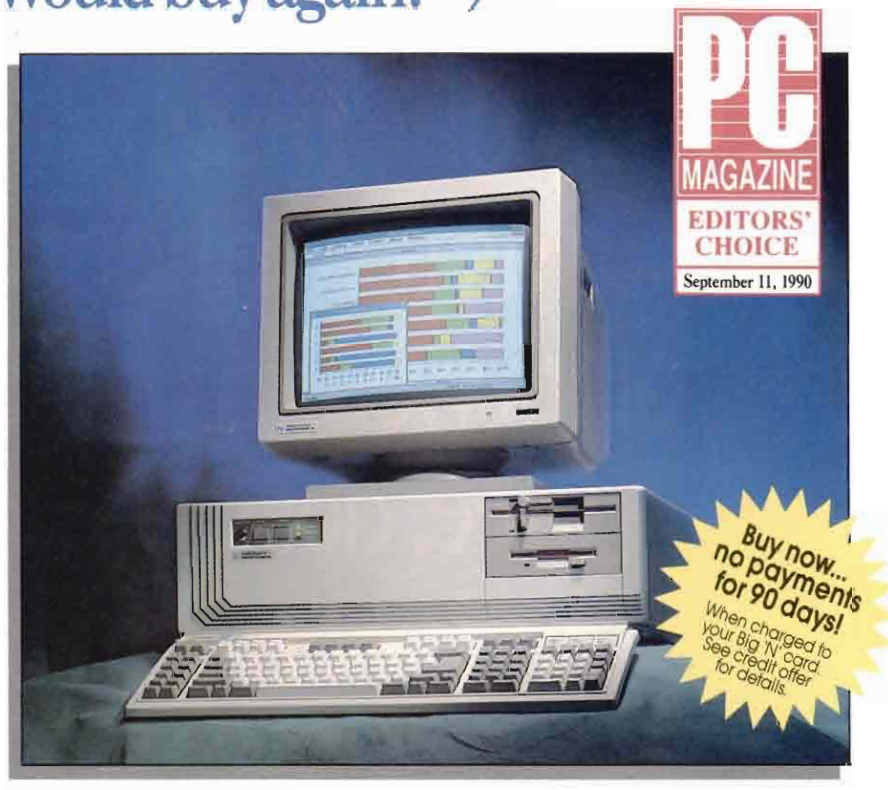

Whether 80286, 386 or 486 technology, Northgate consistently brings you top rated systems. Our value and performance is unexcelled when you look at the experts' opinions. Northgate is a company in which you can place your trust – perhaps our most important advantage!

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And, as if we had planned it, *PC Magazine* came along with its Service and Reliability issue in which Northgate's dedication to customer support was well evidenced. "As we learned more about its service policies, it became clear that Northgate stops at nothing to please its customers." No wonder "Northgate was the hands-down winner when it came to customer loyalty."**

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* *PC Magazine*, September 11, 1990 ** *PC Magazine*, September 25, 1990
† *InfoWorld*, July 30, 1990 †† *Computer Currents*, August, 1990

CIRCLE 173 ON READER CARD

OSF/1 For Everyone

HP recently took some unnecessary heat for its OSF/1 migration policy. Reports coming out of the October ADUS conference criticized the company for announcing it would not release OSF/1 for Apollo DN systems. Some users and members of the press went so far as to claim that HP adopted this policy simply to sell more hardware. By porting OSF/1 only to HP Apollo 9000 Series 400 systems and soon-to-be-announced PA-RISC workstations, they argued, HP was forcing DN users to trade in their systems before they were ready.

Let's make no bones about it. HP is in the business of selling hardware and software—and that's a darn good thing. If HP weren't aggressively marketing new systems and developing profitable strategies, your investments and, eventually, your productivity would suffer.

In this case, however, the critics got it wrong. HP announced its *planned* strategy to users before any formal press announcement was made. According to HP's Jan Silverman, marketing manager for software and communications, the plan was announced to users first so that "HP could assess the response and react if necessary."

Silverman says HP made the initial announcement because it believes software developers will need at least two years to release a significant number of applications running under OSF/1. By that time, Silverman argues, the mips rating of your average workstation could triple. Without significant upgrades, the Apollo DN systems, which are 5 to 8 mips machines, are unlikely to be viable platforms come 1993. The Series 400, on the other hand, and HP's second generation PA-RISC workstations will remain competitive machines for quite a while.

The Series 400 will continue to take advantage of advances in the Motorola 680x0 family of processors. Machines based on the 68040 (when it finally becomes available) will command upwards of 20 mips with a clock speed of 25 MHz. Also, HP guarantees low-cost upgrades to 40 mips or more as Motorola performance improves. Likewise, the new Precision Architecture systems promise speed, power and future growth. If HP has its way, these machines will be the first in a long line of systems that capitalize on RISC's rapidly advancing price/performance curve. Both the Series 400 and the new PA-RISC stations will be offered with OSF/1 right away.

Not porting OSF/1 to Apollo DN systems was a sound, sensible policy decision. Any vendor would have made the same choice. But very few vendors would have listened to their users in the way HP has. Immediately after the ADUS announcement, HP held a management roundtable discussion to give users a chance to air their views. When the managers heard the urgency with which DN users voiced their complaints, they decided to reconsider.

To be fair, the requests of Apollo DN users weren't out of line. It's certainly understandable that Domain users want to migrate to an industry standard operating system. Given equipment depreciation cycles, it's also understandable that not everybody can afford to trade in their hardware right away. Many Apollo users, particularly those at colleges and universities, simply don't have new systems in their budgets. These users will have to live and work with slower boxes for some time to come.

Unfortunately, by the time HP was able to issue a revised migration strategy, one that included a port of OSF/1 for DN systems upgraded to the 68040 processor, Apollo users had already taken their argument to the press. HP took an unfair hit for a policy that looked honestly at its customers' needs. In the end, the Apollo DN users were given both an inexpensive 68040 upgrade option *and* the OSF/1 operating system they wanted.

HP deserves to be commended for listening to its users, considering their complaints and issuing a new policy to meet their needs. Reconsidering a decision like this based on user feedback is what separates it from other hardware vendors. HP wants to keep its installed base satisfied, and it's willing to accommodate users even when that means rethinking its own strategy.

Again, not many vendors offer this kind of response and very few, if any, maintain such close and open relationships with their users. As we move into a decade that promises both significant technology advances and tight budgets, the combination of innovation and support that HP offers should not be underestimated.

Don Marks

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INDUSTRY WATCH

Bill Sharp

Overseas Sails

One of HP's long-standing difficulties is that, after doing something well, the company seems unable or unwilling to let us know about it. Gradually, with speed that now surpasses the gliding grace of glaciers, we are hearing more about HP successes overseas. I just wish we didn't have to ask to find out.

When *HP Professional* editors asked HP CEO John Young about his company's growth outside the U.S., his response was surprising. Dividing the globe into three large chunks of HP business, the U.S., Europe and Asia, Young said, "The U.S. may end up offering the slowest growth among these three blocks in the next 10 years."

Many of HP's businesses report strong sales results in both Europe and Asia, while U.S. sales have slowed with the onset of a recession. The impact on the growth of HP business is significant. Said Young, "I suspect that by the time the year is over, we'll see more than half our business, maybe as much as 55 percent, come from outside the United States."

Taking RISC International

Long ago, HP sought even-handed business relationships in countries outside the U.S., setting up joint ventures such as YHP in Japan, and operating full manufacturing facilities (not cheap assembly plants) in Mexico; Japan; Boeblingen, Germany; Grenoble, France, and other locations.

Recently, HP signed an agreement with the People's Republic of China to manufacture HP/Apollo workstations in Shanghai. The joint venture between HP and China's Ministry of Machinery and Electronics will be known as the Hua Pu Information Technology Company. Rumor has it Hua Pu's products will satisfy up to 50 percent of the Chinese market's workstation needs.

HP functions on a more global basis than any other computer firm. Young's message is that this trend will continue. He points to newly formed HP organizations in Thailand, India and in what was until recently East Germany. Elsewhere in Germany, HP has formed a joint venture with Daimler-Benz for large scale systems integration, and other relationships in eastern Europe appear to be on the horizon. Says Young, "We think that the central European connections with a unified Europe are going to provide a very dynamic environment, and we are in a good position to participate there."

According to CEO John Young, HP functions on a more global basis than any other computer firm.

Top marks for rapid growth continue to go to HP's Asian/Pacific regions, and HP's new efforts in India and Thailand will further this trend. Concludes Young, "We have a very strong presence in the world marketplace today, and we are going to continue to have that kind of emphasis. Our attitude is, when we can get something in place and barely afford it, and maybe not even quite afford it, we tend to do it."

HP Meets The Press

During briefings at HP's Cupertino headquarters, Managing Editor Don Marks and I nosed further into the picture of HP's efforts outside the United States.

HP's commercial UNIX computer sales grew at 67 percent for at least the first half of this year. This number is a rare exception to HP's anachronistic rules about releasing performance figures. Its release will help those outside HP take the firm's big RISC-based minicomputers more seriously. As significant an increase as this is, it says even more for international sales, because sales inside the U.S. grew at some unspecified, more modest rate.

Carol Mills, marketing manager for HP's General Systems Division, says "HP is number one in commercial UNIX computer sales in Mexico, Australia, Hong Kong and Singapore. Europe is harder to determine, but we're doing very well. We tend to sell smaller systems in Europe, but UNIX penetration is higher there than it is here. And, we are far ahead of IBM and DEC in Europe."

"DEC tries to sell VMS there when they can," Mills continues, "Europeans don't want to hear that. They want UNIX."

HP managers told us that in Europe, HP is often considered a European

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.

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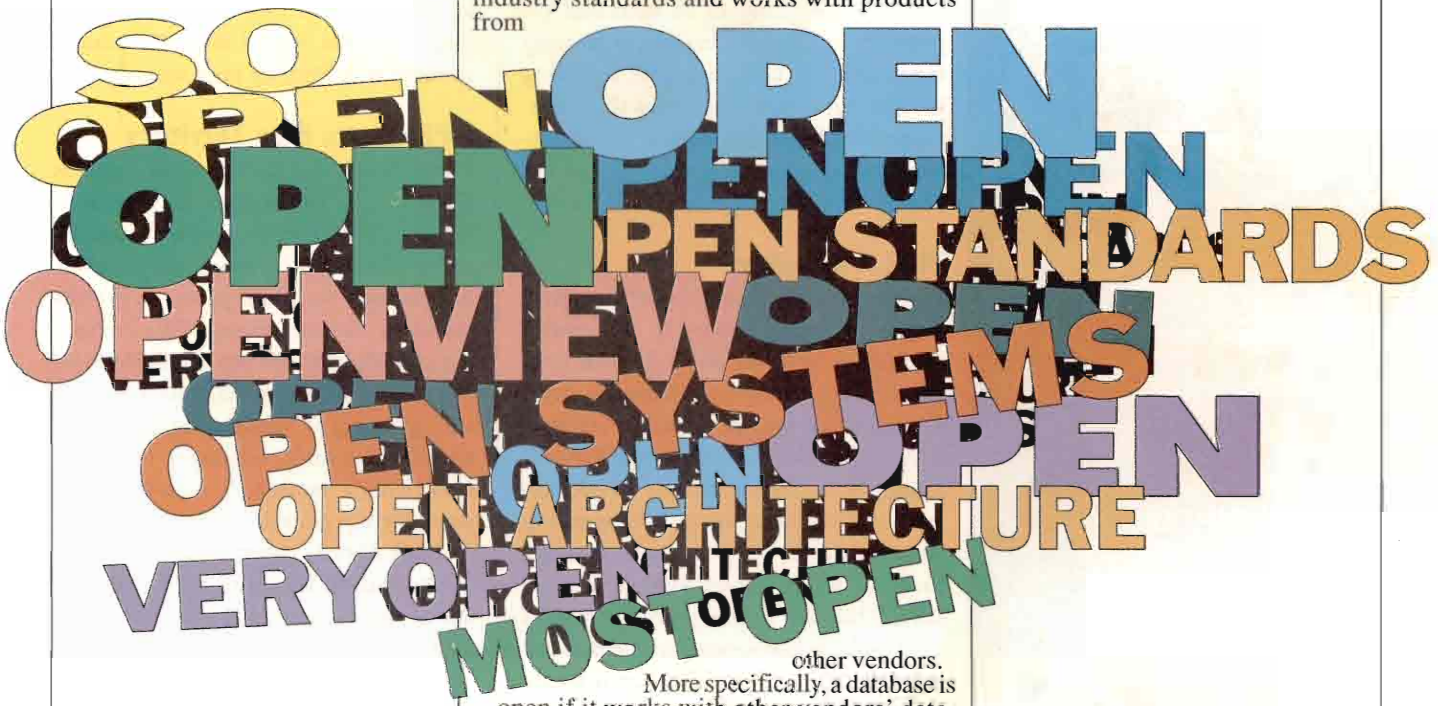

other vendors.

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company because there are several facilities on the continent. This translates into a competitive advantage that will grow as Europe becomes a more cohesive society over the next several years.

While HP's move to shift its management headquarters for PC products from Sunnyvale, CA to Grenoble, France has confused some and irritated others, Mills sees it contributing to an increased HP presence in Europe. "Europe is growing faster than the U.S., and 1992 is driving information systems growth there. Grenoble always has been a PC manufacturing location. They just moved the management function there."

PICK A Country

Quick, what do some consider the third largest operating system in the world? According to Clive Surfleet, VAB programs manager with the General Systems Division, the answer is PICK. Under a VAB agreement with Ultimate, HP will supply 9000 series multiuser UNIX systems to drive Ultimate's PICK operating system, Ult/ix. The 3 1/2 year contract includes an estimated $100-million in sales. This deal is one reason why HP's VAB business has boomed in the past few months, says Surfleet. The deal is taking business worldwide from Bull and IBM, business that was out of HP's reach until the agreement. Sales are particularly strong in the U.S., Canada, Australia, France and the U.K.

HP's 1000 line is stronger than ever in telecommunications and process control applications where real-time operation and data acquisition and control are crucial, says Dave Fastenau, marketing manager of HP Data Systems Operation. Telecommunications markets demand real-time performance that's still beyond the capabilities of UNIX, and therefore are excellent customers for the 1000, which has a commanding presence in telecommunications worldwide, including with AT&T in the U.S., as well as Britain, Italy and other countries.

According to Fastenau, emissions testing systems based on the 1000 are fixtures at Ferrari, Daimler-Benz and Mercedes. The CDs you buy at your local record store probably were tested on a system controlled by an HP 1000. A single firm sells 70 percent of the CD test systems worldwide, and HP 1000s are used to control these devices. The world's largest maker of turnkey cement production plants for use worldwide, with 70 percent of that market, embeds an HP 1000 into each one, including a plant that was hauled into the remote mountains of Peru by pack animals.

MPE Charts New Territory

Then there's the Commercial Systems Division, that makes those HP 3000 MPE XL minicomputers that aren't supposed to be selling well. Linda Lazor, marketing manager for those products, reports that 3000 sales are *growing*. "We are seeing growth over the last year," she said. We pushed a little harder. "3000 sales are still growing in double digits," Lazor added with a smile, refusing to be bullied into giving a number. As with other systems, the big growth is outside the U.S.

Rich Sevcik, general manager of the 3000 division, says sales in Europe are flat at the moment because of interest rates, but sales in the Far East are "growing very well, especially in Korea." He sees eastern Europe as a fertile ground for HP efforts, with some well-known installations already in place. "The Lenin library, the largest library in the world, is managed with 3000 systems," he says. In another agreement, HP and the University of Moscow will work together on Russian-language application software, he says.

"We have been a world-based company for decades," says Sevcik. "This is not a new activity for HP. This is a continuation of a philosophy that has been in place for a long time. Customers know we have that presence and the stability that goes with it—customers know we are solid."

A company long run by engineers, HP is finally looking just a little bit more like an extrovert. All we have to do now is get them to talk about it. ■

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CIRCLE 130 ON READER CARD

OSF Moves Industry Closer To Open Systems Environment

HP Outlines Support For OSF/1

The Open Software Foundation has unveiled the OSF/1 operating system, the first operating system intended to serve as a platform for an open systems computing environment. Designed to operate over a wide range of hardware platforms, it provides full interoperability with existing multiuser operating systems and applications. OSF/1 is fully compliant with standards and industry specifications including: POSIX, X/Open's XPG, and AT&T's SVID.

OSF was established two years ago to develop a comprehensive operating environment based on industry standards. That environment consists of core technologies that can be integrated or used separately: the OSF/1 Operating System, the OSF/1 Motif User Interface, and the Distributed Computing Environment (DCE).

OSF used a request for technology (RFT) process to find the best solutions needed to create a hardware-independent, vendor-neutral software system. Two RFTs still under consideration are those for an Architecture-Neutral Distribution Format (ANDF) and a Distributed Management Environment (DME).

At the OSF press announcement in New York, HP's Dean Morton announced that HP will put OSF/1 on its second-generation PA-RISC workstations, which will be shipping next year, and that HP will be moving all of its operating systems to the OSF/1 base.

Because HP is also integrating components of the OSF DCE into its systems, customers will be able to take full advantage of the next generation of distributed computing. Within three years, the OSF DCE will be available on HP's OSF/1 implementation and on other HP platforms and operating systems. This strategy will enable HP products, including the HP 3000, to act as open servers within an open-systems environment. HP plans to make MPE XL systems fully interoperable with open systems technology.

HP also plans to to establish OSF Motif as the standard graphics environment for all its workstation platforms and to incorporate Motif into all its software development tools and applications.

Data Based Systems Wins Pharmex Contract

DBS To Replace MAI Basic-4s With HP 3000 Series 922

Pharmex, a supplier of pharmacy labels and label distribution systems, signed an agreement with Data Based Systems Inc. to install a new corporate computer and information system.

Under the terms of the agreement, DBS will replace two MAI Basic-4 computers with an HP 3000 Series 922 super minicomputer that will be located at Pharmex's headquarters. DBS also will supply and customize MCBA's Classic Accounting and Distribution software and provide custom designed modules for Sales History and Catalog Telemarketing.

Data Based Systems is a premier Hewlett-Packard Value Added Business Partner and Systems Integrator providing advanced office and business solutions to Fortune 1000 companies, professional service firms and government agencies.

Contact Data Based Systems, 31 Highway 12, Flemington, NJ 08822; (201) 782-8811.

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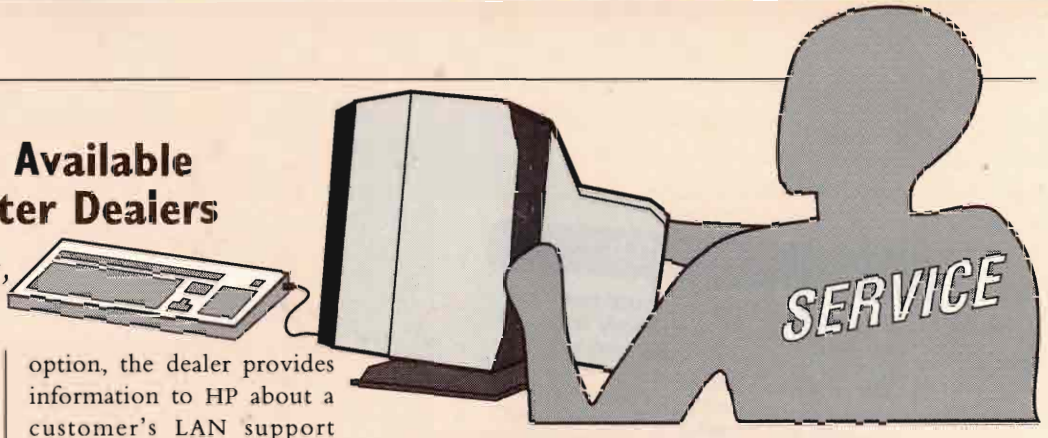
CIRCLE 262 ON READER CARD

HP LAN Services Available Through Computer Dealers

Program Offers Revenue, Profit Opportunities



HP announced it will become one of the first major computer manufacturers to make key LAN support services available through computer dealers.

Called HP Dealer Premier Network Support, the program offers new revenue and profit opportunities for dealers. There are three components that comprise the program:

- HP CableSite — planning, installation and testing of LAN cables.
- HP PC-LAN — support of existing and new customer LANs.
- HP SuccessLine — full hardware support of standard multivendor PCs and peripherals.

Under the support-referral option, the dealer provides information to HP about a customer's LAN support needs. HP then quotes and delivers the network services directly to the customer. Dealers will receive a referral fee from HP based on support and services purchased by the customer.

Under the support-subcontracting option, HP authorized dealers price and sell their own network-service contracts to the customer. The dealers, who receive a discount on the custom-quoted price of HP's network services, resell those services.

Prices for each of the new services are based on the customer's environment and applications.

ASK To Sell OCS Data Center Management Product Line

Sales Directed At HP 3000 Users

Operations Control Systems (OCS) and ASK Computer Systems Inc. announced an agreement stating that ASK will market OCS Data Center Management products to ASK's HP 3000 installed customer base and to prospective customers.

The OCS product line that ASK will market includes EXPRESS for multiple-CPU batch job management; LIBRARIAN for multiple-CPU library management and version control; SPACECONTROL for disk space management and analysis; CHARGEBACK to track computer use, allocate costs and analyze resource utilization; TAPE for multiple-CPU automated tape library management; and PRIVATE for access control security and automated logoff.

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

Circle 368 on reader card

HP Offers LAN Operations Support Services

Worldwide Support Offered Around The Clock

Hewlett-Packard introduced HP LAN Operations a service/support program that targets local-area network sites. This is a new network-management service for multivendor LANs. Based on a similar set of services HP has been providing to its private-packet wide-area network (WAN) users since 1987, it is a comprehensive operations support package for managing technical workstation LANs, minicomputer LANs, and PC LANs based on TCP/IP communications, conforming to Ethernet and IEEE 802.3 standards.

Under this support option, HP will manage customer LAN operations, offering scalable coverage customized for each customer's specific needs. The service is available around-the-clock or during limited hours. Network operations contracts are priced after evaluation of each customer's requirements.

This service includes LAN monitoring and troubleshooting (fault finding and resolution), monthly status and performance reports, recommendations to maximize network usage, and 24-hour telephone support. HP also maintains network documentation to assure operational continuity and supportability.

Optional features of this program include helping customers to analyze network performance, managing network changes, and placing an HP network administrator at the customer's site full time.

HP LAN Operations services are delivered by customer network centers located in Atlanta, GA and Bristol, England. These centers enable HP to deliver network operations support to customers worldwide. Center personnel are trained to diagnose and correct network problems remotely with the assistance of HP's 32 response centers.

HP will work to complement a customer's in-house expertise by providing only the services needed. In addition to LAN monitoring and troubleshooting, HP also offers a range of services that encompass the entire life cycle of a LAN, including network planning, design consultation, network implementation and training of customer personnel. —*Ron Levine, Field Service Editor*

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CIRCLE 105 ON READER CARD

RunningMate's I/O Mate XL Available

Provides Significant Performance Improvements

RunningMate announced that production copies of the new I/O Mate XL are now available. This new version provides improvements for data retrieval on HP 3000 systems.

Like I/O Mate for the Classic HP 3000, I/O Mate XL installs without making any source code changes and does not require you to create any extract routines or programs. Contact RunningMate, 2883 Acacia St., Placerville, CA 95667; (916) 325-3663; (800) 824-9046.

Circle 374 on reader card

Collier-Jackson Integrates ALLBASE/SQL

Focuses On Industry Standards

Collier-Jackson announced integration of HP's ALLBASE/SQL with Collier-Jackson's line of accounting and human resource software for the HP 3000.

ALLBASE/SQL is HP's relational database that utilizes SQL, an industry standard data access protocol.

In addition to restructuring its products for ALLBASE/SQL, the company will continue to offer support for its TurboIMAGE database applications.

Contact Collier-Jackson, 3707 W. Cherry St., Tampa, FL 33607; (813) 872-9990.

Circle 373 on reader card

Network Research Initiates European Strategy

Protek Represents FUSION

Network Research Corp. initiated its strategy for its HP product line in Europe by signing Protek, Europe's largest reseller of HP workstations.

Protek will represent FUSION Network Software for HP BASIC and PASCAL in the U.S.

Protek works with more than 400 dealers in the U.K. In addition to its dealer distribution, a separate arm of the company sells direct to large end users, such as Conde Nast and Courtaulds.

In addition, Protek undertakes development work on contract to HP. HP recently contracted with Protek to develop an online vibration monitoring system. Protek will be working closely with the HP offices in the U.K. to provide FUSION Network Software support for HP customers.

Contact Network Research Corp., 2380 N. Rose Ave., Oxnard, CA 93030; (805) 485-2700.

Circle 365 on reader card

Ingres Offers Premium Support

Ensures Reduced Response Time

Ingres Corp. announced Premium Support, an optional new customer service program that ensures reduced response time and customized support through a dedicated pool of senior technical support representatives.

Premium Support is an addition to Ingres' portfolio of customer support and training options, which also includes INGRES/Advisor, a service introduced in July that allows customers to access an online knowledge base by telephone to help resolve technical questions 24 hours per day, seven days per week.

Under the new program, each Ingres Premium Support specialist works closely with a maximum of three to four clients. In turn, every Premium client is assigned a support team comprised of two to three Premium Support specialists. This team is responsible for addressing all of the client's product support requests, regardless of product or problem type.

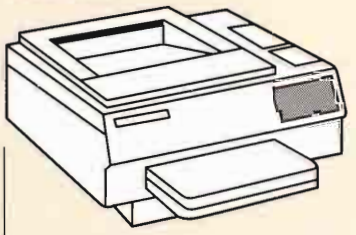
Pricing for Premium Support is individually negotiated by site based on product integration and deployment across operating systems.

Contact Ingres Corp., 1080 Marina Village Pkwy., Alameda, CA 94501; (415) 769-1400.

Circle 398 on reader card

Insight Software To Support LaserJet IIID, DeskJet 500

MacPrint, Version 1.23 Provides Seamless Connectivity



Insight Development Corp. announced that MacPrint, LaserControl and PrintAPlot will support HP's new LaserJet IIID and DeskJet 500 printers.

Insight introduced MacPrint version 1.23, which offers full support for both printers. LaserControl version 3.4 and PrintAPlot version 2.0 already support the full line of HP LaserJet printers, including the LaserJet IIID and DeskJet 500.

MacPrint 1.23 is a printer utility software package that provides seamless connectivity between Macintosh computers and HP and compatible (PCL-based) printers.

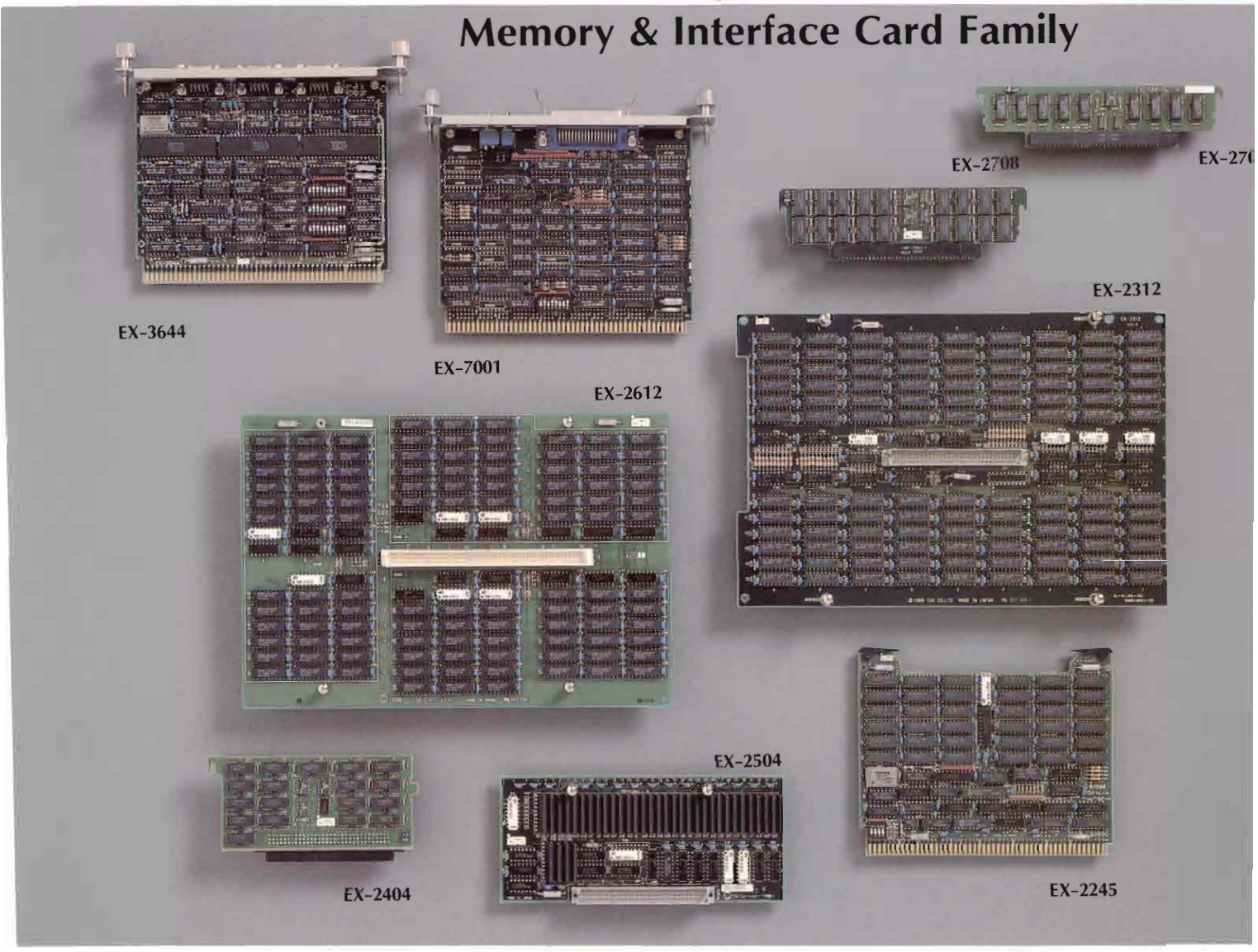
MacPrint 1.23 and LaserControl 3.4 are both priced at $149. PrintAPlot 2.0 is priced at $299.

Contact Insight Development, 2200 Powell St., Ste. 500, Emeryville, CA 94608; (415) 652-4115; (800) 825-4115.

Circle 367 on reader card

Innovative Design from ISA

Memory & Interface Card Family



With over 10 years of experience in designing and manufacturing data storage enhancement products for HP users, we now wish to seek ***extra dealers*** *who are experienced in the HP market to expand our established sales channels in* ***U.S.A., Canada*** *and other parts of the world.*

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EX-2225C	2MB			
EX-2245C	4MB			
EX-2304	4MB	350/370	HP98258B	PARITY
EX-2312	12MB		HP98258C	
EX-2404	4MB	340	HP98248A	PARITY
EX-2501	1MB	332	HP98269A	PARITY
EX-2504	4MB		HP98269B	
EX-2604	4MB	360	HP98257A	PARITY
EX-2608	8MB		HP98257B	
EX-2612	12MB		HP98257C	
EX-2704	4MB	345	HP98229A	ECC
EX-2708	8MB	375/400	HP98229B	ECC

Interface Card Family

MODEL	DESCRIPTION	HP EQUIVALENT
EX-3644	3 channels RS-232C I/F	HP98644A×3
EX-7001	Centronics I/F	

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Dealers.

Switzerland : COMPUTECHNIC AG Tel.41-71-42-64-64 FAX.41-71-42-64-55
West Germany : HCS GmbH Tel.49-40-550-10-75 FAX.49-40-559-14-86
France : SEDASIS SA Tel.33-98-41-70-90 FAX.33-98-41-66-33
Australia : KINGDOM PTY LTD Tel.61-2-451-8131 FAX.61-2-451-8131

CIRCLE 245 ON READER CARD

RAPID, ALLBASE Users Migrate To PowerHouse 4GL

Agreement Calls For Support And Maintenance

Cognos announced that its PowerHouse 4GL software will become a growth path for users of HP's RAPID and ALLBASE tool sets.

Under terms of the agreement, users of RAPID and ALLBASE 4GL software products will be able to migrate to Cognos' PowerHouse 4GL solution with no product license fee. In addition to receiving an upgrade product, HP users can purchase ongoing support and additional products from Cognos at standard prices.

Specific products include HP TRANSACT/3000 and REPORT/3000, and HP ALLBASE/4GL, ALLBASE BRW and BRW V.

Contact Cognos, 67 S. Bedford St. Burlington, MA 01803.

Circle 375 on reader card

Oracle Forms Hewlett-Packard Products Division

*Company Announces SQL*Connect To TurboIMAGE*

Oracle Corp. announced the formation of a Hewlett-Packard Products Division. The division will develop and market Oracle products for HP 3000s.

Oracle also announced SQL*Connect to TurboIMAGE, a new product that works with HP's proprietary network model DBMS. For the first time, all 80 computer platforms Oracle supports — including HP, PC, VAX, Macintosh and UNIX workstations—can access TurboIMAGE data utilizing Oracle's client-server capabilities. All Oracle and third-party tools that support ORACLE can retrieve HP TurboIMAGE data.

In addition, users can transparently integrate HP TurboIMAGE data with ORACLE and other ORACLE-supported data managers such as IBM's DB2, SQL/DS and DEC's RMS file system.

Oracle also announced several product enhancements for Oracle's products for HP. They include Field Mode capability for SQL*Forms, more than 50 enhancements to Oracle Financials applications, and performance enhancements to Version 6 of ORACLE RDBMS for HP MPE XL.

Pricing for all products depends on the CPU configuration.

Contact Oracle Corp., 500 Oracle Pkwy., Redwood Shores, CA 94065; (800) 345-DBMS.

Circle 371 on reader card

For Your Information

■ Bradmark Computer Systems and Robelle Consulting announced the transfer of DBAUDIT from Robelle to Bradmark. DBAUDIT is an IMAGE logfile transaction analyzer for the HP 3000. (408) 879-1630.

■ Softool opened wholly owned subsidiaries in France, Germany and the United Kingdom. The German and English subsidiaries are fully staffed with marketing sales and technical support personnel, while the French subsidiary serves as the European technical support center. (805) 683-5777.

■ Exabyte Corp. president and Chief Executive Officer Peter Behrendt accepted the 1990 Manufacturing/High Tech award on behalf of Exabyte at the Annual Colorado Business Award luncheon sponsored by the Colorado Association of Commerce and Industry, Coopers and Lybrand and *Colorado Business* magazine.

■ Tallgrass Technologies, a supplier of data storage systems, has added three regional U.S. distributors: Westcon Associates (New York, NY), Technology Factory (Gaithersburg, MD) and Technology Distributors Inc. (Canton, MA). (913) 492-6002; (800) TAL-GRAS.

■ HP has established a U.S.-only toll-free telephone number, (800) 233-5153, that customers can call to determine if their HP LaserJet IIP printer is one of approximately 70,000 manufactured during the early months of the printer's release that have faulty power supplies. The company will replace the power supply of affected HP LaserJet IIP printers at no charge to customers. Owners of HP LaserJet IIP printers purchased before March 1990 are encouraged to call the toll-free number.

Calendar Events

1/22-24: The eighth annual UniForum, International Conference of UNIX Operating System Users will be held at INFOMART, Dallas, TX. Call (800) 323-5155 or (708) 299-3131.

3/18-20: The Sixth International Conference on Multimedia and CD-ROM has been rescheduled and will be held at the San Jose Convention Center, San Jose, CA. Call (203) 964-8287.

3/26-28: The National Database Exposition and Conference (DB/EXPO) will be held at the Moscone Convention Center, San Francisco, CA. Call (800) 2-DB-EXPO or (415) 941-8440.

4/22-25: The 12th Annual Conference and Exposition sponsored by NCGA will be held at McCormick Place North, Chicago, IL. Contact Sharon Sutton, (703) 698-9600.

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

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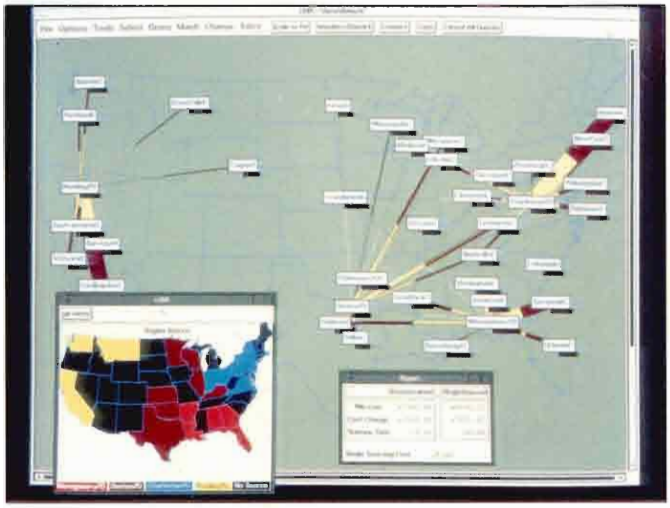
CIRCLE 141 ON READER CARD

Operation Linx



Fortify Planning With Numetrix' Logistics Management Tool

You're excited about the international trade barriers coming down. The 1992 liberalization of the European Economic Community fits well with your company's strategies, the first task on your agenda is to ship large volumes of products to European distributors. Sounds promising, but have you figured out the logistics of maintaining European production plants and distribution warehouses?

To help with complex tasks like this, Numetrix Inc. (Norwalk, CT) introduced Linx, a workstation and PC-based management tool designed to help manufacturers manage logistics demands and requirements regardless of complexity. And, regardless of location — national or international.

Linx is based on the growing theory of integrated logistics and supply chain management in which a company manages all its operating sites as one and controls the entire manufacturing process from raw materials to production, to distribution.

Linx is an offshoot of Numetrix' Schedulex, software that lets production planners optimize schedules, perform "what-ifs" and control factory-level planning while taking capacity constraints into account.

Linx provides the same capabilities for integrated logistics planning. It helps solve strategic issues, such as where to locate a facility, and tactical issues, such as sourcing, production and distribution allocations and time-phased inventory targets.

Linx combines mathematical optimization programs and interactive computer graphics to solve complex materials and distribution management problems. A "map" shows suppliers, plants and warehouses involved, and the best possible shipping routes between them.

The factors needed to solve the problem, such as sales forecasts, costs, and rates for production and distribution, can be obtained through a data transfer file or created on the screen using interface tools. The graphical interface also features a mapping background with political or user-defined boundaries and a single-sourcing display.

Ed Sitarski, software designer of Linx, says, "The most obvious advantage of the graphical interface is that the user has no idea that they're interacting with a linear program. They keep working with the problem as it relates to their demands, capacity contraints, etc. The model is solved automatically."

For example, if you want to expand your distribution to customers in Germany, the graphical user interface allows you to draw lines showing potential shipping routes. Based on data you supply about transportation costs, available resources, and other factors, you can "solve" to determine if it's worth shipping directly to Germany, or if you'd be better off establishing a production plant and a distribution facility for your customers.

With complex models involving sites with multiple inventories, the graphical interface can BLOCK (or summarize) sections of the map to simplify viewing and UNBLOCK other sections for more careful study. Also, pop-up windows allow you to examine specific data directly related to individual components of the map.

Available on HP's 9000/300 Series, Linx interfaces with existing MRP II and DRP systems.

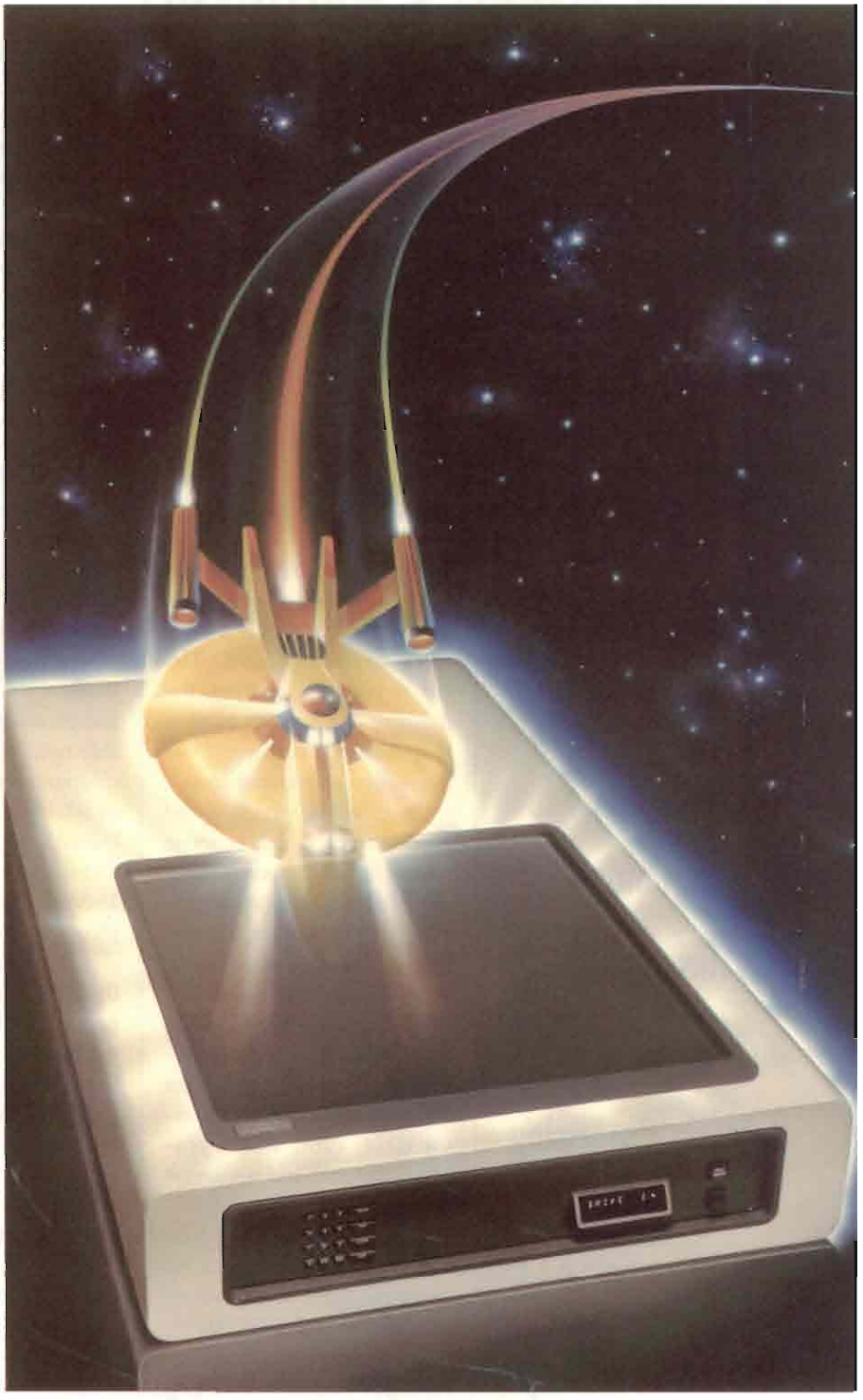
Competition in the '90s will be fierce as the marketplace goes global. Linx can help companies become the preferred supplier in their markets by minimizing manufacturing, inventory and distribution costs. —*Andrea Zavod, Assistant Editor*

Numetrix Inc.
401 Merritt 7
Norwalk, CT 06851
(203) 847-3452

CIRCLE 337 ON READER CARD

Space — It's not endless when it involves your disk resources!

Do you carefully manage disk space usage or do you meet other commitments and just accept the fact that you have to add disk space more often? That's usually the trade-off. That's also what makes SPACECONTROL the best tool to help you manage disk space.



Save Time, Space, and Money

SPACECONTROL eliminates manual disk management chores, shrinks disk storage requirements, and saves time and resources by shortening backups and reducing processing errors. It also provides complete audit trails of disk management activities.

Online Decision Support

With SPACECONTROL, you evaluate disk resources and simulate the effects of space management policies with a unique, easy-to-use, window interface. The flexible reporting facility provides a complete picture of disk and tape usage and provides trend analysis reports to forecast future space requirements.

Online Housekeeping

SPACECONTROL lets you sort and filter by name, size, age, or file code. It also manages spool files. You can include or exclude individual files or entire sets. And, you can trim, compress, back-up, archive, and purge files interactively.

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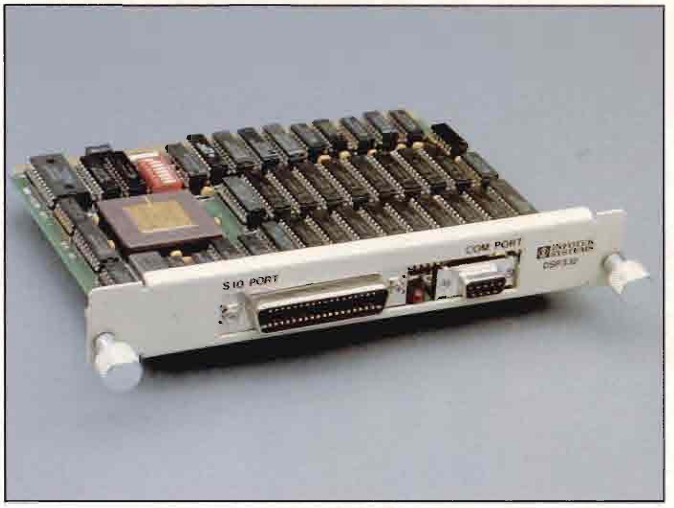
CIRCLE 162 ON READER CARD

When Speed's Required



Infotek's DSP332 Lets Your HP 9000 Workstation Fly Through High-Speed Numeric Processing

Automobile manufacturers and automation specialists know there's one test they can't take for granted. The test is vibration analysis, the measure of vibratory motion that occurs because of the interaction of moving parts.

In this test, pressure and strain gauges, which generate analog signals proportional to the vibration and stress that an object undergoes, are positioned along the object to be analyzed. The signals are then digitized using high-speed analog-to-digital converters. The digital signals are fed to a Digital Signal Processor (DSP) card, which processes the data and displays it in a useful form for analysis.

If you're in the market for a digital signal processor for your HP 9000 workstation, consider Infotek's DSP332.

The Infotek DSP332 Digital Signal Processor is a 32-bit floating-point DSP card for the HP 9000 Series 200/300 workstations. It's suited for applications that require high-speed, high-accuracy numeric processing, such as Fast Fourier Transforms (FFT), windowing, digital filtering, image and signal processing and process control.

The DSP332 utilizes AT&T's WE DSP32C 32-bit floating microprocessor, which is optimized for DSP applications. Operating at up to 7.5 mips and 15 Mflops, it can complete a 1024 point FFT in 4.8 ms.

"The DSP332 is Infotek Systems' next generation of digital signal processor, an easy-to-use product for highly technical applications," said John Morse, president of Infotek Systems. "This specialized coprocessor brings to its users a new level of speed and accuracy at a very reasonable cost."

Extensive I/O facilities are available on board the DSP332, which occupies one I/O slot in the HP 9000 Series 200/300/400 DIO-1 backplane. Internal DMA permits simultaneous operation of the external 20 Mbaud serial port, and the 16-bit bidirectional parallel DIO-1 port allows for maximum throughput. The 16-bit bidirectional latched port is byte- or word-addressable from the HP host computer. All ports can transfer data to on-board RAM via internal WE DSP32C DMA. An additional UART (RS-232) external port is also available.

A software library is provided with the card giving you the most common signal processing applications such as FFT, Inverse FFT, Hamming and Hanning windows, Finite-Impulse and Infinite-Impulse Response filters.

The DSP software library can be downloaded from floppy disk or hard disk for enhanced versatility. The library also contains some self-diagnostic tests. The functions are provided as a set of subroutines that are easily accessed from the HP BASIC operating system or from PASCAL.

The DSP332 has 512 KB of 35ns no-wait-state static RAM for large data sets and program instructions. Because the on-board memory is not preprogrammed with a limited set of functions, the functionality of the card is infinitely extendable to suit custom signal processing applications.

The Infotek DSP332 is priced at $2,900. —*George T. Frueh, Technical Editor*

Editor's Note:
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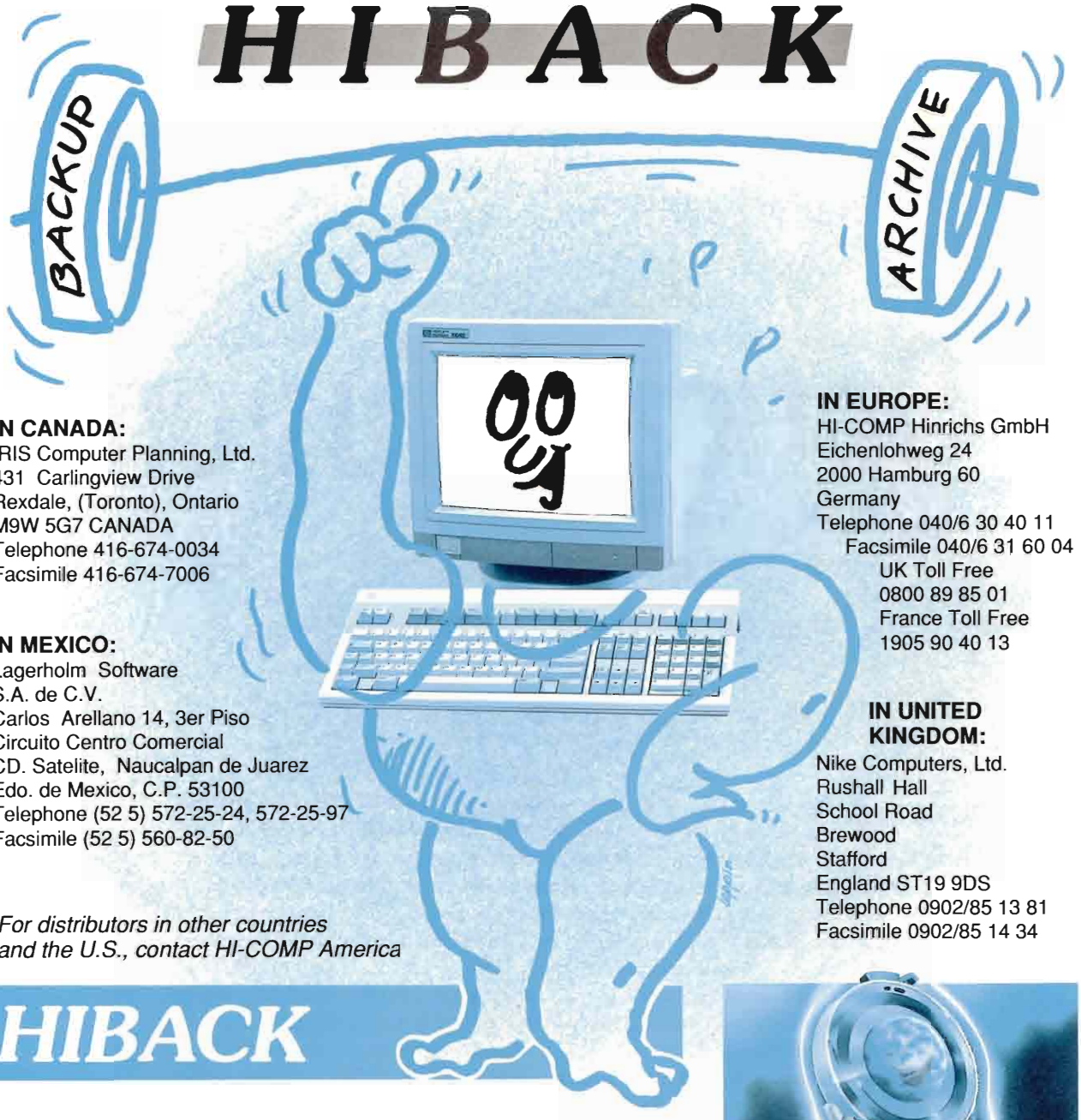

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Optical Infusion

With The Advent Of CD-ROM, Mass Storage Technology Gets A Shot In The Arm

[By Ron Levine]

Throughout the '70s and '80s we saw the power of the "old" mainframes incorporated first into minicomputers and then even into microcomputers. We saw new and ingenious software applications automate tasks we never imagined a computer could do. The introduction of off-the-shelf, store-bought programs made it possible for almost anyone to use computers. But one system component lagged behind this rapid evolution of computer technology—mass storage. It is only now catching up.

A major stumbling block to automating many operations is finally being addressed with the commercial introduction of optical storage devices. Although auxiliary storage has advanced from reel-to-reel tape to hard disk to diskette, then to Winchester disk and now to 8mm and 4mm tape cartridges, the basic technology has remained unchanged — data is still stored in magnetic fields.

Magnetic storage has served us well during the last 25 years, but its limitations have prevented widespread integration of computers in many occupations and work environments. Now, the new optical technology for mass storage and retrieval is gaining acceptance quickly. It offers increased capability, capacity and reliability, and at a cost per storage byte much cheaper than conventional methods.

Optical storage provides the ability to record and retrieve video and audio data with word data. The high-density recording capability of optical devices provides media capacity never before

HP LaserRELEASE, a program for distributing the HP 3000 MPE V operating system and subsystem software, uses CD-ROM instead of magnetic tape as the software distribution media.

imagined, and it's a stable, rugged medium. Optical storage devices, in general, record data on a thin film by burning microscopic holes in the film with a laser. Then data is read by a laser device that records the presence or absence of holes — in a manner similar to the way the old paper tape readers interpreted information. There are three types of optical recording media currently in use: prerecorded, writable and rewritable. Prerecorded optical storage is the most widely used.

CD-ROM

PRERECORDED OPTICAL STORAGE, also known as CD-ROM (compact disk - read only memory), is a distribution media for large, informational databases that don't have to be updated constantly. CD-ROM is also an excellent medium for archival purposes. In addition, its ability to record and play back an integration of video, audio and text makes it a valuable training tool. Hewlett-Packard has, from the inception of CD-ROM technology, led the implementation of products and services that fully realize the medium's potential.

The 4.7-inch optical drive and disk have become the industry standard. Most of these devices store approximately 600 MB of data. Half-height, 5 1/4-inch drives also are available; these fit into a standard-size drive enclosure.

Because the cost to prepare a CD-ROM master has dropped, and the cost to reproduce disk copies is already low, CD-ROM is the most economical optical media for mass distribution of databases.

But superior data handling and recording capability are perhaps the most important advantages of CD-ROM over magnetic media. Text, audio, video and images may be mixed at input, stored and later retrieved together for display or printing. This unique capability makes CD-ROMs ideal for training materials. For instance, HP users previously received several manuals and other documents to support a new system. Now, this entire package is combined onto one CD-ROM disk for field distribution. Verbal instructions and images are also included with the text to facilitate the learning process.

Another advantage of CD-ROM is its huge storage capacity. One compact disk can store an entire encyclopedia set, with text and graphics combined. A typical CD-ROM disk can hold the equivalent of approximately 300,000 typed pages.

These same huge storage capacities make CD-ROMs the

There are important differences between magnetic and optical storage that you need to be aware of when integrating an optical device into your system.

preferred medium for use as visual catalogs in the CAD, CAM and CAE fields. Through such a catalog, a circuit designer, for example, could look up every conceivable component (already in graphic form) that makes up a circuit. And, because CD-ROM is a more cost-effective and convenient means of storing records other than paper, microfilm, or other storage mediums, it can be used by large database users, such as government, medical, legal and financial institutions. Artificial intelligence software, which requires considerable amounts of memory and storage, also could benefit from CD-ROM's capacity.

Another unique feature of optical disk storage is its indestructibility. Compare an optical disk's expected media life of 25 years or more to the average three-to-five year life span of most magnetic media. (The current standard media for archival storage, magnetic tape, not only suffers from magnetic degradation, but also stretches with time.) The recorded data on the optical disk is also more stable. The disk can be dropped, handled freely and, of course, it doesn't have to be kept away from magnetic fields. Like many forms of magnetic media, CD-ROM disks are removable and can be locked up.

Optical vendors also have learned some lessons from past "media wars" that plagued magnetic media. From the beginning, formatting standards, both physical and logical, were developed and widely accepted for CD-ROM. Users can be confident that a CD-ROM drive, a disk and a computer, all from different sources, will "talk" to each other.

What Are The Disadvantages?

THERE ARE IMPORTANT DIFFERENCES between magnetic and optical storage that you need to be aware of when integrating an optical device into your system. File locating, access methods, storage capacity that exceeds many operating system's addressing capabilities, and file management criteria for data sectoring and error handling are some differences.

These disadvantages are overcome via operating system modifications and other programming additions to handle the optical media or by adding controllers and interfaces to integrate the optical units into the system. Today, many plug-and-play units are also available — these allow for the incorporation of optical units into existing systems without reprogramming or hardware reconfiguration.

The most significant disadvantage with respect to magnetic media remains the write-once (prerecording of data) limitation of the media. Once data is recorded on a CD-ROM, it is permanent and cannot be altered or erased. Sometimes, however, this disadvantage can become an advantage through the careful selection of suitable applications (i.e., those for which unalterable data is a plus and not a minus; for example, financial systems that require permanent audit trails).

CD-ROM Breakthroughs

CD PUBLISHER FROM Meridian Data Inc. was perhaps the most influential breakthrough in launching CD-ROM into widespread use in commercial applications. CD Publisher enables you to format data for CD-ROM mastering in-house on a microcomputer (PC). Before its introduction, mainframe-based systems or the services of an outside publisher were the only means available for CD-ROM application development.

Meridian Data followed CD Publisher with its 1988 introduction of CD Net. CD Net enables one or more CD-ROM products to be accessed and shared over a LAN. This means you can distribute CD-ROM-based information to many users without buying a CD-ROM drive for each user. CD Net is compatible for use with Token Ring, Ethernet and ARCNET, and it supports Novell, 3Com, HP's OfficeShare and other network software. Each CD Net unit can integrate up to 14 CD-ROM drives (or 9.3 GB of data) onto the network. Unlimited CD Net units can be placed on a network.

In 1989, the introduction of Meridian Data's CD Professional was another major advance in developing CD-ROM applications at the desktop. Until then, mastering and replicating compact disks was usually performed at outside facilities, with large investments in equipment. CD Professional eliminated the mastering and replicating process by producing an original master disk each time.

With CD Professional, small-scale CD-ROM production can be done in a typical office environment. You can record information on a compact disk without outside services, at a fraction of the cost of employing a mastering facility. CD Professional can copy approximately 5,000 pages or 10 MB of data per minute onto a compact disk, at a cost of less than 10 cents per MB. This in-

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house desktop system maintains the CD-ROM publishing process in a controlled environment, an important consideration for government agencies and some corporations.

This year, Meridian Data unveiled a PC-based system that enables you to create a multimedia CD-ROM application. Named VR Producer, it allows text, graphics, and still-image video information to be interleaved with audio information for real-time, simultaneous playback.

Prior to the introduction of VR Producer, a multimedia developer had to make a master (physical) compact disk in order to test this type of application. With VR Producer, the different types of interleaved information are treated as if the data already resides on a compact disk; the developer can test the multimedia application in house, refine it, and keep repeating the process until the application meets the established requirements before actually committing it to disk.

"When CD-ROM technology was introduced in 1985, the CD-ROM publishing process required the power of a mainframe computer, which made the process very expensive," notes Frederick Meyer, president of Meridian Data. This barrier has been broken with the introduction of PC-based development tools. Today, more than 70 percent of all CD-ROM applications are prepared on Meridian Data systems, adds Meyer.

HP CD-ROM Implementations

ACCORDING TO DOUG ILES of Hewlett-Packard's Product Development and Application Support Division, the initial research and development of CD-ROM products at HP was fueled by customer satisfaction surveys. HP's research labs, which look at new technologies, investigated CD-ROM offerings as a response to customer comments about the quality of HP's documentation. With more than 50 divisions, HP struggled to eliminate inconsistencies in format and presentation. This process sometimes caused delays in publication and impaired the user's ability to locate information quickly.

CD-ROM offered an effective solution to the problem. Since 1987, when HP introduced its first CD-ROM-based service as an alternative method for distributing information to the field, it has grown considerably. Initially, CD-ROM distribution served only as a supplement to paper, at an additional charge. Today, many customers are replacing paper documents with CD-ROMs. Currently, more than 400 HP manuals per month are shipped on CD-ROM.

As of April 1990, technical users manuals, software-status bulletins, application notes, operating-system software and subsystem software could be ordered on CD-ROM, as a standard service, in place of paper documentation and magnetic tape. Users receiving new or updated software and documentation on CD-ROM are charged lower subscription rates than those requesting paper documents.

Support materials available on CD-ROM are related to the operation of HP minicomputers and workstations operating in the MPE V, MPE XL and HP-UX environments. Using support information stored on CD-ROM, the customer instantly can locate specific information instead of having to flip through many pages of printed documentation. With software distribution on CD-ROM, users can reduce a software installation by two to six hours.

[HEWLETT-PACKARD CD ROM PRODUCTS]

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■ ***HP LaserRX, LaserRX/XL and LaserRX/UX*** — The industry's first performance management tools that operate on a personal computer using a CD-ROM drive. HP's LaserRX products allow you to collect and examine system information. You can then use this information to manage system resources, as well as to maintain and improve system performance. HP LaserRX monitors HP 3000 MPE V systems, HP LaserRX/XL does the same for Precision Architecture MPE XL systems, and HP LaserRX/UX performs system management for HP 9000 Series 300/800 systems running HP-UX 7.0.

■ ***HP LaserLAN*** — This product enables up to eight users to access any of HP's CD-ROM information products from a LAN. It operates on a MS NET or HP OfficeShare network.

■ ***HP LaserRELEASE*** — This is the CD-ROM distribution of the HP 3000 MPE V operating system and subsystem software.

■ ***HP Series 6100 Model 600/A Drive*** — This CD-ROM drive can be connected directly to HP-IB systems without a special controller card. Previous drives required either a controller board or a SCSI interface.

■ ***HP Multimedia CBT with Audio*** — CD-ROM computer-based, self-paced training (CBT) courses that integrate audio, graphics and text. Three interactive training courses cover operational information for the HP 3000 Model 900 business computer. Courses include: Account Management; Storing and Restoring Files, System Backup; and System Startup, Shutdown and Recovery.

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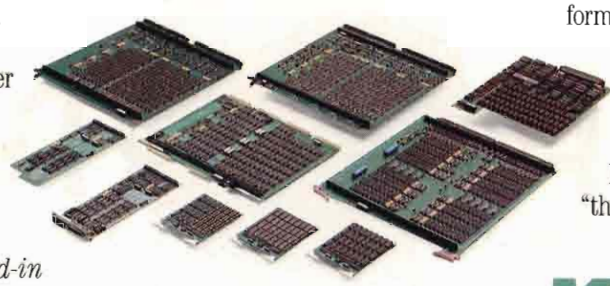

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However, keeping up with this flow of information, and making sense of it, has become a full-time job. Most of us no longer have the luxury of evaluating source data to reach decisions: We are dependent on summaries and extracts made by others who may have different views and priorities.

Companies are beginning to turn to computers to help manage this intimidating influx of information, and several exciting technologies are becoming available to help capture and organize this information flow.

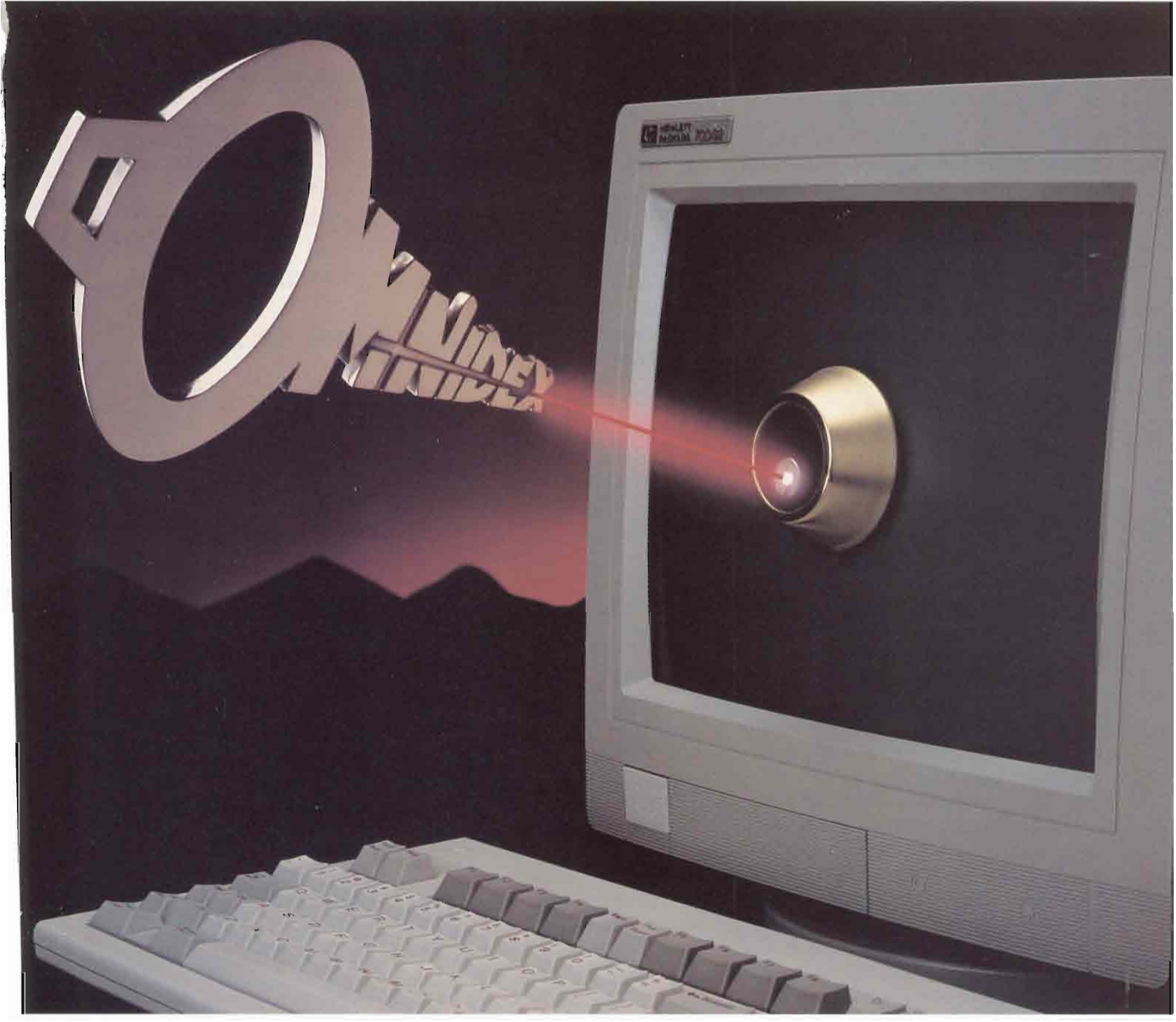
Ever since computers were used to store data, we've been looking for better and faster ways to retrieve data. Early databases consisted of flat files that contained a row, or record, of data for each entry. If there were five people in a customer file from the same company, all the information about the company was maintained in each person's record. Unfortunately, free-form text didn't work very well. The problem is that text files aren't organized into records, and there are no easily identified fields.

[BY MILES B. KEHOE]

Database management systems (DBMSs), such as HP's IMAGE, became popular because they allowed common fields to be maintained in separate files, or "data sets," linked to the unique data. Thus, the company information could be stored in a single "master" data set, and each person's "detail" record would contain only a reference to the company record in the "master" data set.

This method allowed for more efficient use of disk space and reduced errors, because a change in company information could be made in the master data set without changing the detail customer records. Free-form text retrieval didn't fit well in this model, either.

In real life, there are often complex inter-relationships between a number of elements of a database, and the duality of the master-detail data set became too limiting. At this point, "relational" database systems became popular because they allowed for flexible inter-relationships to exist between several different elements of data. At the same time, there was a move to standardization in the retrieval lan-



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guage, and led by IBM, SQL became the common way to retrieve data.

Relational SQL DBMSs, like HP-SQL, remain popular because they allow businesses to store and retrieve data with great flexibility. However, like the earlier generations of databases, the utility of relational databases is still limited to structured data, like customer or financial data. Relational databases don't lend themselves to storage or retrieval of free-form textual data, which is vitally important in the real world of information gathering.

Text Retrieval

BECAUSE CONVENTIONAL DATABASE systems were poorly suited to the storage and retrieval of textual data, software experts have searched for years for a way to handle free-form text more efficiently.

The first generation of retrieval software was based on keyword technology, which allowed users to retrieve documents based on the occurrence of a word specified by the user.

Typically, this method required the author of a document to provide a list of keywords that described the subject of the document. Then, when someone wants to search for all documents, he must provide a keyword. Any document marked with the requested keyword is presented.

The biggest problem with keyword retrieval is that the author and user may not agree on the list of keywords that should be associated with a particular document. Furthermore, different authors may select different keywords for the same article, or one author may choose different keywords at different times.

In addition, because language is often vague, words become ambiguous when taken out of context. A retrieval on the keyword "terminal", for example, could find documents on computers, as well as airports and train stations.

Boolean Retrievals

KEYWORD TECHNOLOGY JUST wasn't good enough, and soon technology based on Boolean retrievals became available. Boolean technology expands on keyword retrieval in that the user can enter a list of keywords and a limited set of relationships between the words.

The term "Boolean" originates from mathematician George Boole who described a logic system based on the operators AND, OR and NOT. Boolean retrieval technology allows you to specify these operators in their keyword retrieval requests.

Hence, you could execute a simple retrieval request such as: "computer" and "terminal". Boolean systems often rely on a list of words from the documents that's built in advance. This allows you to specify Boolean phrases to provide more accurate retrievals than with single keywords alone. It also eliminates the problems that ensue when the author of the document also provides the list of keywords.

The biggest problem with keyword retrieval is that the author and user may not agree on the list of keywords.

Also, Boolean systems often allow "proximity" related searches. You can retrieve documents where words are specified side-by-side — such as the phrase "computer terminal".

Other proximity operators allow you to retrieve documents where two or more words appear in the same sentence or paragraph — for instance, a sentence containing the words "computer" and "terminal".

The problem with Boolean retrieval systems is that requests can become complex very quickly, and you may retrieve documents that are only of marginal interest. Consider the inquiry that might be used to search for all documents about laser printers:

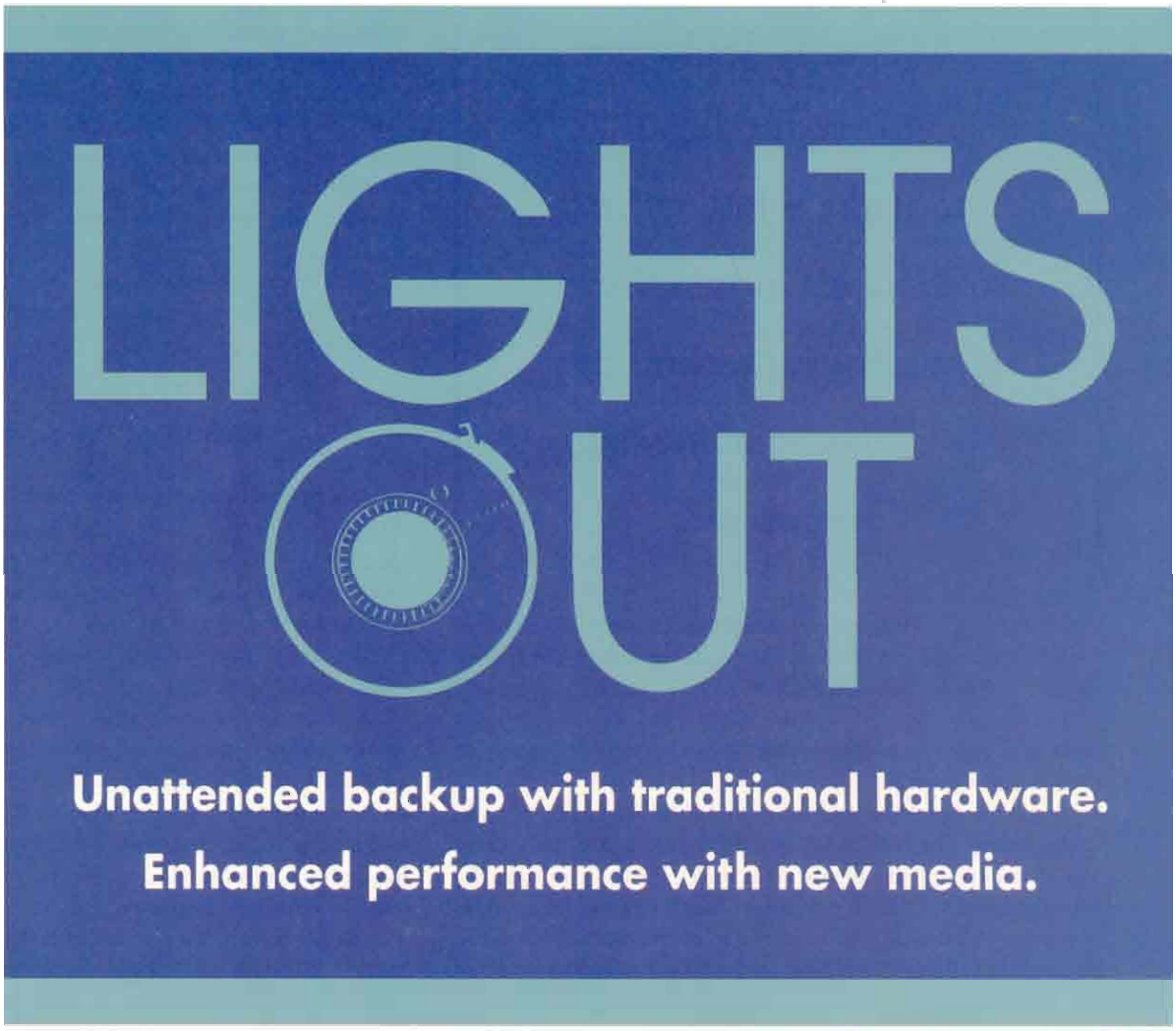
```
( ("laser" and "printer") or ("laserjet") or ("laserwriter")
or ("HP" or (phrase("Hewlett Packard") and ("printer")))
or ("Apple" or (phrase("Apple Computer") and ("printer"))) )
```

And, if you find this confusing, understand that this request is far from complete.

Perhaps one of the biggest problems with retrieval technology is the error of missing relevant documents, and Boolean technology is vulnerable to this error. As a search becomes more complex, the likelihood of missing related documents grows. A misplaced parenthesis can cause an entire range of documents to be ignored, even though the user thinks they are included. The potential for compounded errors here is obvious.

The Statistical Approach

THE STATISTICAL SYSTEMS approach attempts to improve the reliability of retrievals through statistical algorithms embedded in the program. One assumption of statistical retrieval systems is that the documents in which the specified keywords appear most frequently are the most important documents on that topic. Another assumption is that



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As companies begin to see the need to make white collar professionals more efficient, text retrieval technology will become increasingly important.

words that appear together frequently are in some way related.

Unfortunately, statistical systems are typically fixed by design. The results produced can't be influenced by your understanding of the subject or of the retrieval system. If a particular query produces undesired results, there's no way to modify the algorithms.

Statistical algorithms often are biased by frequency as well. A document that continually repeats a phrase will rank above one that contains the phrase only once, although in fact, the former document may not be as important to the user as the latter. Statistical retrievals are better than pure Boolean or keyword retrieval, but lack the precision necessary to be of real use.

Concept Retrieval

ONE OF THE NEW TECHNOLOGIES available to solve the problems of Boolean and statistical retrieval systems is called *concept retrieval*. It combines elements of keyword and Boolean retrieval with the ability to define complex inter-relationships between words and phrases, and to specify weights, or "relevance rankings," to these relationships.

When you retrieve documents based on these weighted relationships, they are presented in order of relevance to the query, not in the order the documents were stored.

Concept retrieval is a first step toward the use of artificial intelligence in retrieval, because an expert in a particular field can define the relationships used to search documents on that subject. A novice can use the definitions to perform specific retrievals, and then scan the documents in order of relevance. The frequency with which a key phrase appears does not determine a document's relevance.

Software that implements just such a retrieval system exists today. Using such a system, an expert can predefine the topic "HP printers" and specify weights and relationships between the individual words. For example, the appearance of the words "HP" and "LaserJet" in the same sentence could be taken to indicate the relevance of a document. Documents that include this combination could be considered more relevant than those in which the words "laser" and "printer" most often appear separately.

With relevance-ranked retrieval, a novice can perform retrievals with the expertise of the person who created the retrieval topics.

Additional Retrieval Needs

IN ADDITION TO SIMPLY RETRIEVING relevant documents, new technologies also permit some things that users are just beginning to need. Often text documents are related to other documents. The phrase "hypertext" has been used to describe the ability to create instant links from words or phrases in one document to a related document with minimal effort on the part of the user.

When a user retrieves a document and finds a reference to another subject, the technology will support the ability to immediately jump to that related document. For example, browsing through an article about HP printers, you may want to jump to other documents about Hewlett-Packard. This hypertext capability will become increasingly a part of text retrieval software in the future.

Textual data is often accompanied by figures or tables that may be graphical or pictorial. Furthermore, text exists in several formats. For example, a single company may use WordPerfect for legal documents, Microsoft Word for internal memos, and ASCII text files for electronic mail storage. A text retrieval software package should be able to deal with all this data with minimum effort on the user's part.

As companies begin to see the need to make white collar professionals more efficient, text retrieval technology will become increasingly important. In the future, companies will want to integrate all their text and graphic information, as well as information from external wire services and sources, into a single text retrieval system.

Knowledge needs to be shared throughout an organization in order for people to make effective decisions based on relevant information. The ability to distinguish what is relevant can make the difference between a great decision and a poor one. And, in the future there may not be room for companies that can't make the right choices. —*Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.*

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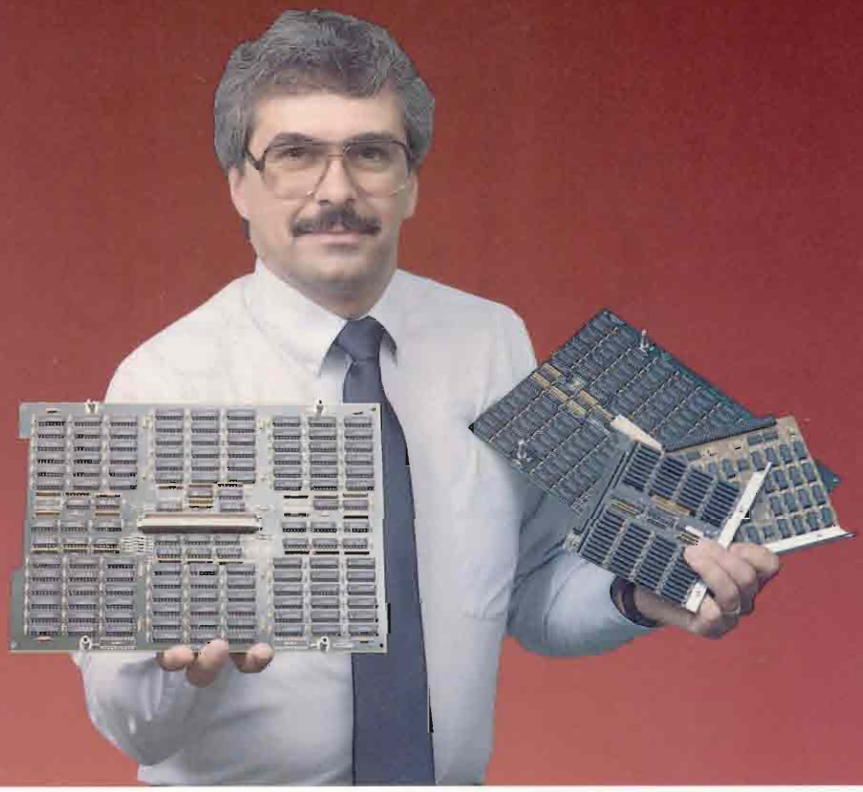

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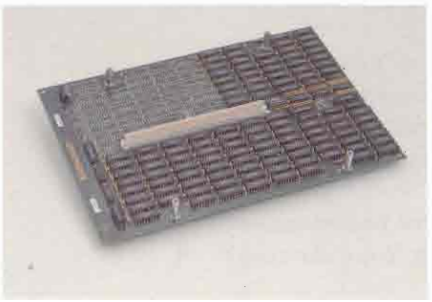

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Tips For Managing Your Software Development And Maintenance Life Cycle

Change ... *for the* ... Better

[By Betsy Leight]

Much of the emphasis on change control in MIS departments has been initiated by concerns over the risks of computer fraud, malicious destruction of programs and data, and issues related to the reliability of audited financial data. However, good change control can do much more; it can minimize bugs and other production errors and maximize the productivity of MIS staff. It's worth your while to take a look at the errors commonly caused by poor change control. From these simple mistakes, you may discover advanced change control procedures that enhance your work environment and prevent major errors in the future.

In my experience working with numerous MIS departments, more than 50 percent of production problems are caused not by logic errors, but by various types of version control mistakes. The effects of these errors range from annoyance to catastrophe. Nearly all could be avoided by effective change control. Here are a few examples of common version control mistakes.

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of the production source code, fix the bug, test quickly, and move the new object code into production. Users are elated. Two hours later your manager walks into your office. Your fix works fine, but the enhancement you implemented last month is gone. Apparently, you forgot to move the source code back last month along with the new object code when you implemented that change.

Next, you're assigned to make an enhancement to the inventory valuation system. Your shop allows unrestricted access to source code but programmers customarily make a backup copy of any source program before changing it. You make the backup copy and begin work. Suddenly, you're called into an emergency meeting and asked to drop everything and work on a change to the general ledger interface, which has to be completed before year-end, which just happens to be next week.

Working under pressure, you become engrossed in the GL change and forget about your half-made changes to the inventory programs. Meanwhile, an inventory valuation bug pops up, and another programmer is assigned to fix the program you had started to change. He backs up the source program, fixes the bug, compiles, tests, and moves your partially completed, untested changes into production. Before the problem can be detected, numerous database records are updated incorrectly.

In another scenario, a programmer, John, is assigned to make a major change to a group of programs. He makes copies of all of them in his work group and begins work. Ten days later, a bug is discovered in one of the programs. A second programmer, Jean, is assigned to fix the bug. Jean, not realizing that John already is working on the program, makes her own copy, fixes the bug, tests the fix, and moves the program into production. John completes his major project several weeks later. He tests thoroughly, then moves the programs into production after coordinating database changes and production schedules. His enhancement works beautifully, but the bug Jean fixed is back.

Basic Change Control

THESE SCENARIOS ARE ALL examples of simple version control problems. More complex situations exist, such as the requirement to maintain multiple versions concurrently or to maintain local changes to third-party software, but the majority of version control problems result from understandable human errors. They can be avoided by implementing a basic change control procedure.

Basic change control begins with some fundamental rules.

■ ***Rule No. 1***: Production source code should be kept separate from test source code, and programmers shouldn't have the access to change it except through a controlled process.

As basic as this idea is, a substantial number of MIS departments, some of them quite large, don't follow it. Many others provide for the separation, but don't enforce it by restricting access, e.g., programmers have AM capability in the account where the production source code is kept. This simple control will prevent the situation found in the second example because the original source code is never overwritten. The second programmer would have to make his own copy of the source code from the original. Of course, you must be careful because this procedure could still result in concurrent update problems, because both programmers are working on the same file.

Production source code should be kept separate from test source code, and programmers shouldn't have the access to change it except through a controlled process.

The most common approach for keeping production and test files separate is called a "checkout-checkin" procedure. In the "checkout" phase, the programmer makes a copy of the production source code in a test location, usually a separate account. After making changes and testing, the changed files are moved back into the production location, replacing the original source code. The procedure is enforced by restricting programmers to read-only access to the production library. Someone other than the programmers typically performs the "checkin" or move-to-production step (see *Figure 1*).

■ ***Rule No. 2***: Establish a mechanism to prevent concurrent update by two or more programmers.

In many small shops, concurrent update is unlikely simply because each application is assigned to a single programmer. However, in any environment where there is a potential for two people to be working on the same program, it's a very real problem. It can produce some of the most insidious bugs.

The most obvious way to prevent concurrent update is to establish some type of record of files checked out that gets reviewed prior to each checkout operation. Although this can be done manually, it's labor-intensive and error-prone, and therefore a candidate for automation. Some shops establish a physical documentation checkout in parallel with the files. The programmer simply signs out a program documentation binder before moving any files. If the binder for a program isn't on the shelf, the programmer knows that the program must be out.

A third, more automated approach is to rename the files immediately after checkout, so that a subsequent attempt to copy

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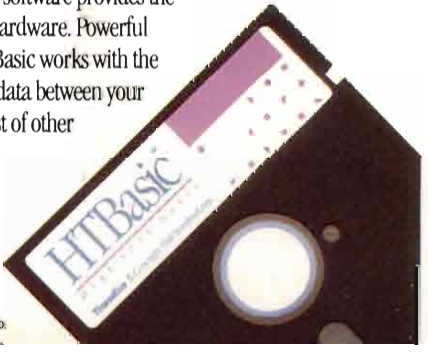

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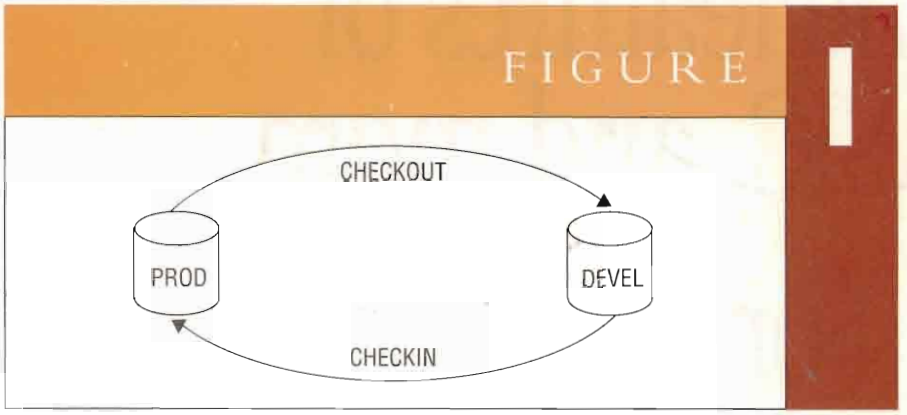
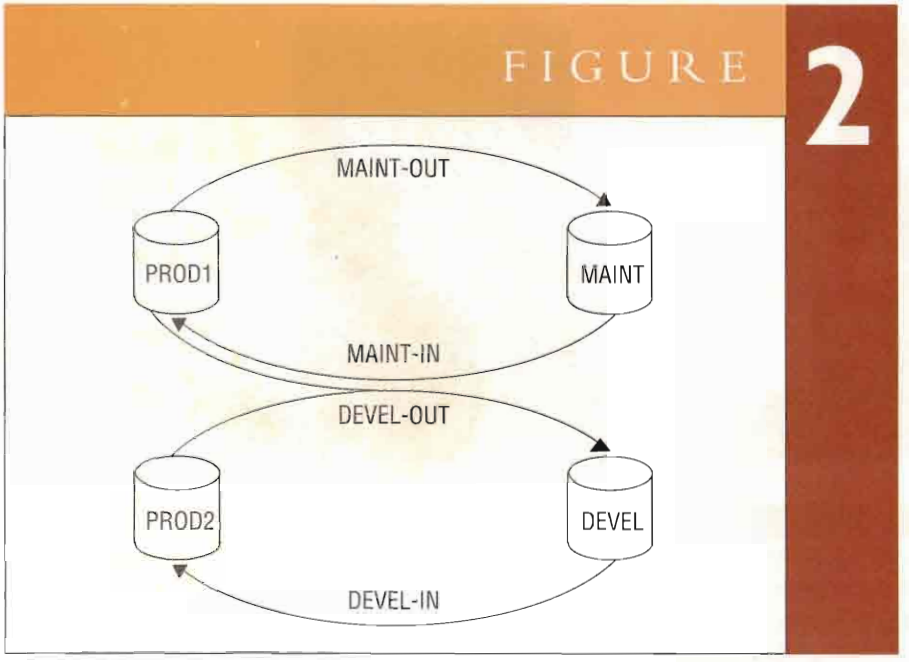
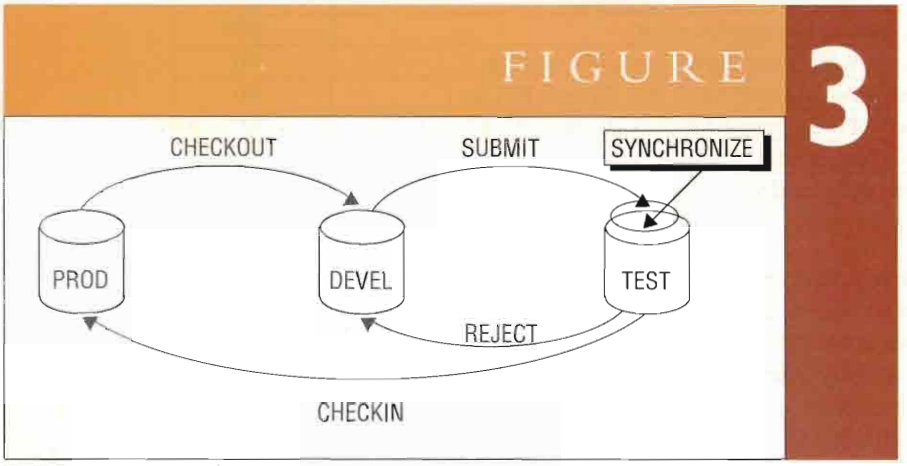


Checkout-Checkin Process.



Concurrent Maintenance and Development.



Secure Test Area with Source-Object Synchronization.

them will fail, resulting in a non-existent file error. This approach is simple and efficient, but it has three drawbacks: The person doing the check out has to have write and save access to the production file in order to rename it; there's no way to find out who has the file if it's checked out; and the file isn't found if you try to access it for any other reason, which can be particularly troublesome for mass moves.

Finally, many shops prevent concurrent update simply by specifying the location in which development copies will reside and preventing overwrite through access restrictions or lockwords. If you go to check out a file and there's already a copy in the development location, you know the file is in use.

■ ***Rule No. 3***: Keep your development area free of old copies of programs.

There are several ways to accomplish this, but diligently limiting the source files in your development group to those being worked on is a good start. This method could have prevented the failure to update the production source code in the first scenario and, more than likely, avoided the inadvertent transfer of the partially corrected file in the second example. If it's exceptional for source program copies to reside in development groups, a neglected source program will stick out like a sore thumb when you do a LISTF.

■ ***Rule No. 4***: Always make a backup copy of old software files before moving the new files to production. Use job streams or a software utility to reduce the opportunity for human error in this process.

A "skeleton" job stream can be used to make sure that the old files are renamed or copied to another group and that the files all are moved into production. Various techniques can be used to set a "flag" if any part of the move is unsuccessful. The job stream also can be set up to purge the files from the test area after a successful copy. This will help you to accomplish Rule No. 2. It might be worthwhile to write a simple utility to rename, copy and purge a list of files. Commercial software also is available to do this.

■ ***Rule No. 5***: Don't rely on memory to identify programs affected by changes to

database structure or common code. Use a scan utility or maintain a "where-used" cross-reference.

Several utilities are commercially available for searching groups of files for a particular character string such as a dataset, item or called routine name. These utilities are easy to use and take the guesswork out of identifying the programs affected by a change to common code. As an alternative, you can maintain a manual or automated cross-reference of programs and common code used.

Advanced Change Control Techniques

ALTHOUGH MOST SHOPS will never have the challenge of maintaining multiple concurrent versions that software vendors do, MIS departments are routinely called upon to make major, long-term enhancements to applications while still maintaining the current, production system. Invariably, this raises the sticky issues of how to keep the development versions separate from the maintenance ones and how to make sure the bug fixes and other maintenance changes made to the production system are integrated into the new version.

The first step in dealing with concurrent maintenance and development is to provide completely separate work areas for the two activities. Although it may be tempting to avoid the overhead and inconvenience of working in separate accounts or groups, it's too easy to make mistakes when working with two or more files with the same or similar names in the same work area.

There are two workable approaches to forward integration of maintenance changes. One is to integrate each maintenance change into the development version immediately as soon as it's completed. This requires diligence on the part of the maintenance programmers, perhaps an additional check during the move-to-production process, and a good task list for the developers. The other approach is to make the copies for the development project at one time, take a "snapshot" backup of the source library at that time, then keep track of which programs have had maintenance changes since the backup. Later in the project, use either maintenance log or a source comparison utility to identify the code changes that have to be integrated (see *Figure 2*).

Another common, but complex, situation arises when a business makes local modifications to a software package, then has to integrate those changes each time the vendor sends out a new release. Here again, the key to managing the situation lies in keeping the modified source code separate from the original vendor source. The best technique for doing this is to use the MPE

accounting structure by setting up a separate group for the modified source code. If the vendor's software account is divided into groups by file type, it may be simpler to set up an entire new account for the modified files, with corresponding groups.

Once this structure is set up, a procedure must be established to check out files for modification from the custom group or account—if they exist there—or from the vendor original source code if a customized version does not exist. When the changes are complete and tested, all source files are moved to the custom "library." Object code, of course, is moved to the location containing the executable code for the application. Most shops don't find it necessary to retain a copy of the vendor's unmodified object code.

The true test of this procedure comes when you receive a new release from the vendor and are faced with the task of integrating your modifications into the new source code. With the modified source code in a separate group or account, identifying the programs that must be changed is easy. But determining what modifications must be made isn't as simple. One efficient way to do this is to use a source comparison utility. Several are commercially available. The comparison utility can be used to isolate your changes to the old source. These changes can then be applied manually, or in some cases automatically, to the new source. The modified code can then be compiled, tested, and moved to the modified source library.

Without a comparison utility, the best way to accomplish merging of your changes with the new source code is to adhere strictly to documentation standards when making any changes to the vendor code. Deleted lines should be commented out rather than removed from the program. Changed and added lines should be clearly documented with a recognizable indicator in a particular column. If all changes are marked with a consistent indicator in the comments, a scan utility can be used to quickly list the changed lines, reducing effort and the risk of overlooking changes.

Source-Object Synchronization

SOURCE-OBJECT SYNCHRONIZATION means ensuring that your production object code was in fact generated by compiling your production source code. Source-object synchronization, combined with a good checkout-checkin procedure will prevent unpleasant surprises such as those described earlier.

The most common method of ensuring source-object syn-

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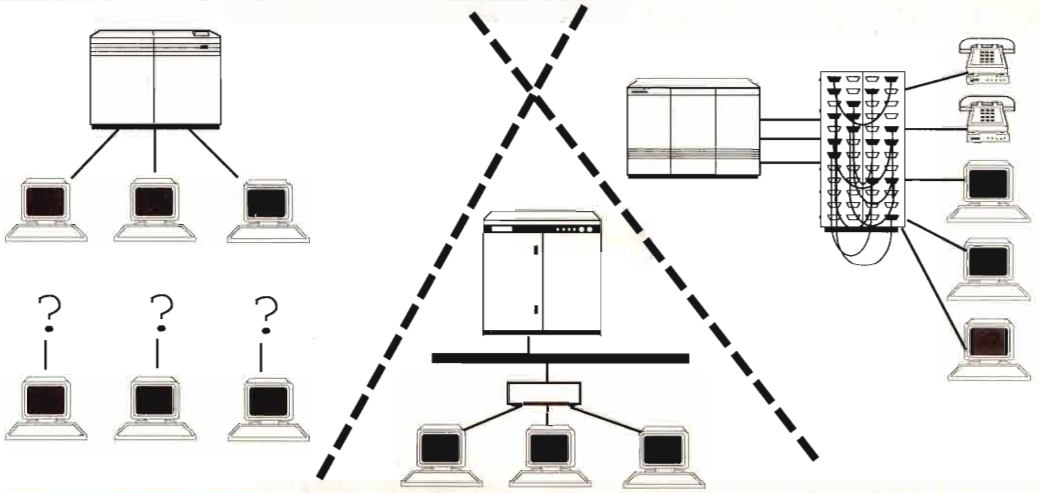

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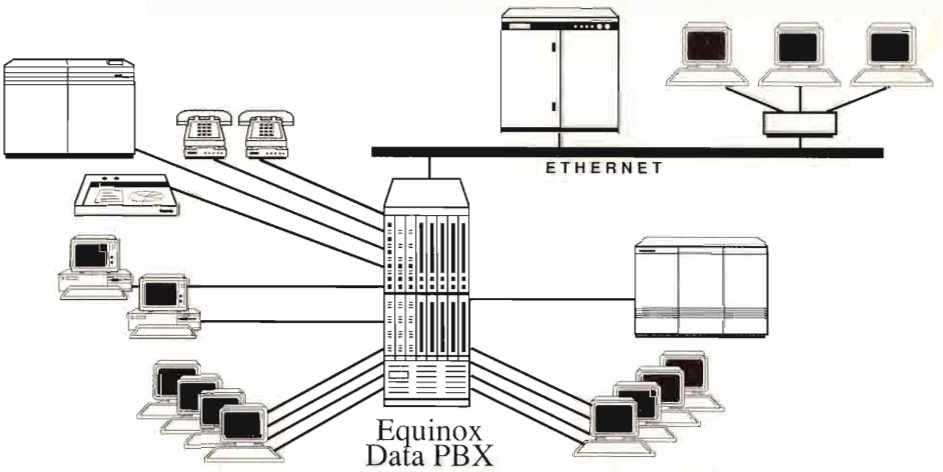

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With the timestamp approach, the source and object code can be compared to determine whether they are synchronized, rather than recompiled to force synchronization.

chronization is by recompiling the source code in a controlled location. Frequently this redundant compile is performed in the production location after checking in the changed source code. In many cases, the changed object code isn't checked in at all. Rather, the old object code is replaced in the execution location by the recompile. The major drawback of recompiling in the production library is that you run the risk of putting untested object code into production. Testing is done in the development location on object code that was compiled there, but this carefully-tested code is then overwritten with potentially different object code by the redundant compile.

A preferred method is to perform the redundant compile in a secured test area, prior to final testing. It's important that the area be secured, so that additional changes can't be made to the source code after the compile, putting it out of synch with respect to the object. With this approach, it's critical that the source and object be moved together into production. This can be done procedurally, or by software that moves both files with a single operation and moves neither if one can't be moved for some reason (see *Figure 3*).

Another approach is to mark files with a timestamp or version number to indicate synchronization. With this approach, the source and object code can be compared to determine whether they are synchronized, rather than recompiled to force synchronization.

The problem with this approach is that it isn't 100 percent reliable unless the version number or timestamp is placed on the file by the compiling process and stays with the file forever. A version number can be placed in the source code and compiled into the object, but changing the version number is usually a manual effort and can be overlooked. Timestamps can be synchronized by compiling and then moving the files together into the secured test area. Timestamp synchronization can be checked again before moving the tested source and object code together into production.

Another alternative is to use a MAKE utility. MAKE utilities are common in the UNIX environment and are rapidly becoming popular on other platforms. MAKE utilities use file modification timestamps to identify object code that's out of date with respect to its source code, i.e., the source code has a later modification timestamp than the object code, indicating that the object code must be rebuilt to preserve synchronization. MAKE utilities provide for the definition of a hierarchy of "objects" so that you can synchronize not only with respect to source code but with respect to RLs, USLs, and source INCLUDE modules in complex applications. MAKE utilities also allow you to define rebuild rules to reconstruct the object from its components in an efficient manner, rebuilding only the intermediate components that are out of date with respect to their dependencies.

Because MAKE will identify objects that are out of synch, it's useful to run it against the production library on a regular basis. To avoid the trap of putting untested object code into production this way, the rebuild rules should be set up to compile into a Q/A location for testing rather than directly into the production object location. You should note, however, that MAKE will identify only situations where the object timestamp is earlier than that of the source. If you move your object into production and leave the source behind (or purge it accidentally), MAKE won't detect this condition.

Managing Common Code

VERSION CONTROL FOR source programs and their related object files is relatively straightforward if you follow a structured, well-controlled change procedure. But managing versions of copylibs, source INCLUDE files, USLs, RLs, SLs and XLs is much more complicated. If a copylib or INCLUDE file is changed, what source programs have to be modified, or at least recompiled? If a USL is changed, what object code must be rebuilt? If an SL or XL routine changes, what programs may have been changed?

The simplest approach for identifying programs affected by a change to a copylib, INCLUDE file or callable routine is to use a scan utility. Several are available commercially (and there's at least one in the contributed library). A scan utility is used to search through a group of files for occurrences of a particular string, which might be a copybook or INCLUDE name or the name of a called external (SL or XL) routine. The more sophisticated scan utilities can search for several strings in one pass and use wildcard or "metacharacter" search strings.

There are also commercial software packages that maintain a cross-reference index of dataset and data item names, copylibs, INCLUDES, called routines, etc., specifically for this purpose. Alternatively, you can maintain your own simple cross-reference database, perhaps on a PC. Any of these approaches can prevent

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unpleasant surprises that result from neglecting to change all the programs affected by a database or common routine change.

To identify object code that must be rebuilt because of source INCLUDE, USL or RL changes, a MAKE facility is ideal. A MAKE facility also can do the segmentation for you to rebuild the object, based on your generic rules or rules specific to this program. A "low tech" but effective alternative is to maintain a rebuild jobstream for each executable file. These job streams can be scanned for the name of the RL or USL that has been changed. Those that match can then be streamed.

In addition to these issues, there are "mechanics" problems, such as how to compile programs that use copylibs and INCLUDES in a test area. Should you check out the copylib and INCLUDE files along with the source code? If one INCLUDE file is changed, how do you ensure that you'll compile with this changed INCLUDE file but use the production version of all others?

First, many companies have found that INCLUDE files offer much greater flexibility than copylibs in managing common source code. Because each common source module is a separate file, the specific module can be checked out to make a change without tying up the entire set of common code. Moving a single INCLUDE is also much faster than moving a several-thousand-line KSAM copylib.

It's most efficient to check out only INCLUDE files that are being changed, so compiling source in a test area by pulling in INCLUDES from the production library is desirable. Read access to the production library from the development area is therefore required. Rather than having to code file equations for every INCLUDE that isn't being changed, you may wish to fully qualify INCLUDE files in the source so that they point to the production library by default. That way they have to be equated only for those that are being changed. This approach introduces some inflexibility, but a scan-and-replace utility can make short work of any mass changes that may be required.

Basic change control procedures can prevent a significant percentage of production failures. They should be part of every MIS department's operation. Change control doesn't have to be elaborate or cumbersome to be effective. Generally, larger shops require more sophisticated change control, but other factors are just as important. Shops with special requirements, such as maintaining local customization of supported vendor software, can benefit from more sophisticated change control techniques. Automation can improve the efficiency and reliability of change controls. Whether you take advantage of commercial software packages or develop your own utilities should depend on your specific needs and resources.—*Betsy Leight is executive vice president of Operation Control Systems, Palo Alto, CA.*

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THE TRIAL RUN

Beta Sites Give Vendors And Software Developers A Head Start On New Products

DEVELOPMENT

Bill Sharp

There was a time when developing hardware that employed the latest high-speed, whiz-bang, semicoherent technology was all a vendor had to do. Those days are gone. Now, computer makers still have to do all that great techno-babble stuff, but they have to have software, too—real, functioning application software, available right away and running smoothly.

Computer manufacturers gradually have caught on to this clever concept and now help to ensure that the software users need is ready to use when the product is introduced.

Preparing software this early requires extraordinary cooperation on the part of the computer maker and the software developer. The hardware people have to tell the software people what they're doing far in advance and in great detail. Then they have to allow the software vendors to test the hardware with the software they've developed for it. For important software vendors, this may need to happen months in advance of the hardware's introduction.

In addition to working with software developers, computer makers have to give very large customers an advance peek as well. If a company might buy hundreds of new workstations in a year, it's a sound investment of time and effort to make certain it's happy with the new model.

HP's programs to give companies access to new computer models before introduction have cute names like Early Bird, Beta Site and Seed. But regardless of the name, they all seek to give HP an edge in pleasing the company involved in the agreement. And, they also give that firm the attention and assistance it needs to sell HP products that can be linked to its software or hardware, or to purchase large numbers of the new computers.

Mentor Graphics (Beaverton, OR), was one of the first companies to form an OEM relationship with Apollo. The first such agreement between the two was signed in 1982, and Mentor's electronic design software has been sold on Apollo workstations ever since. Farrokh Irani, HP's systems product manager for Mentor, says the relationship developed into a close and effective one that successfully moved over to HP/Apollo when the two workstation efforts merged.

"We work on all kinds of different things with HP," he says. "I view the Beta program as a chance for a customer to evaluate, to get an early view of a new product that might be of interest to us and to our customers."

SAS Institute (Carey, N.C.), is a beta site of a different stripe. SAS develops commercial software for a large number of computer systems, including IBM mainframes. Since 1983, SAS has used a fair-sized fleet of Apollo workstations for the CASE portion of its product development.

A close relationship between the two companies is the primary reason why the development labs at SAS sprouted Apollo systems, says Andy Betancourt, workstation marketing manager for SAS. Betancourt calls HP/Apollo, "One of the more supportive vendors. They really do support both hardware and software and understand the software development work that we have to do." He also notes that the high quality of the relationship has endured the switch from Apollo to HP/Apollo.

"I can't say enough about how they support the vendor," he adds. "I'd have to give HP a top ranking. That's an observation that we have drawn from very early on. It's sometimes a drawback that HP is a company of engineers, but they understand our engineering problems very well."

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Irani at Mentor also commends HP's strong commitment to its customers. Since Mentor announced its port to Sun workstations early this year, "The relationship with HP has strengthened," he says. "HP is trying harder to serve Mentor's needs, and we appreciate all the hard work. They realize they have to work harder, and I think HP is up to it."

Beta Site Startup

Effective beta site relationships benefit both the product vendor and the reseller or volume customer. When in the natural world similar relationships are formed between plants or animals, biologists call them "symbiotic," but competitive-minded businessmen prefer the label "win-win" for human versions of such arrangements. Whatever name you use, it's supposed to be a good deal for all concerned. However, a word to the wise: Caution is always advisable when entering a new relationship.

SAS's Betancourt agrees. Typically, he says, hardware vendors approach SAS proposing that SAS port its software to their computer platform. "But before we even want to see the computer," he says, "there has to be a good business reason for doing it.

"Is the amount of effort that we have to expend to take the software to that architecture going to pay off? How soon? Those are the questions that have to be weighed in such a decision. Once that's determined, there's a technical exchange where they send technical people and engineers here to try and give us a good overview of their product."

Beta Testing

Irani says Mentor's process is similar. He sends a request for a specific number of units to HP, specifying the duration of the beta site loan, and submits that to the local HP sales office in Wilsonville, OR. "HP's people are out here at our loading dock when the products roll in," he says. "HP engineers help install the new products in our laboratory, checking systems and setting up the manuals."

Then Mentor's engineers and service people have their crack at the systems, running software tests, checking configurations and testing peripherals. "Basically, we make sure the product is going to work with our applications and check the performance levels," he says. "There might be some mechanical flaws. Locations of switches may be odd, or we may notice a problem with the display monitor. We make up our reports and present them to HP. More often than not, HP takes our suggestions very seriously."

Beta site testing gives resellers and large customers an opportunity to verify that their software will work effectively on a new architecture.

Betancourt says SAS has a great deal of experience working with computer vendors, "and 300 software engineers with considerable experience in many areas," he adds. "One of the very first things we do is take the computer apart and see how it was engineered and see what features are there that they might not have told us about.

Once past that point, says Betancourt, the team uses several compiler exercisers to test the viability of the vendor's compiler to support SAS application software. Any unusual conditions in hardware or software are tested repeatedly during this phase. "The ultimate test would be to take our 3 million lines of code and compile them on the vendor's compiler and see where we go from there," says Betancourt. "Our software provides one of the better ways to find out what a system can do."

Beta Benefits

Beta site testing gives resellers and large customers an opportunity to verify that their software will work effectively on a new architecture. When discussing the merits of a successful recompile, Betancourt uses phrases such as "peace of mind" and "a degree of comfort."

"It gives us an early opportunity to prove there are no compatibility problems with new hardware. HP/Apollo has been outstanding in providing early copies of every operating system release to help us remain compatible."

Stronger relationships may involve working with a computer vendor early in the development cycle. Mentor's Irani says his firm "gets a very early view into the development of product features. We want to make sure that the product has the features that our customers need. We get involved right from the start." In the case of the HP/Apollo 400 Series, Mentor had systems on hand several months before customer shipments began.

At the same time, most early test programs are not exclusive. When there is one beta site, there are generally several more. Beta site customers interviewed for this article did not believe they were treated uniquely by HP. And although each computer vendor approaches several firms as beta site testers, these same major customers and resellers are free to act as beta sites for other computer vendors as well. SAS's Betancourt says, "We are a beta site for probably everyone you can think of," and rattles off a number of prominent brands. "Most vendors realize that their key software partners need to verify compatibility and need to know the hardware is going to stay current," he says.

Vendor Benefits

Knowing details about new products well ahead of introduction allows resellers and software developers to make the best possible use of their resources, but what does the vendor get out of all this? (Besides hassles, that is.)

If all goes well in the beta test process, the computer maker could have a

ready-made home for lots of the new products before the first one even comes off the assembly line. This is not a bad deal, particularly in the workstation market, where product lifetimes are measurable with a second hand, or in the high-end market where minicomputers and mainframes have purchase lead times of a year or more. Getting the marketing process started before the race begins is a big gain for vendors.

Beta site testing also provides vendors with a trial run. Shipping a product that doesn't work is catastrophic in any market, and beta relationships allow computer vendors an early test in a more forgiving environment than the real world. A minor glitch or two is excusable in the beta version of a product, and fixable. The same mistake in the final product might kill a deal or lose a customer.

Showing a valued customer the latest hot stuff before anybody can buy it yields other benefits as well. If they love it, the vendor has an ally, someone who will help spread the good word once the product goes public. This is the best kind of advertising, and it isn't for sale—the vendor has to earn it. SAS said it was impressed with HP's efforts to maintain compatibility with previous products on both the Apollo and HP sides, thus protecting customer investments. Without a beta site program, such a statement could not have been made so early in the product's life.

Diane Wortsmann, marketing programs manager for Mentor, notes that in running the beta program, "HP is looking at a way to get real life applications running on the product so they can have the highest quality possible before they ship the product out the door."

Customer Benefits

Some benefits to the end user are fairly obvious. Extra testing, poking and prodding will uncover some flaws that can be eliminated, making the end product that much better for the final customer. Making the software and hardware work smoothly together is a nice idea as well. Also, those first few looks at the user manual, accompanied by 20 people simultaneously scratching their heads and exclaiming, "Huh?" might iron some wrinkles out of the product documentation. All of this makes life easier for the user of the final product.

Some beta site benefits are a bit less obvious. For instance, because many vendors seek to make it easy for SAS to port to their zippy new hardware, SAS gets assistance from vendors that further extend its own resources. Consequently, SAS customers have a wider choice of platforms than they otherwise would. Betancourt says SAS software is supported on more than 12 different archi-

tectures, sometimes including three or four platforms from a single vendor.

"There is a psychological comfort that the user gets in knowing that two companies are working together to help him," he says. That means he's much less likely to run into a problem and find the hardware and software vendor each blaming the other—and leaving the problem unsolved.

Betancourt recalls an incident that demonstrates what a close relationship between vendor and beta site can do to protect the customer. When HP-UX Release 7.0 became available for the Series 800, four or five SAS customers reported unusual system bugs, accompanied by system crashes. SAS notified HP, which promptly sent an engineer out to solve the problem. When this didn't work, HP set up a dial-in line to an Model 850 so SAS engineers could do their own investigating.

What they found, says Betancourt, was that SAS used a certain piece of code to flush the instruction cache. When the operating system changed, caching changed with it, and the instruction crashed the system. SAS quickly devised a patch to alter the flush procedure, and the problem was solved.

This story makes two strong points about HP. First, its close relationship with SAS enabled it to respond quickly and effectively to a customer problem. HP's aggressive beta site program is responsible for this relationship. Betancourt asserts, "If we had told HP we could not set up a modem line to the customer, they would have brought an 850 here for our engineers." And, for systems that are tested in the program (the 800 was not), such problems usually don't arise. Here, HP modified its operating system immediately. "Other vendors would have said they would fix it on the next operating system rewrite," says Betancourt.

Feedback

HP's biggest return on its beta site investment is the feedback it receives about new systems before they ship to other customers. Like all feedback, it comes in good and not-so-good varieties.

SAS feedback on the Series 400 was modest. The primary message that went back to HP from SAS was, "Yes, indeed, there are no compatibility problems and this is a very nice system," says Betancourt. "So our feedback, which sometimes can be rather lengthy, was not much in this case. One problem that we did run into was that they did not have the boot ROM for the Domain operating system, but they warned us about it. About two weeks later they installed the Domain boot ROM, and we were able to alternately boot either Domain or HP-UX, just like they said we would be able to do."

Just the same, Betancourt wonders if the "two operating system, two binaries and two keyboards" solution HP devised was the best possible compromise for the Series 400.

After much mulling over, SAS is determined to move all its CASE workstations into "one vendor and one architecture," rather than the mix of Series 400 and DN 10000 systems that had been proposed by HP. SAS is also certain that it wants to move to a RISC-based system. And although that was certainly not what HP wanted to hear, such feedback may have helped nudge its RISC development along. In fact, HP's own second-generation RISC-based workstations should be announced very soon.

Mentor's feedback to HP was that the Series 400 is "an excellent machine," says Irani. "We have not run into any significant problems in hardware or software. He says the 400 is "definitely holding its own" despite the 68040 delays. In terms of RISC versus CISC, Irani says "What is really important to the customer is the end result—price, throughput and available applications. That is what a customer really is going to look at. We see a lot about RISC machines, and Mentor will support Sun's SPARC. But HP is also working on its next generation of PA-RISC. We look forward to seeing how those machines compare."

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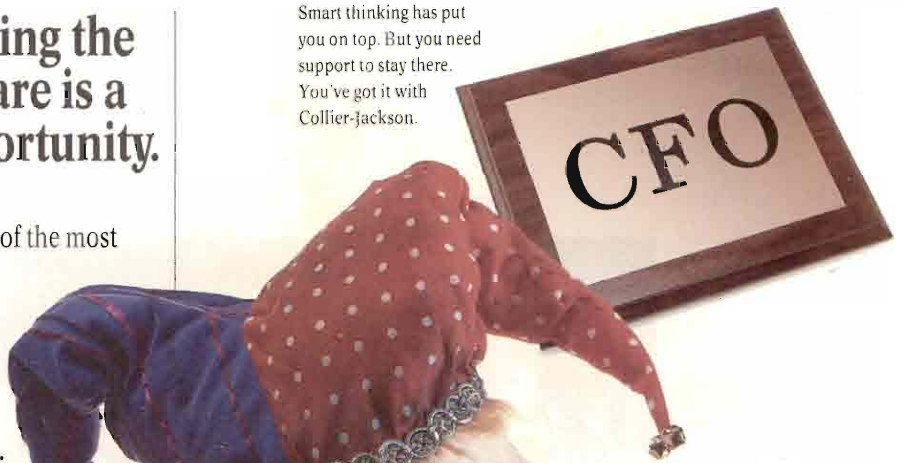

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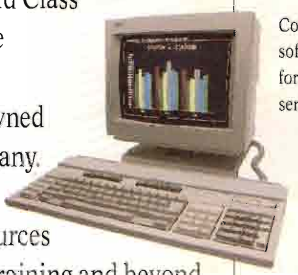

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MPEXtra

VESOFT's MPEX/3000 Goes Beyond MPE Functionality

By Joel Martin

One of the oldest and most widely used (4,500 sites) software products available for the HP 3000 is MPEX/3000 from Vesoft Inc. (Los Angeles, CA). MPEX, first released in 1980, is a productivity tool that extends MPE's functionality.

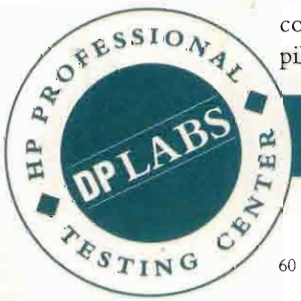
In some ways, MPEX can be thought of as a shell for MPE, in the same sense that a UNIX-based operating system has shells. You may ask why MPE would need a shell when its commands are easy to remember and use. The answer is that MPE's ease of use also has meant limited functionality, particularly prior to the release of MPE XL.

For example, MPE doesn't provide a command to purge sets of files or compile a number of source files into a single program. These, or similar functions, might easily be performed in other operating systems but always have required an abundance of commands in MPE. Vesoft's MPEX/3000 extends MPE's functionality but retains its ease of use.

MPEX.PUB.VESOFT

MPEX is a single program that performs enhanced MPE commands on sets of files. It also adds commands not provided by MPE, an MPEX-level programming language and facilities to select files based upon the file attributes (e.g., the date the file was last accessed). MPEX typically is set up to run from a user-defined command (UDC).

When you run MPEX, you'll be



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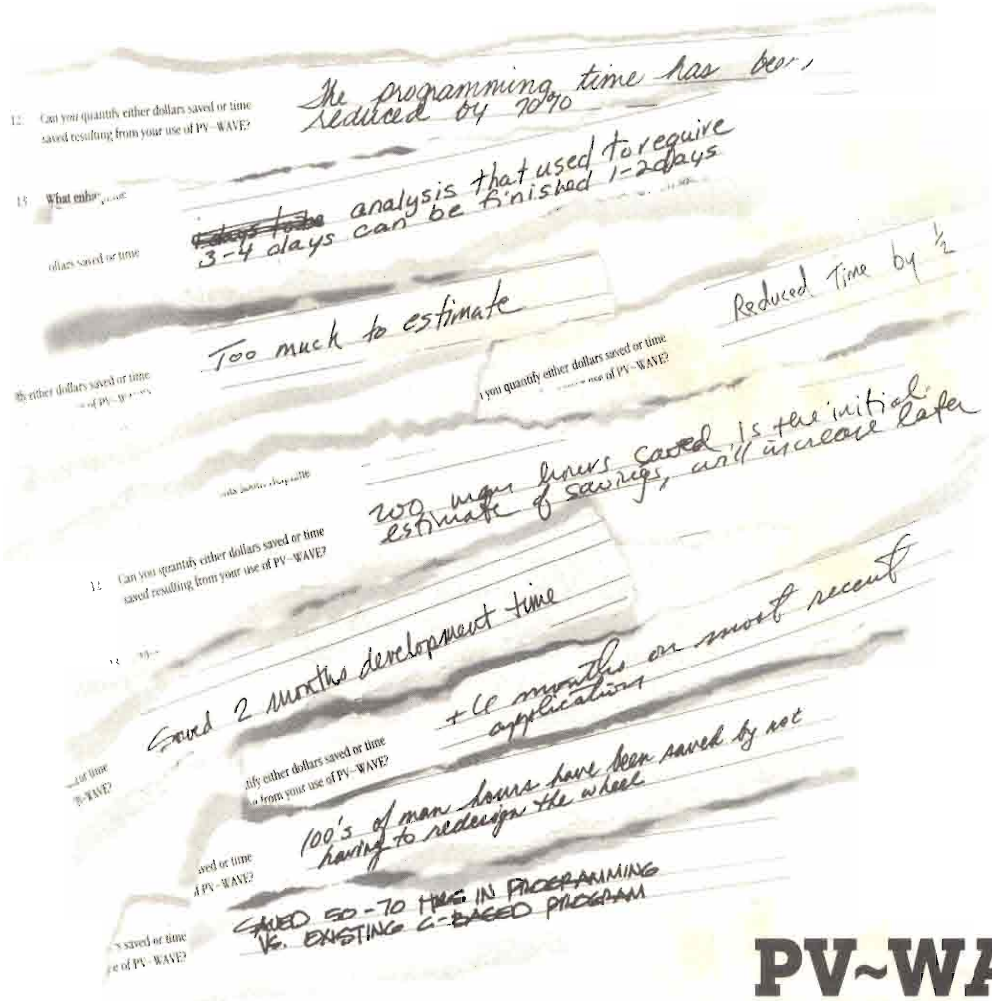

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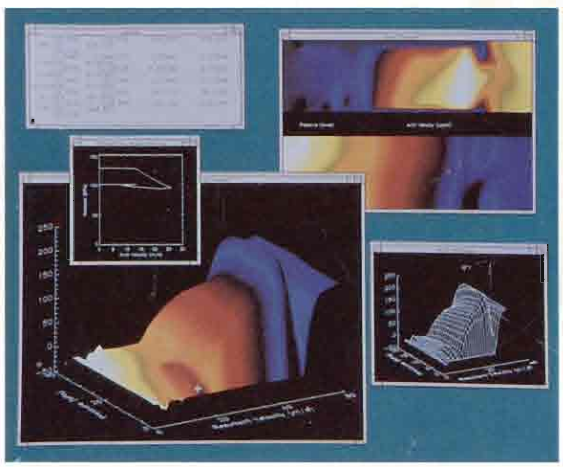

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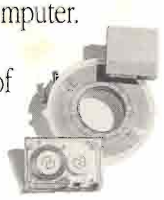

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greeted with a welcome message, a hint on MPEX use, and a percent sign as the program prompt. At this point nearly all MPE V and MPE XL commands are available to you — subject to MPE's security of course — including your UDCs and command files. MPE supports command files only on MPE XL, but MPEX supports command files on MPE XL and MPE V. The easiest way to describe MPEX is to give you some examples.

MPE vs. MPEX

Suppose you're an MPE V system manager and need to identify all programs that require privileged mode. The MPE way is to run the LISTDIR5 utility and issue a LISTF @.@.@ command, directing the output to the line printer. When the listing finishes, you review each file's capability list highlighting the files with privileged mode (PM), and write their names onto a separate piece of paper. The LISTF command takes some time, and reviewing its output (potentially several hundred pages) could take hours. The MPEX way? Issue the single command:

```
LISTF @.@.@(CODE="PROG"
AND PROG.PMCAP),SEC;*LP.
```

Not only do you get a listing of files that interest you, but the security matrix of each file (which users can read, append, write, lock and execute) is printed in a very readable format. This saves time and eliminates the possibility of overlooking a file.

Now suppose you're a programmer and you want to purge your old spoolfiles in the TEST account for the job logging on as PTFYINIT. MPE runs the SPOOK utility and you perform a SHOWOUT command. You write down the file numbers or mark up a listing produced by the SHOWOUT and then start purging the files. This requires identifying each file by its unique number. In purging the files, you risk typing one of the file numbers incorrectly and inadvertently deleting another user's output. Again, the MPEX way requires only a single command:

```
DELETESPOOLFILE
@.@.TEST(SPOOL.JSNAME MATCHES "PTFYINIT")
```

You save time and eliminate the possibility of purging the wrong file or files (see *Figure 1*).

These examples show the simpler uses of MPEX. The program also allows you to combine filesets in its commands, to use an indirect file to identify the fileset, and to print files or parts of files that include a specified text string or strings.

Highlights

Copying sets of files, even copying databases between CPUs, is easy with MPEX and much faster than with the standard FCOPY utility.

Several commands are available for listing or manipulating spool files, and these MPEX commands are much more powerful than their counterparts in SPOOK.

Standard programs such as the EDITOR, QUERY and SPOOK can be hooked to allow you to execute MPEX commands while within those programs. Hooked programs can take advantage of MPEX's comprehensive command-redo facility.

MPEX has a command language that enables you to pass a series of commands to most popular text editors to perform global changes across an MPEX fileset. Jobstream programming can be brought to a new level of power and sophistication through use of MPEX's programming language and job control facilities. Variables of types INTEGER, DATE, BOOLEAN and STRING are supported at the MPE level and operations such as addition or truth testing can be performed on those variables.

Your user programs can be run from within MPEX, saving system overhead and reducing load times if you need to move between MPEX and the user program. Users with SM capability can build and save files in any account. In this instance and others, MPEX is more consistent with the application of MPE security rules than MPE itself.

Many parts of MPEX are site and user configurable, so that MPEX can be tailored to your site's requirements and to each user's style.

I attempted dozens of varieties of LISTF, ALTFILE, PURGE and other extended MPE commands as well as commands specific to MPEX. Although I've been a light user of MPEX for some time, I couldn't help but be impressed with the power of this product.

A Thorough Exam

Of course, I found a few quirks in MPEX — I always find something — bugs or errors.

Particular commands within MPEX are sensitive in their acceptance of parameter values. Performing a LISTF of files with a file code of "log" gives a detailed and well-explained five-line warning about the need to upshift the file code parameter value. The use of the lowercase in other instances didn't give a message of any type and selected none of the desired files. MPEX does

FIGURE 1

```
%deletespoolfile @.@.di@(spool.jsname matches "PT@" and
spool.readydate<today-1)
------Deleting #020, PTB500SA, #J'2172, PTFYINIT,MGR.DISPLAY (40 sectors)
------Deleting #021, PTB500SA, #J'2173, PTFYINIT,MGR.DISPLAY (40 sectors)
------Deleting #022, PTB500SA, #J'2175, PTFYINIT,MGR.DISPLAY (40 sectors)
120 sectors saved
%
```

An example of deleting spool files using MPEX. Deleted only those files that are two or more days old.

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provide a facility to ignore the case of a string parameter value, but ideally you wouldn't have to use this function when the parameter only can take on upper-case values.

There also are slight differences in the parameter handling of spoolfiles versus standard MPE files and the use of the wrong parameter name, (e.g., ACCDATE instead of READYDATE gave me no error or warning message and selected no files). I was puzzled by a few other items generally related to error handling, but a call to Vesoft's technical support quickly cleared up the confusion.

You may notice that MPEX can be slow to start up. If you consider the functionality supported by MPEX, this won't be an irritating delay. But you do have two means at your disposal to reduce the start-up time. You can either follow some of the suggestions in the user manual section entitled "Speeding Up MPEX Start-up," or run MPEX when you first log on and do all of your work on the HP 3000 from within MPEX.

One particular anomaly bears special mention. In testing the DELETESPOOLFILE command of MPEX, I was able to delete a spoolfile that wasn't deleteable using SPOOK. Hmmm, a security breach, I thought. Not quite. Vesoft's technical support (actually Eugene Volokh, the author of MPEX) suggested that I might see if I had been ALLOWed the DELETESPOOLFILE command by the system manager, and I had. The anomaly in this case was with SPOOK, not MPEX.

As powerful as MPEX is, there are still some facilities I'd like to see. Foremost on my wish list would be to extend the MPEX functions to support actions on users, groups and accounts, as well as files. For instance, it would be helpful to be able to execute a command such as ALTACCT @-SYS(CAP=SM);-CAP=-SM to remove system manager capability from all accounts except the SYS account.

Using the software is very easy once you've acquainted yourself with the MPEX fileset concept. Although there are many commands and parameters, you'll be productive with MPEX within a few minutes of loading the software.

You'll find MPEX to be an almost indispensable tool for managing your system.

As I noted, MPEX is customizable. You can change the prompt character for MPEX and for programs run from within MPEX if desired. You can also modify many of MPEX's defaults, and set up your own independent customization file. Access to particular commands and features of MPEX can be restricted by the system manager to users with certain capabilities.

Help

Eugene Volokh has done an excellent job with the MPEX documentation. The manual is substantial but well organized and easy to navigate. As should be the case more often with computer documentation, the manual makes heavy use of real-world examples. When appropriate, there are warnings on features that could have unusual results or side effects. There's also a generous table of contents and a 16-page index. The indexing of more keywords would be helpful, but aside from that the manual is nearly beyond reproach.

The MPEX help facility is substantial but more idiosyncratic than the software itself. In a very significant way, the help facility is more powerful than MPE's. You can ask for help using keywords and concepts, such as "HELP DB" for help on any MPEX database operation, but I found requesting help on a specific command to be less easy than the MPE approach. This is particularly true if you require help with the formatting or structure of a command parameter. When requesting help on a keyword, MPEX will display about eight lines of the user manual preceeding the keyword, as well as the keyword help text. The reason for this is explained in the documentation but in day-to-day usage it feels awkward, appears to be a bug, and is largely unnecessary. (The help facility allows you to show the previous page or half page with a single keystroke.) I would give the help facility high marks for its volume and completeness but I have mixed feelings about its accessibility.

Unless you're running a completely turn-key application that's self-maintaining, you probably need MPEX. This classic power tool for MPE V and MPE XL adds new muscle to MPE and continues to improve with age. This latest release is now supported by a fine manual that is instructive even for grizzled MPE veterans. Larger sites in particular should find MPEX an excellent value.

As a bonus, MPEX is shipped with Eugene Volokh's book, *Thoughts and Discourses on HP 3000 Software* — required reading if you want to get the most out of your MPE investment.

You'll find MPEX to be an almost indispensable tool for managing your system and for program development. You may wonder why HP has done so little to improve MPE's functionality. The more you use MPEX and read the documentation, the greater your respect for this product's power will be. ■

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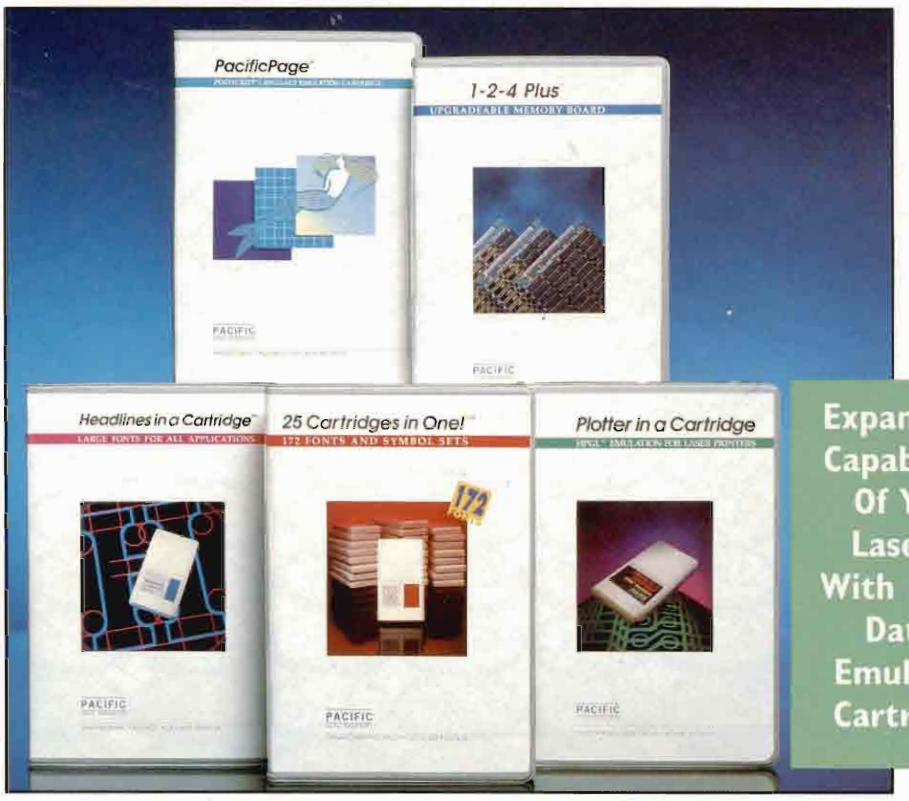
CIRCLE 256 ON READER CARD

FONTS Unlimited



Expand The Capabilities Of Your LaserJet With Pacific Data's Emulation Cartridges

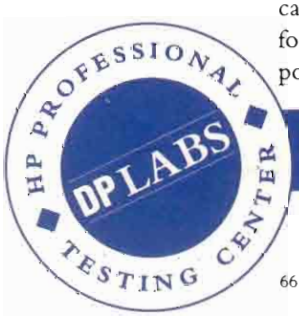
With Pacific Data Products Inc.'s (San Diego) HP LaserJet printer cartridges and memory boards, good things *do* come in small packages.

If you're looking for large, bold headline display fonts, Headlines in a Cartridge gives you access to 18 Helv (similar to Helvetica) and Tms Rmn (similar to Times Roman) fonts in sizes up to 48 points.

If you'd like a variety of fonts in a single cartridge, 25 in One! III (so called because it incorporates 25 HP LaserJet cartridges into just one) gives you 172 fonts and 20 complete symbol sets in both portrait and landscape orientation.

If printing PostScript files on your HP LaserJet is something you thought you could never do, consider PacificPage, a PostScript language emulation cartridge. PacificPage provides 35 scalable font families plus all PostScript language capabilities including scaling, rotating, reverse text, screens and patterns.

For CAD and HP-GL users, Pacific Data's Plotter in a Cartridge lets your HP LaserJet II emulate and provide all the features of the HP graphics plotters — models 7475A and 7550A. With the cartridge installed, your laser printer receives instructions and processes data in exactly the same manner as these two plotters.



By George T. Frueh

In addition to printer cartridges, Pacific Data also offers memory expansion for your LaserJet. Memory upgrades are easy with the 1-2-4 Plus upgradeable memory board. This plug-in board lets you expand the standard 512K memory of the LaserJet II Series by an additional 1, 2 or 4 MB.

Choose Your Cartridge

Headlines in a Cartridge and 25 in One! III come with software installation and user guides. PacificPage and Plotter in a Cartridge come with application setup, printing guides and user guides. Each cartridge comes with its own printer driver software on 1.2 MB 5 1/4-inch diskettes to support a wide variety of word processing packages (5 1/4-inch and 3 1/2-inch diskettes are available on request).

We installed and examined the printing capabilities of the four cartridges using our HP LaserJet Series II printer. Our AST Premium 286 PC was connected through its LPT1 port to the Centronics parallel connector on the LaserJet.

Headlines in a Cartridge supports several word processing packages including WordPerfect 5.0 and 5.1, Aldus PageMaker, and WordStar 2000 Release 5.0, 5.5 and Windows. The 2-MB ROM cartridge provides 18 large fonts and includes bold and italic weights in the sizes commonly selected by typographers: 14, 18, 24, 30, 36 and 48 points. Typefonts include Helv and Tms Rmn.

Included on the installation disk is the test print file, HPHDLN.DOC. This file provides a complete printout of all the characters for each font contained in Headlines in a Cartridge. To print this file, we placed the floppy disk in Drive A, and issued the DOS command:

```
COPY A:HPHDLN.DOC LPT1
```

An eight-page printout containing 18 samples was printed. Included in the samples were both Helv and Tms Rmn typefaces in italic and bold styles in point sizes 14 through 48. We also printed several documents created with Microsoft Windows Write incorporating several large fonts.

You may select a font before entering text or by highlighting text and then selecting a font. All fonts created had remarkably crisp edges when printed, including the large 48-point size fonts.

Headlines in a Cartridge is designed for use with Pacific Data Products 25 in One! III, as well as other Hewlett-Packard and compatible font cartridges.

The 25 in One! III cartridge provides fonts for a full range of printing needs including general and legal word processing, scientific and technical writing, forms, presentation graphics, database

management, spreadsheets and specialty applications such as tax forms. The cartridge's 172 fonts are available in point sizes from 3.6 to 18, fixed and proportional spacing. Drawing tools are also included. Like Headlines in a Cartridge, 25 in One! III supports a host of software applications, including Lotus 1-2-3, Microsoft Windows Write, WordPerfect, WordStar 2000 and XyWrite III Plus.

The installation diskette that accompanies 25 in One! III contains a test file named HP120.DOC. This file provides a complete printout of all the characters available for each font. Printing this file resulted in 23 pages showing samples of all 172 fonts in both portrait and landscape orientations. We also created sample test files with Microsoft Windows Write and printed them using various font types. Fonts are selected from within a document in the same way as with Headlines in a Cartridge.

PostScript For The Masses

PacificPage is a PostScript language cartridge that emulates Adobe PostScript Version 47. It provides all the features of a PostScript printer on your HP LaserJet Series II printer. When using this cartridge, you must install at least 2 MB of additional memory in your printer. PacificPage is compatible with any application that supports PostScript output, including Ventura Publisher, Aldus PageMaker, Word-Perfect, Microsoft Word, Adobe Illustrator and Harvard Graphics.

With the cartridge installed, your printer operates in either the LaserJet's default Printer Control Language (PCL) or in the PostScript page description language. You can select either mode via the operator control panel on the printer or by executing the Software Language Switch batch files provided on a 5 1/4-inch diskette. The files contain escape sequences that instruct your printer to operate in either PCL or PostScript mode.

Included on the installation diskette for this cartridge is a menu-driven demo program. This program contains sample graphics renderings, fonts, bar graphs and logos. Printing times for the demos range from 30 seconds to five minutes.

The Plot Thickens

Plotter in a Cartridge gives you the power of an HP 7475A and 7550A plotter on your HP LaserJet IID and IIP printer. When using an HP LaserJet Series II printer, you must use cartridge model number CE101. The cartridge offers a choice of 20 user-defined pen sizes, automatic scaling ability (based on paper size), multiple port selection and multiple copies. This cartridge requires at least 1 MB of additional memory in your printer.

Plotter in a Cartridge provides 20 black pens in user-defined sizes of 1 to 48 dots (1 dot = 1/300 inch). Width settings are stored in printer memory. The cartridge provides imaging speeds of up to 150 meters per second.

Plotter in a Cartridge also contains software switch batch files on the Demo/Software Switch diskette that let you switch between PCL and HP-GL modes of operation. After installing the software switch batch files, you can switch from PCL to HP-GL directly from your computer.

We printed several HP-GL demonstration files included on the Demo/Software Switch diskette. The HP-GL pen and scaling demo included a plot of the space shuttle. Printing time was 40 seconds. Although we didn't plot the same file using an HP-7475A plotter, Pacific Data Products claims that plot time on an HP-7475A is eight minutes, 12 seconds.

We also printed several in-house HP-GL files created with AutoCAD. We experienced no difficulty printing these files, and each file printed in an average time of one minute.

In Need Of Memory

As previously stated, PacificPage and Plotter in a Cartridge require additional memory in your LaserJet printer above the standard 512 KB. We upgraded our printer's memory by installing the 1-2-4 Plus memory board with 2 MB memory.

The board contains an array of 32-chip sockets divided into four banks with eight sockets per bank. Eight 1-MB memory chips are installed in bank 1 for the option. For the 2-MB memory option, 16 memory chips occupy banks 1 and 2. For the 4-MB option, the board is entirely populated with 32 memory chips.

We installed the 1-2-4 Plus memory board in our HP LaserJet Series II printer in a matter of minutes. The 1-2-4 Plus board is compatible with the HP LaserJet Series II, Series IID, Canon LBP 8II, 8IIR, 8IIT, Olivetti PG108 and PG208.

So, if your HP LaserJet II printer is crying out for a larger assortment of fonts or you'd like to expand its printing capabilities to include PostScript and HP-GL files, consider Pacific Data Products' line of compatible HP LaserJet cartridges and memory boards. ■

HEADLINES IN A CARTRIDGE
25 IN ONE!III
PACIFICPAGE
PLOTTER IN A CARTRIDGE
1-2-4 PLUS

SYSTEM REQUIREMENTS: HP, Canon and Olivetti printers.

PRICE: Headlines in a Cartridge lists for $299; 25 in One!III is $399; PacificPage for the LaserJet Series II printer only (bundled with the 1-2-4 Plus memory board and 2 MB of memory) is $499, PacificPage PE (not sold with memory board) is $499; Plotter in a Cartridge and Plotter in a Cartridge PE is $395; 1-2-4 Plus upgradeable memory board for HP LaserJet Series II and IID printers is $199 for O MB, $299 for 1 MB, $399 for 2 MB, and $599 for 4 MB.

PACIFIC DATA PRODUCTS INC.

HEADQUARTERS:
9125 Rehco Rd.
San Diego, CA 92121
(619) 552-0880

FOUNDED: 1986

PRODUCT LINE: Cartridges and memory expansion boards for HP, IBM, Canon, Olivetti and compatible printers.

OWNERSHIP: Wholly owned subsidiary of Digital Communication Associates.

CIRCLE 299 ON READER CARD

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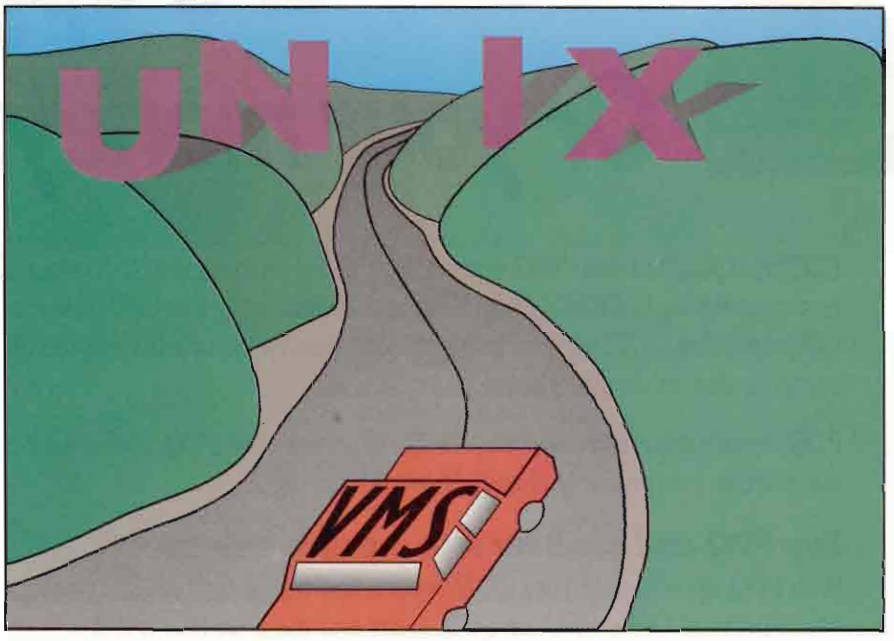
Don't Leave VMS Without It



Strangers To HP-UX Get A Warm Reception When BBC's VCL Is Their Guide

By David B. Miller

You have a recurring nightmare. You are plunked down in the middle of a foreign land with no one to help you get home. You can't speak the language; hand signals sort of help, but not really. Some of the surroundings look familiar, but all of your attempts to communicate fall on deaf ears. You're lost and feel alone.

Hey, wait! This isn't a dream. It's reality. A VMS user, you've just been plunked down into UNIXLAND. You can't speak the language. No one understands DCL, COPY, SEARCH, DIFFERENCE, RENAME, HELP — this machine understands nothing. Your new HP 9000 workstation *looks* like a computer, it *smells* like a computer, and it *acts* like a computer. But, after successfully logging in, all your attempts to communicate fall on deaf circuits. You break out in a cold sweat. Your heart sinks. You feel lost.

A Friendly Stranger

"Don't worry, son," a friendly, familiar voice rings out. Hope springs eternal as the stranger (who looks a lot like Karl Malden) says, "At least you've gotten as far as a username and password. Type 'vcl' at the prompt. Then type 'help'. I think you'll be just fine. Use VCL, from Boston Business Computing, and

FIGURE 1

VMS	VCL	MS-DOS	HP-UX
APPEND	APPEND	COPY	cat
COPY	COPY	COPY	cp
CREATE	CREATE	MKDIR	mkdir
DEFINE	DEFINE	SET	set
DELETE	DELETE	DEL	rm
DIFFERENCES	DIFFERENCES	—	diff
DIRECTORY	DIRECTORY	dir	LS
edit	edit	edlin	VI/EMACS
HELP	HELP	—	man
INQUIRE	INQUIRE	—	read
MAIL	—	—	mail
MONITOR	—	—	ps
PHONE	—	—	talk
PRINT	PRINT	PRINT	lpr
RECALL	RECALL	F3	history
SEARCH	SEARCH	FIND	grep
SORT	SORT	SORT	sort
SPAWN	SPAWN	COMMAND	&

Some of VCL's commands and their HP-UX and MS-DOS equivalents.

remember, don't leave VMS without it."

The stranger disappears through a raised floor tile. Ready to try anything at this point, you obey his command. You type "vcl" at the HP-UX prompt. A banner announcing Boston Business Computing's (Andover, MA) VCL product is displayed, and a $ prompt reappears. This time, "help" offers not an error message, but a welcome sight. The familiar look of DCL help rushes to your monitor. All of your favorite VMS commands are there: TYPE, SHOW, COPY, RENAME, DIR, etc. Can this be real?

The answer is yes if your system manager (maybe you) has Boston Business Computing's VCL installed on your HP 9000. VCL is an implementation of the Digital Command Language (DCL) with which most VMS users have grown comfortable. Versions of VCL are available on a wide variety of HP-UX and MS-DOS platforms, including the HP 9000 Series 300/400/800 and HP Vectra. It can take a significant amount of pain out of moving to a non-VMS platform or having to split your time between VMS and non-VMS environments.

VCL Infiltrates HP-UX

We installed VCL on our HP 9000/834 running HP-UX 7.0. Installation was a breeze. You simply **tar** the files to a directory you've created, and run an install script. (That's assuming you know enough HP-UX to get this far. Otherwise, an HP-UX user will have to help you.)

A nice feature included is a **testvcl** procedure that lets you try out the package before you actually install it. If you're satisfied with the results, you can run the install script that places executables and other files in appropriate directories. You can place VCL's files in any directory you want and then steer your users in the right direction.

VCL Logical Names

Invoking VCL with the **vcl** command is the simplest way to get things started. You can invoke quiet mode with the **vcl -q** command, which causes the VCL banner not to print. You also can use **vcl -c**, followed immediately by a command. The **-c** switch causes VCL to run the command following the **-c**, but you won't stay in the VCL environment. You'll be kicked out to your HP-UX shell immediately after the command executes.

A third switch is **-v**. This turns on command verification, equivalent to VMS's SET VERIFY. Verify mode is particularly useful, as VMS users know, to debug command procedures (script files of sorts). Verification displays each command of the script as it's executed. So, if you're having problems, you can more easily track it down.

That Warm And Fuzzy Feeling

Your confidence builds as you set about tackling the task of taming your HP 9000. You feel comfortable again. You've got your DCL back. Here are some of the encouraging signs that are giving you renewed confidence.

- All your favorite DCL commands are implemented in VCL. DIR, COPY, RENAME, SORT, PHONE, MAIL, RECALL, SPAWN, CREATE, HELP, and others, all are there. Command qualifiers are attached with a slash (/) instead of a hyphen as in HP-UX. Comments are included with the ! character.

Command output looks like VMS, too. It doesn't look like the command's HP-UX equivalent. Line editing and command recall are supported. For example, the CTRL-A combination toggles command line insert/overwrite mode. The up and down arrow keys allow you to peruse a command history buffer of up to 128 commands. RECALL can be used to see what you've done so far.

In VMS, you can see what your process is doing with the CTRL-T combination. Unfortunately, VCL currently doesn't support this feature. Such node names that VMS users are accustomed to in DECnet networks and VAXclusters also aren't supported in VCL commands.

For a partial list of VCL commands and their HP-UX counterpoints, see *Figure 1.*

- File and directory specifications look

VCL can be a valuable aid in any kind of VMS to HP-UX migration effort.

like VMS. Although you could get used to the HP-UX equivalent of these pretty quickly, there's nothing like the homey feeling of specifying files and directories with the [,], and . characters. The root (/) directory, for example, displays as [000000], as in VMS. The file specification **/usr/bbc/test/afile** looks like [USR.BBC.TEST]AFILE. in VCL. What's more, VCL allows up to 128 levels of subdirectories, which is quite a bit more than VMS's maximum of eight.

The VMS wildcard characters *, %, and the ellipses, can be used in file specifications. The hyphen allows you to access a parent directory. For example, the way to access all files with an extension of .BBC from the directory above your current one is with the file specification: [-]*.BBC. A SET DEFAULT [-] command would be the equivalent of **cd ..**.

If your system uses short file names, get used to the idea that the long names allowed by VMS (39 characters each allowed for directory names, subdirectory names, the file name and the file extension) will be truncated to fit.

VCL converts all file names to lowercase by default, so some file names that contain uppercase letters and special characters not allowed by VMS can cause a problem. VCL avoids this by allowing you to quote the offending characters.

Because HP-UX doesn't support file version numbers, you won't find version numbers supported in VCL. However, you can set up VCL to warn you when a file is specified with a version number.

- Logical names and symbols are supported. If, in VMS, you were accustomed to DEFINEing or ASSIGNing logical names to directories and files, you can do the same in VCL. For example, the directory:

```
/usr/bin/local/notlocal/contrib/nonsense
```

could be assigned the name "dave" with the command:

```
DEFINE dave
[usr.bin.local.notlocal.contrib.nonsense]
```

You could then refer to the entire directory with the string "dave".

The VMS-like logical name tables LNM$PROCESS, LNM$JOB, LNM$GROUP and LNM$SYSTEM are supported. LNM$PROCESS and LNM$JOB are private to you. Any logicals you DEFINE or ASSIGN in these tables will be exported to your HP-UX environment and will be available to other processes invoked from VCL. Logical names defined in LNM$GROUP and LNM$SYSTEM are available to members of your group and to the entire user community, respectively.

VMS style symbols also can be defined. For instance, if you want to map the VCL DIR command to the HP-UX **ls**, command, enter:

```
ls :== DIR
```

Using two equal signs makes the symbol **ls** global. One equal sign creates a local symbol.

Symbol substitution within command files, symbol abbreviation and foreign commands can be accomplished as if you were on a VAX. The DEASSIGN and DELETE/SYMBOL commands are used to eliminate logical name assignments and symbols.

- File Protection looks like VMS but follows HP-UX conventions. VMS's OWNER, GROUP and WORLD user classes correspond directly to the OWNER, GROUP and OTHER classes in HP-UX. The VMS SYSTEM class is ignored. VMS READ, WRITE and EXECUTE permissions are mapped directly to their HP-UX equivalent. The VMS DELETE permission is treated like HP-UX WRITE permission. SET PROTECTION is used to alter file permissions.
- Lexical functions. Lexicals are used heavily to get information about the system and its users, as well as to process string information. The F$USER( ) lexical, for example, will return the current process's identification in the form of [group, user], similar to VMS's User Identification Code (UIC).

Many of the VMS lexicals are supported. They can be particularly useful tools inside of command procedures.

- Help looks like VMS. VMS users have long enjoyed a structured, hierarchical, extensive online help facility. BBC provides an ASCII file of help text that you can modify to suit your site. A Makehelp program is provided to build a new help library.
- Even error messages look like VMS. VMS error messages follow a strict, if not somewhat intimidating, format in the form of %facility-level-ident, text. FACILITY is the name of the command that encounters the error. LEVEL is the error's severity (Informational, Success, Warning, Error, Fatal Error, X for VCL Fatal Error). IDENT is an abbreviation of the message, commonly used to look up the message in the VAX/VMS error message manual. TEXT is a more detailed error description.

VMS error messages (even successful messages are reported in this format) have been intimidating VMS users for years. Now, you can be intimidated by them on your HP-UX system. I don't know about you, but I get a little shaky anytime I see a message appear on my screen with percent signs, lots of hyphens and abbreviations. They are useful and descriptive, however, once you know how to read them.

Other Features

Suppose one day your manager walks in and accuses you of not biting the bullet and learning HP-UX commands the manly way. You've got nothing to fear. All along you've been running in VCL's TEACH mode. TEACH mode takes a VCL command as an argument and displays the equivalent HP-UX (or other native mode) command. At least you

have an answer for that one.

Another day, you're using VCL and your manager walks in and starts pounding away at your keyboard with HP-UX commands. VCL doesn't choke, however. Why? Well, you've been running VCL in PASSTHRU mode. In PASSTHRU mode, VCL sends commands to HP-UX to execute if it doesn't understand them. So, you can get a VMS-style directory with the DIR command, or you can choose to do an **ls** from the VCL command prompt and look at the HP-UX version. It's up to you.

BBC's documentation is excellent. It is clearly written and easy to follow.

HP-UX purists might wince at the prospect of users on their systems doing "DCL things." However, VCL can be a valuable aid in any kind of VMS to HP-UX migration effort, or if HP-UX platforms are beginning to cohabit with your VAXs. With the TEACH mode, you can go both ways and learn each command's incarnation, making yourself doubly flexible.

If you're faced with a trip away from the VMS fatherland to go to some fascinating foreign land like HP-UXville, don't go unprepared. Take a piece of home with you. It should make settling down in your new digs a lot easier.

VCL

PLATFORMS: MS-DOS 3.1 or above and HP-UX.

PRICE: Ranges from $195 to $4,995, includes a 30-day money-back guarantee and two-months technical support.

BOSTON BUSINESS COMPUTING LTD.

HEADQUARTERS:
Three Dundee Park
Andover, MA 01810
(508) 470-0444
(508) 474-9244 FAX

PRODUCT LINE: VMS emulation software

FOUNDED: 1983

CIRCLE 298 ON READER CARD

HP-UX

Andy Feibus

An X Windows Primer

The X Window System, also called X Windows, X11, or X, was created at the Massachusetts Institute of Technology (MIT) in 1984. Several versions of X have been developed; the version of X currently available is number 11, which was first released in 1987.

X was developed to provide a device-independent, network-based graphics windowing system. To this end, the X *client-server* model was devised.

In the client-server model, the programs that make X graphics requests (e.g., draw a line) are called *clients*, and the displays on which these requests are performed are called *servers*. Think of them as *display servers*, if this model seems confusing. A client does not need to execute on the same system as the one providing the display server.

For example, system *abc* is networked to system *bdg*, which contains a graphics display capable of displaying X graphics. Client programs can run on *abc* or *bdg*, displaying their results on *bdg*'s graphics display.

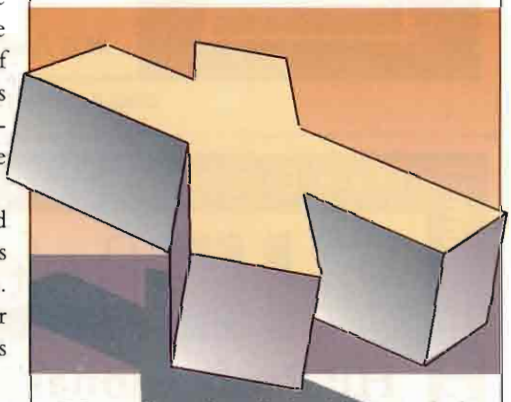
The server processes X requests (these requests are generated by the client programs), displays the results of graphics output requests, tracks mouse motion and displays a *cursor* at the present mouse location, and reports all *events* (e.g., mouse button presses, keyboard key presses, etc.) that occur.

Clients create one or more windows (to be displayed on the server). These windows may overlap other windows on the screen (possibly hiding information). When the server is started, an initial window is automatically created on a server. This *background* window, or *root window*, is the canvas on which all other windows are placed. In general, your X Windows usage will be limited to creating and running X (and non-X) client programs and to tailoring your X environment.

What X Clients Can You Run?

The most common X client you'll invoke is the terminal emulator. X includes a terminal emulator **xterm**, which emulates both the DEC VT 102 and the Tektronix 4014. HP, with its X Windows product, includes **hpterm**, which emulates an HP terminal.

From these terminal windows, other X (and non-X) clients can be started.



Other clients bundled with X include **xclock**, which displays the current time either in analog or digital format, and **xcalc**, a simple calculator.

Under HP-UX, the client programs included with X are stored in the directory **/usr/bin/X11**; the configuration files are stored in the directory **/usr/lib/X11**.

The most important X client you'll run is the *window manager*. The window manager is responsible for the appearance and characteristics of all windows created and manipulated on the server. The window manager usually runs on the same system as the server; however, this isn't required (especially in the case of DOS-based X servers). A single window manager always should be invoked for each server.

Included with the standard X Window System is the window manager **uwm**, which allows you to:

- Convert each window into an icon (a small static symbol representing the client window).
- Resize and move windows.
- *Shuffle* windows (exposing hidden windows and, possibly, obscuring other windows).
- Access a menu of activities that can be activated from the root window.

X Windows also provides arbitration to determine which window obtains input from the keyboard, mouse, etc. This arbitration is called *keyboard focus*. With **uwm**, the window receiving input from the keyboard or mouse is the one in which the mouse cursor presently resides.

Other window managers (**hpwm**, the HP window manager, and **mwm**, the Motif window manager) may also be available on your system. Each window manager provides a slightly different operating environment. For example, **mwm** provides each window with a border containing the window's title, buttons to either iconify a window or expand a window to the size of the server's screen, resize locations, and a button to activate a window control menu.

When you login to most UNIX workstations, a window manager is automatically started for you. To start the server program and a window manager on an HP-UX system, login and run **x11start** from a graphics console.

Since an X client can run on any server connected to your network, how does an X client know which display server to use? For any X client, you can specify this information in two ways.

First, you can set the shell environment variable **DISPLAY** to indicate the display. To assign this variable with the Bourne or Korn shells, enter:

```
$ DISPLAY=host:server
$ export DISPLAY
```

To assign this variable with the C shell, enter:

```
% setenv DISPLAY host:server
```

The *host* is your system's network name—the network name is usually the system's host name; run **uname(1)**, **hostname(1)**, or **nodename(1)** on the server to determine this name. To use the local server (i.e., the client and server are executing on the same computer), specify **unix** as the *host*.

The *server* number specifies which display to use on the server system; in most cases, this value is **0**. If the server computer has multiple graphics displays, then this value is the display number (as determined by the system).

The second way to select a particular server is to include the server's location as a *command-line option* for the client program. For example, to start (in background) the HP terminal emulator on display 0 of the server named **habc**, enter:

```
$ hpterm -display habc:0 &
```

The **-display** argument indicates that the next argument is the name of the display server on which to operate. All X clients understand this option.

Another option that all X clients understand is the **-geometry** option, which provides a way to specify the size of the window in which the client operates. The general format for this option is:

```
-geometry widthxheight
```

where *width* is the width of the window and *height* is the height of the window. These measurements are usually in pixels (e.g., **- geometry 600x200** indicates a window 600 pixels wide and 200 pixels high). Some clients (e.g., terminal emulators) measure windows based on a single character's height and width. So, the command:

```
$ hpterm -geometry 80x24 &
```

creates a window 24 lines long and 80 characters wide. You also can specify, using the **-geometry** option, where to initially position the window on the screen. This position is specified as an offset (in pixels) from the edges of the screen.

The format for this geometry option is:

```
-geometry widthxheight+xoff+yoff
```

Where:

- **+xoff** specifies the distance (in pixels) between the left edge of the window and the left edge of the screen.
- **-xoff** specifies the distance (in pixels) between the right edge of the window and the right edge of the screen.
- **+yoff** specifies the distance (in pixels) between the top of the window and the top of the screen.
- **-yoff** specifies the distance (in pixels) between the bottom of the screen and the bottom of the window.

For example, to create a 24-line, 80-character HP terminal window in the lower-left corner of the screen, use the command:

```
$ hpterm -geometry 80x24+0-0
```

To run a small clock (**xclock**) in the top-right corner of the screen, enter:

```
$ xclock -geometry 75x75-0+0
```

One final option for this month: **-iconic**. Specifying this argument starts an X client in its iconified form.

Other options are available for each client; for more information on clients, refer to the the documentation included with your X Window System software.— *Andy Feibus is an interplatform system consultant based in Atlanta, GA.*

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RDBMS

Fabian Pascal

Relational Principles

The relational model provides a sound, general and simple foundation for database management. It delineates basic *database functions* and how they should be supported by the DBMS, instead of leaving it to users to code and optimize them in their applications. Products that correctly implement relational features and comply with all fidelity rules offer crucial practical benefits, such as enhanced reliability, ease of use and performance (and, thus, accessibility and productivity), and platform independence.

The only relational model that has gained widespread acceptance in the market is Structured Query Language (SQL). A *data language* with an explicit relational orientation, SQL is, however, far from a complete and correct expression of the model. And, despite its status as a standard, there are many dialects of SQL. Each has its own syntactic and/or semantic variations and extensions and, thus, its own degree of faithfulness to the model.

The reader who has followed previous columns should be aware that only a DBMS with a *genuine SQL engine* can be considered *truly* if not *fully* relational and capable of further extensions. Moreover, if the *DBMS* does not optimize performance properly, or if front-end tools aren't designed to explicitly exploit the relational capabilities of the back-end, the practical benefits won't materialize. This is a weakness of the database market, not of the relational model.

When you go out to select a DBMS, if you evaluate both SQL and non-SQL products against the same set of objective, relational criteria (features and rules), you'll find that:

- SQL-based DBMSs score better on fidelity than non-SQL ones, or than those offering only SQL interfaces.
- Some SQL implementations are better than others. Differences notwithstanding, all SQL dialects have a common core, and they're much more similar to one another than they are to traditional database languages. Therefore, the selection process should focus on finding the SQL DBMS most faithful to the model that offers the tools and performance most appropriate for your specific environment.

Unfortunately, the market doesn't make your task easy. Considerable mis- and disinformation about the relational model, SQL and commercial products are being disseminated constantly. Unless you fully understand the model and its implications, you're likely to be misled into one or more of the prevailing misconceptions. It is, therefore, important to dispel some of the most common ones that you'll encounter frequently.

Just Theory

Standard objection to relational principles takes the form of "Don't bother me with all this theoretical stuff; I need practical solutions." Implicit in this is the notion that theory isn't practical. This is due to a confusion of a *sound theoretical basis* with "just theory." But it's precisely theory — in this case *applied theory* — that gives the relational model its practical advantages, and it's *deviations* from theory that make database products more difficult to use and less reliable.

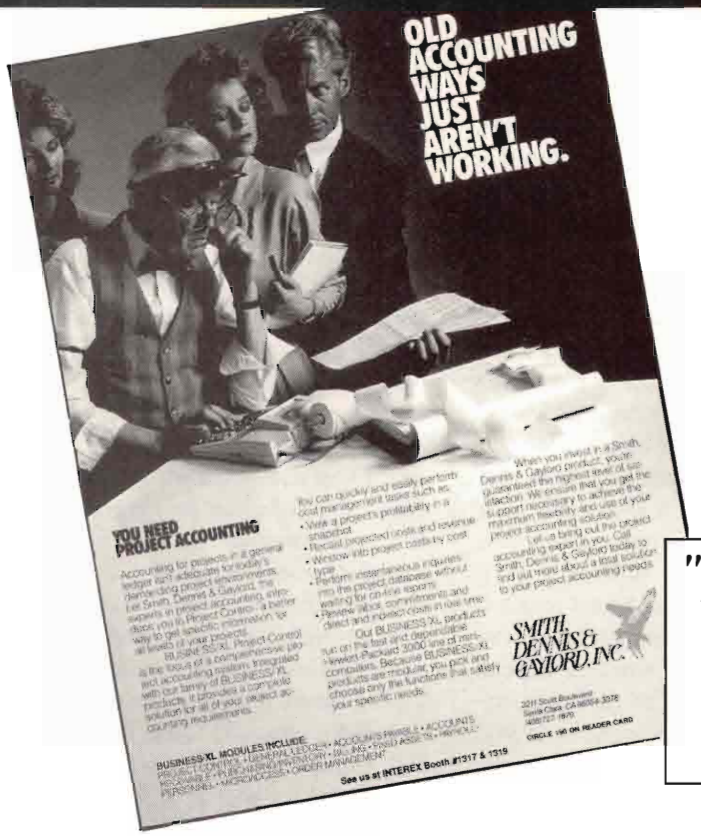
This misconception stems from a lack of knowledge of the relational model. If nothing else, the model simplifies database management and makes it comprehensible to all users, whether technical or not. Tables and their manipulation as sets are certainly simpler than the procedural database approach. Data independence, system-enforced integrity and optimization are only some of the crucial *practical* solutions provided by relational DBMSs.

Irrelevant

Some claim that although the relational theory and SQL have some practical benefits, they aren't for end-users who need "powerful features, customized menus and data-entry screens that non-programmers can readily understand and use."

But data-entry screens and menus aren't database functions. They are add-on facilities that must exploit those functions. Although such tools are, indeed, essential for end-users, they aren't *substitutes* for relational DBMS features. A menu from which you can select database operations is useless if that operation isn't supported by the DBMS.

In fact, more powerful and easier to use tools can be built on top of relational DBMSs, because they can exploit set-level table manipulation, integrity rules built in the database, and so on. Thus, relational DBMSs aren't a distraction, but a *prerequi-*



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site for such end-user tools. And, because they are less procedural, RDBMSs also minimize the amount of programming necessary to access databases.

For Connectivity Only

Another frequent claim is that SQL has value only for database connectivity across networks, but not for standalone DBMSs, especially on the PC.

It's true that SQL has important advantages for networked access to databases. Applications can request and obtain *sets* of rows from remote databases, which reduces traffic, lets the DBMS optimize access, and thus improves network performance. Also, as a *lingua franca* for databases, SQL allows applications and different DBMSs to communicate across the network in a common language.

But this doesn't mean that users of standalone DBMSs can't benefit from the relational capabilities SQL offers. Simplicity, power, reliability, better front-end tools, and features such as optimization, system-enforced integrity, and transaction support are useful in *any* environment, networked or not.

More Difficult

Two misconceptions are involved here. One is that SQL is difficult to learn and use, and the other is that this is so because users must master the mathematics of set theory to be able to use it.

As already mentioned, SQL does have its defects (most of which stem from its deviations from the relational model), which make it more difficult than it should or could be. But by no means is SQL more difficult than traditional database languages. Thus, however difficult it is, SQL is superior to non-relational data languages. Moreover, while SQL can be improved in the relational sense (if users demand it), traditional products can't.

"SQL is quite straightforward for simple data access but is more difficult for expressing complex relationships" goes another argument.

The last part of this assertion is true for any data language. And if it's so, SQL is "more difficult" *than what*? The relational model was devised precisely to simplify complex data relationships (which are infinitely less complicated to express with SQL than with procedural code). Database operations that would take pages and pages of complex programming code can be expressed in a few, more intuitive SQL lines, frequently in one statement. Again, SQL could have been simpler, but any complexity should be compared with the procedural alternatives, which would expose the misleading nature of the argument.

Besides, users don't have to *learn* SQL. SQL DBMSs (especially on the PC) can, should, and do offer front-end tools that exploit the power of SQL but insulate users from its syntax. Some are graphi-

cal, with users pointing and clicking a mouse to select options from menus and windows. The appropriate SQL statements are executed in the background and are transparent to the user.

Relational-Like

A common argument is that non-relational DBMSs can be made to behave relationally by providing them with an "SQL interface," and users won't be the wiser.

Every DBMS must be based on a data model. This model defines the structural, integrity and manipulation features that must be *built into* the DBMSs engine. The only known (if not as well-defined and complete) alternatives to the relational model are the hierarchical and network (or CODASYL) models. The three data models are mutually exclusive in the sense that adopting either of the non-relational ones violates the relational model. Indeed, the relational model was devised to avoid the problems posed by the other two. For example, if data relationships are expressed in the physical database structure and then exposed to users in applications, relational features (e.g., system optimization) are defeated, and fidelity rules (e.g., data independence, guaranteed access) are violated.

Among other problems (not the least of which is performance), an SQL interface to non-relational engines also means that database functions such as integrity and security aren't enforced in the database, and low-level procedural programs can bypass and thus subvert them. What users need isn't relational "appearance," but *true* relational benefits, and there's no satisfactory way for SQL interfaces to provide them.

This misconception is sometimes extended one step further by the claim that database operations expressed with current user tools can be transparently translated into SQL and executed by the system. Of course, if the tools aren't explicitly designed to tap relational features of the DBMS, translations will be difficult, inefficient and in certain cases not even possible. Moreover, the subversion problems will persist.

Multifile

The most common misconception, primarily (though not exclusively) in the PC world, is that an RDBMS is a DBMS that can handle more than one file at a time. It originates in the mistaken notion that the term relational comes from "relating files." According to this definition, a COBOL program accessing multiple VSAM files would be relational.

But such cases don't even involve a DBMS, let alone a relational one. Indeed, DBMSs were devised to *manage* files, so that users don't have to manage them by writing programs. For this reason traditional products, such as dBASE, can't be really called DBMSs, but rather should be considered *programmable filers*.

Thus, it's the *extent* to which the *system* manages databases and *how* it relates the database files that determine whether a product is really a DBMS, and a relational one at that. Now it should be obvious why almost all DBMSs are presented as relational, while in reality most of them are nothing of the sort. This erroneous use of the term is so entrenched in the market, that even after it has been exposed, it still persists (of course, in some cases, it is intentionally employed by vendors to disguise their product's inability to provide relational benefits).

Without a good grasp of the relational model and its implications, you can't see through these misconceptions, and it's easy to be misled. So, when evaluating database products remember that:

- Relational theory is what yields the practical benefits.
- SQL is the closest you can get today to those benefits.
- Not all SQL implementations are of the same quality.

Don't let anybody fool you. Demand your relational rights. Good luck.—*Fabian Pascal is president of micro-paSQaL, Washington, D.C.*

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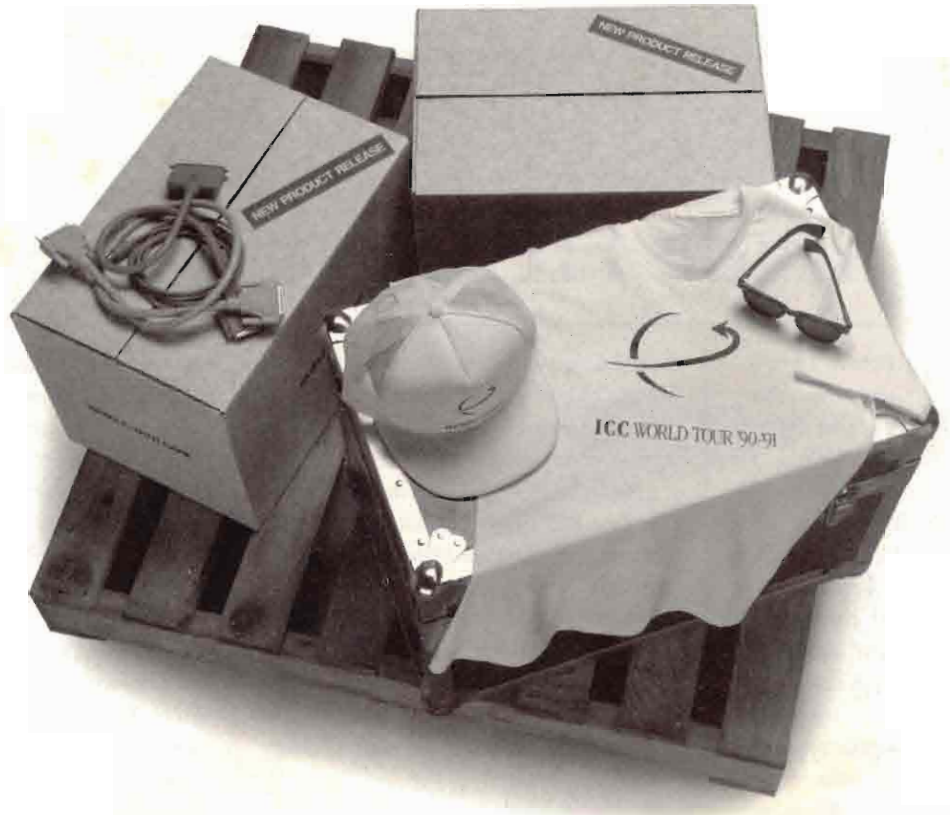

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PC TIPS

Miles B. Kehoe

Inside HP NewWave

Before I get into the many virtues of HP NewWave, I'd like to warn you about a problem you may encounter installing Microsoft Windows 3.0 on your Vectra. Because NewWave is based on Windows 3.0, you'll never get NewWave running until you overcome this unique interaction between Windows and the Vectra.

As you probably know, if you own a Vectra, HP provides a character-based front-end called PAM to help novice users run DOS applications. When you install PAM and HP's MS-DOS, you usually find that PAM has been included as the "command shell," the first program you see after your computer starts.

The problem is that the Windows 3.0 installation program requires that the command shell be COMMAND.COM. On your Vectra, you'll probably find the CONFIG.SYS file instructs MS-DOS to use PAM as the shell. If you try to install Windows in such an environment, it will report that you don't have enough disk space to complete the operation.

If you're using Windows, and especially if you're using NewWave, you probably want to eliminate PAM completely. Windows lets you start applications within the graphical environment, and NewWave lets you do away with the need to keep track of your applications. If you look in your CONFIG.SYS file, you'll find a line that looks like this:

```
shell=pamcode.exe root
```

This is the offending line. Remove it, reboot your computer, and the Windows installation program should run.

If you really want to use PAM, as well as Windows and NewWave, make sure the last line of your AUTOEXEC.BAT is the single word "pamcode." When you reboot your computer, you should find yourself inside of PAM, but with function key [f8] labeled "Exit PAM". You can use your normal PAM menu, but I suggest you exit PAM with [f8] before you run Windows and NewWave. If you don't, PAM will use a small amount of memory even while you're in NewWave. I suggest eliminating PAM and moving to NewWave as your primary interface.

NewWave From The Inside

Since its introduction, NewWave has been praised for its advanced "object-oriented" approach. But for most of us, the real benefit of NewWave is its ease of use. In fact, one of my main concerns for NewWave is that, like HP's Touchscreen PC, too many people talk about the technology without stressing its benefits to the end user.

We've all heard a lot about object-oriented environments and programming languages. But what is really meant by object-oriented with respect to NewWave, specifically?

NewWave, like the Windows 3.0 interface that it requires, is an event-based application. By this, I mean that different parts of the environment (and even of the same application) communicate by passing messages, or events, back and forth. When you press a mouse key, for example, Windows passes a mouse event to the application that is currently running.

Within this event-driven environment, objects are at the heart of NewWave. You can think of an object as a smart file. Each object is maintained by the environment and has stored with it information about the processes, or methods, that must be invoked to perform different tasks.

When you create a new object, you specify the object type and name. This object type inherits, or brings with it, several methods. A NewWave Write object, for example, has a method for the open task, the display task, edit task and even more.

In the simplest case, each of these tasks involves some invocation of the NewWave Write application. You can see more of the power of these methods when you consider that a NewWave Write object with Lotus and Drawing Gallery components uses display methods that don't require the actual Lotus or Drawing Gallery application.

Let's look at the events that may occur as you manipulate a multipart, or compound, object.

When you create a new NewWave Write object, an open method is inherited from the general object type. When you double-click on the icon, NewWave sends an open event to the NewWave Write object. This open event causes the environment to perform the series of tasks associated with the open method for NewWave Write objects. The most obvious part of this method is to start the NewWave Write application and pass it the object name. What you see on your screen is an empty document in a NewWave Write window.

In the case of an object that already exists and has text, spreadsheet and graphic elements, the open process is a bit more complicated but just as orderly. The open event performs the launch of the NewWave Write application, but includes a display event for each component of the document.

So, the text portion of the object responds to a display event that causes NewWave Write to show the document text on the screen. If the visible portion of the screen also has the spreadsheet, the NewWave environment sends a display event to the spreadsheet object. It, in turn, starts the special Lotus display application provided by HP and passes information to that application about what part of the screen should be used. Drawing Gallery images are handled similarly.

If you double-click in the spreadsheet portion of the document, it causes an Edit event to be executed. Because editing the spreadsheet is left to the actual Lotus 1-2-3 application, the NewWave environment launches 1-2-3 and passes it the actual filename of the spreadsheet.

When you exit 1-2-3, the modified spreadsheet is displayed in the NewWave Write application because another display event is sent by the environment. Also, any changes can be saved using save events known to all the objects.

Sound complex? Yep. Do you need to know all this to use NewWave? Nope. And that's the beauty of it.

Where Do We Go From Here?

HP now sells NewWave running on MS-DOS-based PCs like the Vectra. HP also understands the need to make a standard user interface across a wide variety of platforms, and I think in the coming years we will see NewWave move into other operating system environments.

The first one that comes to mind is OS/2 and Presentation Manager. Because the environment is based on the same hardware platform as MS-DOS, and because the interface is similar to Windows, this platform makes a lot of sense for HP. Of course, now that Microsoft is concentrating its efforts on Windows and IBM is putting its energy into Presentation Manager, only time will tell if Presentation Manager is the right GUI for OS/2. Nonetheless, I think we'll see NewWave there.

The second platform where NewWave makes sense is HP-UX. The lack of a friendly user interface has slowed the acceptance of UNIX in the commercial marketplace, and a version of NewWave based on the X Windows standard seems like a natural.

Where else will NewWave go? AT&T, Data General, and NCR seem to be interested in making it the heart of their office-based systems. I think NewWave is a product the entire industry can embrace.—*Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.*

Would you like to continue to see articles on this topic?
Circle on reader card
yes 348 no 347

NETWORKING

Gordon McLachlan

The PC Software Giant Lumbers Into LANs

Microsoft — A Network Vendor?

Like any other columnist, I'm unable to resist a good feeding frenzy, and our friends at Microsoft have attracted my attention by their ungainly thrashing about in networking waters.

Largely on the basis of its odd little operating system — MS-DOS — which rode Big Blue's coattails to fame and fortune, Microsoft became a behemoth in the software industry. Now, flushed with the success of Windows 3.0, the company has waded right into the network wars, boasting its own private-label LAN Manager. This I gotta see.

These folks have never released a good product on time, but suddenly they're convinced they can take on IBM and the rest of the industry. Do they have a chance? Or, are they just cocky because they finally put out a version of Windows people are actually willing to pay money for?

I think they're too full of themselves. Microsoft is not a network company and will have to do a lot to convince me that it is. It can't even get Windows to run properly with OS/2 LAN Manager. That doesn't inspire confidence.

I know I've taken the side of OS/2 and LAN Manager in previous columns. Nevertheless, a feeding frenzy is a feeding frenzy, and this is no time for regrets. It's chow time.

The Trouble With OS/2

Unlike some others, I have no quarrel with OS/2 per se. I'm less than enthusiastic about it as a workstation platform, but it has potential for network servers. However, I do have a problem with the way Microsoft has handled OS/2, which is why I'd like it to stay out of the way.

OS/2 is a lot like Windows, and not just because it looks like Windows. The biggest similarities lie in the way the two products have been brought to market. And brought to market. And brought to market. Get my drift? Microsoft has about as much ability to pull off a successful launch as NASA. What is it with these people? I'm beginning to think the damp climate in Redmond has made their brain-pans rust out.

It's not as though OS/2 is taking the world by storm and Microsoft is just taking its place in the sun. My feeling is that Microsoft has gotten too big for its britches and allowed itself to get ticked at IBM. It may be a noble cause, but as others have found out, the evil giant of Armonk is not to be trifled with.

Microsoft has about as much ability to pull off a successful launch as NASA.

All things considered, Bill Gates ought to give up his dreams of network conquests, buy a baseball team and go be a boy wonder on some other turf.

Solomon's Solution?

Part of the problem Microsoft has is trying to figure out who has custody of OS/2. And the way they're handling it, they might as well cut the baby in half. Although Microsoft has been doing much, if not most, of the design and coding, the trademark is owned by IBM. This means Microsoft and IBM both think they are in the driver's seat. This arrangement works about as well as getting blind drunk and letting your buddy steer the car while you work the pedals.

Along the way, Microsoft has battled IBM over what OS/2 was going to look like, which application programming interfaces, networking features and database support should be included. So far, it has lost on all counts.

Not to be deterred, when IBM said it was going to support the Postscript font graphics, Microsoft announced that it would use something called TrueType. I know what Postscript is. Does anybody know what TrueType is? Then, when IBM announced a version of OS/2 that only required 2 MB of memory, which is exactly what OS/2 needs, Microsoft yawned and said, "That's nice, do it without us." Needless to say, that made IBM very unhappy.

IBM, for its part, has never been crazy about Windows. To Microsoft's chagrin, IBM has refused, until quite recently, to endorse Windows for any reason. It wasn't until Windows 3.0 started selling like crazy that IBM finally gave up and admitted it might be acceptable, maybe, in certain circumstances.

This is a strategic partnership? It sounds more like somebody put two cats in a bag. But in a September press release, IBM "reaffirmed" that it is great buddies with Microsoft and that everything is hunky-dory. That's great, but I saw the same press release in 1989, and there was probably one in 1988, too.

The release also revealed that Microsoft and IBM were going to concentrate their development in the same locations. What this means is that IBM wanted the Microsoft folks where they could see them—and come after them with baseball bats if necessary.

Enough about Microsoft. What is the future of the OS/2 LAN Manager itself? Even if you *are* a rocket scientist, you

should be able to figure this one out. The OEMs are not going to be too happy.

I'm sure that OEMs like 3Com and HP have wondered how they got into this mess in the first place. After bravely (or stupidly) riding out the MS-NET fiasco and getting clobbered by everybody, they nonetheless jumped on the OS/2 bandwagon and got sodomized again.

For starters, OS/2 hasn't exactly received a standing ovation in the marketplace. It requires too much hardware to run, and it's too picky about the hardware you give it. Every OEM has to tailor OS/2 to its product line, which causes serious delays.

What's really bad is that the OEMs don't get the OS/2 or LAN Manager code until months after IBM gets its hands on it. The result? IBM has been happily shipping its own enhanced version of OS/2 1.2 — the Extended Edition — with its own proprietary version of LAN Manager, and Microsoft has just started shipping version 1.2 of the Standard Edition to OEMs. Maybe if they hurry, the OEMs can ship before IBM launches OS/2 version 2.0.

I wouldn't want to be some vendor big-shot explaining why I'm staking my PC network strategy on weak code that I can only bring to market months after my competition.

The September press release announced that LAN Manager and LAN Server were going to "converge." That's clever, considering that they started out as the same thing. If these bozos had their act together, they wouldn't have diverged in the first place. The release also stated that IBM was going to take primary responsibility for new versions of OS/2 — a none too subtle hint that it was sick of Microsoft fussing around with it. Now the Microsoft OEMs have the pleasure of becoming true-blue IBM OEMs. Just what they wanted, right?

Network Effects

What effect will all this have on your networking strategy?

IBM also says it wants to let Microsoft and the OEMs have all the functionality of OS/2 Extended Edition and LAN Server. What it all boils down to is that IBM doesn't want multiple versions of its own "standard." With IBM firmly in control, you can also bet that the client-server application programming interfaces (APIs) you use will be based on IBM Presentation Manager, Data Manager and Communications Manager, and not on APIs dreamed up by HP or anybody else.

There is a simple reason for this: If the OEMs always get the code late, and the standard code already includes all of those nifty APIs, it would be pretty stupid to re-engineer them just to make proprietary versions. In my humble opinion, this is going to be the real "new wave," and I'll say it until somebody gives me some sales figures to disprove it.

Further complicating things, IBM has joined with 3Com to develop a LAN management scheme, Heterogenous LAN Management (HLM), which looks like the ISO Common Management Information Protocols (CMIP), but doesn't require the whole OSI stack and hundreds of kilobytes of code to implement.

HLM is going to be independent of the network operating system, but we already know what platforms IBM and 3Com are using. Do you think that these boys are going to let that piece of work loose for all the OEMs? For that matter, will IBM even let Microsoft have it? That all depends on whether it's considered to be a part of the LAN Server or just a piece of proprietary code that only IBM and 3Com will have. Reading between the lines, I would say it's going to be the latter.

Here's my final contribution to punditry: IBM is going to make or break OS/2, and it's going to happen on IBM's terms. If the OEMs want to play by IBM's rules, everything will be fine. If they strike out on their own, they'll get clobbered again.

Come on, HP. What's your response to this mess? I'd love to hear it, and so would my readers.—*Gordon McLachlan is a consultant with National Tech Team in Dearborn, MI.*

Would you like to continue to see articles on this topic?
Circle on reader card
yes 346 no 345

ISA Designs Disk Subsystems

ISA Co. Ltd. designed and developed a series of disk subsystems for the HP 3000, 1000 and 9000.

The Model 3000 Series disk subsystem contains a 64-KB memory component that enables the overlapping of host I/O time and disk access time. This memory component also eliminates controller data buffering time.

The ISA series offers four models with 300, 600, 1200 and 1800 MB in storage capacity. All models support the HP CS/80 protocol and emulate the HP 79xx series disk drives.

Contact ISA Co. Ltd., 1-1-5 Sekiguchi, Bunkyo-Ku, Tokyo 112, Japan; 03 (5261) 1160.

Circle 400 on reader card

MUXLINK For HP 1000s

Interactive Computer Technology introduced MUXLINK, a DS/NS-compatible software package for HP 1000 computers using the RTE-A and RTE-6/VM operating systems.

MUXLINK allows HP's DS/1000 and NS/1000 network software to communicate between HP 1000s over standard MUX ports, without the need for HDLC or LAN communications interface cards.

HP's network software sees MUXLINK's type-66 drivers as if they were HDLC cards, which means any DS/100-IV-compatible service or NS-ARPA/1000 service is allowed over the MUX links.

The initial price for MUXLINK is $1,500 for the first connected pair and $500 per additional node.

Contact ICT, 2069 Lake Elmo Ave. N., Lake Elmo, MN 55042; (612) 770-3728.

Circle 399 on reader card

HP DACQ Runs On All HP BASIC Platforms

HP's data acquisition manager software, HP DACQ, now runs on UNIX systems with HP BASIC/UX, personal computers with the HP BASIC Language Processor II, and HP 9000 Series 300 workstations with HP BASIC.

HP DACQ is a general purpose data-acquisition manager that reduces development time by providing users with a subroutine library to set up databases. The subroutine library can store, analyze, display, print, plot and transmit data.

A scheduler routine also is available to assist in timing and prioritizing subroutines.

HP NewWave Office Gets Additional Support

HP announced three additional software products, 16 value-added resellers and 18 independent software developers (ISVs) for HP NewWave Office.

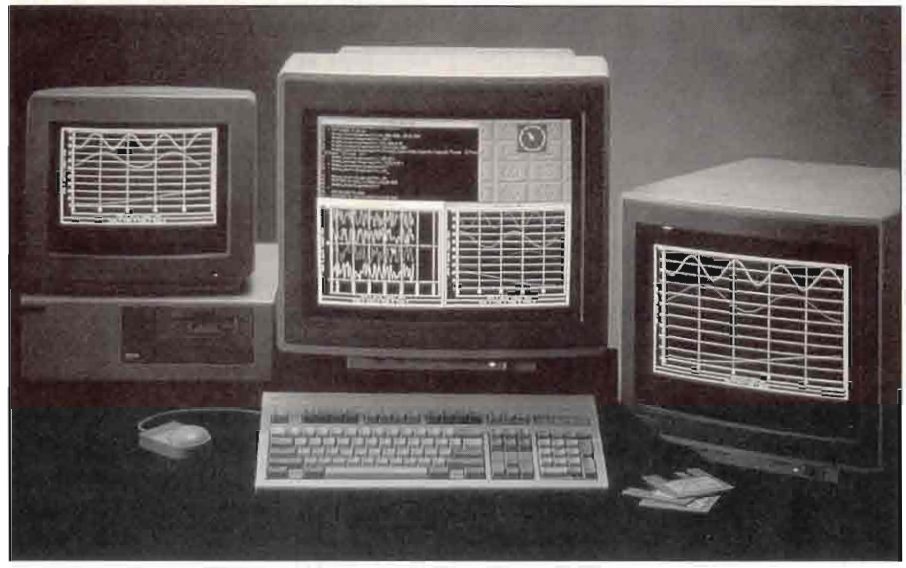
With the new product announcements, HP NewWave Office now comprises more than 20 software products and services that provide customers with communications, decision-support and information-sharing services.

The three new software products are: HP NewWave Mail, an e-mail product that enables customers to send messages, video objects and other data types to other computer users; HP AdvanceLink for HP NewWave, terminal-emulation software that allows users to transfer MS-DOS files to and from HP 3000 and HP 9000 computer systems; and HP OfficeFax, software that allows users of e-mail products, such as HP AdvanceMail and HP NewWave Mail, to fax directly from their computers.

HP NewWave Mail is available for $195, with volume discounts available. Current users of HP AdvanceMail software can upgrade for $125.

HP AdvanceLink for HP NewWave is expected to be available by the end of 1990 from HP's direct sales force and from authorized dealers. It will cost $299, with standard discounts available. Current users of HP AdvanceLink will be able to upgrade to HP AdvanceLink for HP NewWave for $125.

The HP OfficeFax for HP DeskManager or HP OpenMail e-mail systems is $6,000.



HP DACQ now runs on UNIX systems with HP BASIC/UX, PCs with the HP BASIC Language Processor II and HP 9000 Series 300 workstations with HP BASIC.

Ingres Offers Automatic Two-Phase Commit

Ingres Corp. announced a heterogeneous distributed database management system that automatically ensures that information at multiple sites remains consistent after being updated by any type of transaction.

The new capability, automatic two-phase commit, is built into the latest release of INGRES/STAR and allows programmers to create more flexible distributed database applications.

INGRES/STAR allows any transaction to update information stored at any site. The same transaction can, without modification, update information stored at a single site or at multiple sites.

Contact Ingres Corp., 1080 Marina Village Pkwy., Alameda, CA 94501; (415) 769-1400.

Circle 394 on reader card

MiniSoft 92 Supports HP ADVANCENET

MiniSoft began shipment of its HP terminal emulation package supporting HP's ADVANCENET local area network.

MiniSoft 92 is a terminal emulation and data communications package designed for the IBM PC family and compatibles. It provides a complete emulation of the HP 2392A and 700/92 CRT terminals.

MiniSoft 92 for HP ADVANCENET is priced at $129 per node.

Contact MiniSoft Inc., 16315 NE 87th St., Ste. B101, Redmond, WA 98052; (800) 682-0200; (206) 883-1353.

Circle 389 on reader card

FIGARO+ Supports Double Buffering

Template Graphics Software Inc. announced support for double buffering and hidden surface removal with FIGARO+ on personal workstations supporting the X Window System.

Double buffering is typically a hardware feature that allows an object to smoothly spin or move across the screen. In double buffering there are two frame buffers — one visible on the screen, the other hidden from the viewer. As performed by high-end hardware, FIGARO+ creates the next image in a software-hidden frame buffer while the viewer sees the previous frame.

FIGARO+ developers can select the double buffering method most appropriate for their application and the target X server. Using a hidden pixmap as a buffer allows full color-on-color displays and is also appropriate for monochrome displays.

Hidden surface removal improves the correctness of the image viewed on the screen. Without it, an image may appear to be inside out because the facets that comprise the object are drawn in the order in which they occur in the graphics database.

FIGARO+ is available on platforms from HP, HP/Apollo, IBM, DEC and others.

Contact Template Graphics Software Inc., 3510 Dunhill St., San Diego, CA 92121; (610) 457-5359.

Circle 397 on reader card

16-Button Cursor For GraphicMaster

Numonics introduced a 16-button cursor for its GraphicMaster digitizing tablet. The cursor, which joins a four-button cursor and a side-switch pen as optional equipment for the tablet, is suited to a variety of CAD/CAM applications and is compatible with most major hardware and software.

GraphicMaster is available in 12x12 and 12x18 sizes, and features resolution of 1,000 lines per inch, pen tilt correction resulting in accuracy of 0.001 inch and the industry's smallest footprint. GraphicMaster requires no power supply and remembers configurations even with the power off. Its diagnostics — included in the set-up utility — register on an LED indicator.

Contact Numonics, 101 Commerce Dr., Montgomeryville, PA 18936; (215)362-2766.

Circle 382 on reader card

DATAONE Provides IMAGE-To-SQL Migration

Pantechnic Inc. announced DataOne, a tool for migrating IMAGE databases to ALLBASE/SQL.

DataOne converts an IMAGE schema to an HP SQL schema, creates the new database and copies the IMAGE data to HP SQL, with appropriate data type conversions. Existing IMAGE applications can run unmodified to access the migrated HP SQL database. Both native mode and compatibility mode libraries provide emulation of virtually all major IMAGE functions.

DataOne runs on all MPE XL machines and ranges in price from $1,000 to $5,000.

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

Circle 387 on reader card

ROBOT/3000 Receives Network Support

Productive Software Systems Inc. announced networking support for its ROBOT/3000 Cross-Referencing System.

ROBOT/3000 is an application system maintenance tool that provides online inquiry to a complete cross-reference database of all your source programs, form files, job streams and UDCs. With Release 7.0, users of multiple HP 3000s can link their job streams and QUIZ files on production machines to ROBOT's database on their development machines. Online help screens also have been added. Prices start at $4,000.

Contact Productive Software Systems Inc., 7401 Metro Blvd., Ste. 340, Minneapolis, MN 55439; (612) 831-8866.

Circle 388 on reader card

Pacific 4 Memory Expands LaserJet IIP Memory

Pacific Data Products Inc. announced Pacific 4 Memory, an upgradeable memory board that allows users to expand the standard 512K printer memory of the HP LaserJet IIP or the standard 1 MB memory of the LaserJet III printers by 1, 2, 3 or 4 MB.

Pacific 4 Memory provides the laser printing power needed for downloading fonts and forms and printing sophisticated desktop publishing applications such as full page 300 dpi graphics and scanned images.

Prices range from $199 to $499.

Contact Pacific Data Products, 9125 Rehco Rd., San Diego, CA 92121; (619) 552-0880.

Circle 381 on reader card

DISC Releases UNIX PVCS, PolyMake

Digital Information Systems Corp. (DISC) announced a UNIX version of Safe Software's Polytron Version Control System (PVCS) and PolyMake.

DISC is marketing both PVCS and Polymake as the DBL Synergy Configuration Management System, a component of the DBL Synergy software development environment. It's currently ported to more than 50 UNIX platforms. Most DISC versions are fully compatible with Sage's DOS and OS/2 products.

The PVCS and PolyMake products control a software system's organization, construction and maintenance. Version control manages code changes and ensures that the modifications are actually reflected in the intended executable programs. It coordinates access to program sources and maintains project archives, among other features. PolyMake is an automatic system builder, using makefiles to determine and document module dependence. Both utilities can be implemented in both new and existing projects. Contact Digital Information Systems Corp. (DISC), 11070 White Rock Rd., Ste. 210, Rancho Cordova, CA 95670-6099; (916) 635-7300.

Circle 384 on reader card

HTBasic 3.0 Includes Complex Numbers

TransEra Corp. announced Release 3.0 High Tech Basic. HTBasic 3.0 not only allows HP BASIC-compatible instrument and program commands, but continues to improve on the Rocky Mountain BASIC language. New features include the addition of complex numbers, loadable device drivers, higher resolution display support, international character support and syntax extensions.

The DOS PC Version (H86) of HTBasic 3.0, for use on any PC compatible, sells for $625 including shipping in the U.S. The DOS 386 Version (H386), for use on 386 and 486 PCs with up to 16 MB of memory, sells for $925 including shipping in the U.S.

Contact TransEra Corp., 3707 N. Canyon Rd., Provo, UT 84604; (801) 224-6550.

Circle 385 on reader card

New HP Product Expedites Problem Isolation

HP introduced the HP 18227A NetWare protocol interpreter. It's designed to expedite problem isolation for network managers of Ethernet LANs in the management of NetWare-based LANs.

The HP 18227A NetWare protocol interpreter, which runs on the HP 4972A LAN protocol analyzer, troubleshoots communication problems among systems using Novell's NetWare protocols. NetWare protocols are decoded by the HP 18227A. The decoded information is displayed in descriptive text.

The HP 18227A NetWare protocol interpreter is priced at $960. The HP 4972A LAN protocol analyzer is priced at $18,540.

HP Enhances Image-Scanning Capabilities

HP announced it has enhanced, at no additional cost to users, the image-scanning software that's shipped with the interface kits for the HP ScanJet Plus scanner.

HP also introduced HP AccuScan, text-scanning software for AT-compatible and MicroChannel (MCA) PCs.

For AT-compatible and MCA PCs, the new imaging capabilities are offered in HP Scanning Gallery Plus 5.0. Similar capabilities are offered for Macintosh users in HP Desk Gallery Plus. The new capabilities offered by the imaging software include Automatic Exposure, Live Preview, Samples Print and Grayscale Image Editor.

HP AccuScan is the company's first text-scanning software for AT-compatible (including EISA) and MCA computers. This software requires HP Scanning Gallery Plus 5.0 and is fully compatible with Windows 3.0.

HP Scanning Gallery Plus 5.0 software is shipped with the AT-compatible and MCA interface kits for the HP ScanJet Plus scanner. HP Desk Gallery Plus software is shipped with the Macintosh interface kit. Both are available at no increase in price. HP ScanJet Plus scanner and interface kit are $2,190. HP Scanning Gallery Plus 5.0 software is fully compatible with Windows 3.0. HP AccuScan text-scanning software is $595. Users can get upgrade information for HP Scanning Gallery Plus 5.0 and HP Desk Gallery Plus by calling (800) 848-9283.

DISC Announces Omnidex For MCBA

Dynamic Information System Corp.(DISC) announced Omnidex for MCBA, the third in a series of application interfaces. It accesses the accounts receivable, accounts payable and inventory modules for MCBA.

The first two interfaces were Omnidex for MANMAN and Omnidex for Multiview.

Omnidex for MCBA was developed in a joint effort between DISC and Orion Group (South Bend, IN). It enhances the F5 lookup procedure of MCBA. Because of the Omnidex interface, users will have access to customer, vendor, item inventory, and other data in the MCBA database. The interface is fully transparent to the application and does not require any source code modifications.

Omnidex for MCBA will be sold on a per module basis, with prices starting at $750.

Contact Dynamic Information Systems Corp. (DISC), 910 Fifteenth St., Ste. 640, Denver, CO 80202; (303) 893-0335.

Circle 393 on reader card

New PROGRESS Provides Open Application Development

Progress Software Corp. introduced PROGRESS Version 6, an enhanced new release of its 4GL and RDBMS that opens the product's architecture to alternative databases, distributed database capabilities, 3GL access and window managers.

In Version 6, the PROGRESS architecture allows users to access and change data in PROGRESS, Oracle and DEC Rdb databases as well as DEC's RMS file system. These PROGRESS, Oracle, Rdb and RMS data structure can be connected either singly or simultaneously, thereby providing a high level of data integration.

The PROGRESS RDBMS itself has been enhanced to include distributed database support that allows users to dynamically connect up to 240 databases simultaneously, and a two-phase commit architecture that provides data integrity when updates across databases occur.

A complete application development copy of PROGRESS Version 6 ranges from $1,050 to $190,000, depending on the host computer used. The package is available for many PROGRESS-supported platforms, including the HP 9000 Series 800.

Contact Progress Software Corp., 5 Oak Park, Bedford, MA 01730; (617) 275-4500.

Circle 363 on reader card

Bradmark Announces TELESCOPE

Bradmark Computer Systems announced TELESCOPE, for all HP 3000s, including MPE V- and MPE XL-based systems.

TELESCOPE assists operations people, as well as programming and support staff, in communicating with actively running batch jobs. It's designed to be incorporated within existing job streams and, if sophisticated communications are desired, it can be implemented into production programs.

TELESCOPE contains three modules: a Monitor program with an extended command interpreter, full online help and Native Language Support; a series of intrinsics available for MPE V-based programs, or compatibility mode (CM) programs on MPE XL, and in Native Mode (NM) for NM programs on MPE XL; and a TELESCOPE utility program that can be inserted within existing job streams.

Contact Bradmark Computer Systems, 4265 San Felite, Ste. 820, Houston, TX 77027; 713-621-280

Circle 376 on reader card

SL Corp. Enhances GUI Development System

SL Corp. announced SL-GMS 4.0, an object-oriented graphical modeling system used to develop dynamic graphic screens for real-time applications.

SL-GMS 4.0 offers Xt widget integration, Hypercard-like screen management and a Data Source Manager for codeless connection between screen objects and data sources. It also includes Graphic Interactive Screen Management Objects, which are "super-widgets" capable of complex behaviors beyond Xt widgets.

SL-GMS supports major UNIX, VMS

and ULTRIX workstations, including HP/Apollo, Sun, DEC, IBM and MIPS platforms. It is priced at $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.

Circle 391 on reader card

Kelly Ships RAMDISC/XL

Kelly Computer Systems delivered its first shipments of RAMDISC/XL, the RAM disk for HP 3000 MPE XL systems.

RAMDISC/XL is a new software/hardware technology that improves performance on MPE XL machines by eliminating disk I/O bottlenecks. Disk reads and writes to RAMDISC files occur without any of the delays associated with traditional rotating storage devices. RAMDISC/XL exists on the main memory bus of the HP 3000. I/O is fed immediately to the requesting program in less than 1 ms.

Kelly also announced performance analysis tools and a performance analysis service to help MPE XL sites determine which files are the major consumers of I/O resources on their systems.
Contact Kelly Computer Systems, 1101 San Antonio Rd., Mountain View, CA 94043; (415) 960-1010.

Circle 378 on reader card

PARA/SERIES 2.0 Features Motif, X Support

Image Data Corp. introduced PARA/SERIES Release 2.0, the second generation of its imaging and visualization software.

The new release adds Motif and X support to give users a graphical user interface and networkability. It is also the only imaging software designed for parallel processing to provide linear performance increases on multiple processor systems.

The new version also adds an imbedded integrated relational database management system, as well as a range of enhanced features and new functions, such as morphological functions. The software is compatible with all UNIX workstation and network environments and is accessed through a Motif/X Windows user interface.

The four PARA/SERIES modules are PARA/BASIC, PARA/VIEW, PARA/INFO and PARASCENE. The PARA/SERIES Release 2.0 produce is base priced at $20,000.
Contact Image Data Corp., 600 S. Lake Ave., 2nd Fl., Pasadena, CA 91106; (818) 796-9155.

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Intelligent Interfaces Offers MicroRAM Memory Boards

Intelligent Interfaces introduced a 1, 2, 4, 6 and 8 MB family of RAM memory expansion boards for HP computers. The boards are fully compatible with HP 9000 Series 200, 310/320 computers and may be used in conjunction with HP memory expansion boards. Board installation is made by a snap-in backplane design and addressing is switch-selectable.

The MicroRAM6 memory board eliminates the the need for HP 310/30 users to discard or add other memory cards in order to expand RAM memory.

MicroRAM boards are designed to enhance the efficiency of workstations running CAD, CAM, desktop publishing and other graphic applications, including rendering packages. Each memory board comes with documentation, 90-day money back guarantee and full two year warranty. Prices range from $645 to $2,995.
Contact Intelligent Interfaces, P.O. Box 1486, Stone Mountain, GA 30086-1486; (404) 381-9891, or (800) 842-0888.

Circle 361 on reader card

OpenConnect Systems Gain X-Windows Support

Mitek OpenConnect Systems announced X-Windows support for its OpenConnect/TN3270 and OpenConnect/TN3179G products. These products are IBM terminal emulation software products for TCP/IP host systems based on the TN protocol as specified by the University of California at Berkeley.

TCP/IP network users now can access IBM mainframes utilizing a range of TCP/IP attachments to IBM SNA including, but not limited to, Mitek's OpenConnect/Server and the IBM 8232

OpenConnect Systems solutions permit high-speed, bidirectional data communications between IBM host systems and computers, workstations and terminal servers from HP, Apollo, DEC, Sun Microsystems, Tektronix and others that are connected to a TCP/IP LAN.
Contact Mitek OpenConnect Systems, 2033 Chennault Dr., Carrollton, TX 75006; (214) 490-4090.

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Signature _____ Date _____

Please answer these questions:

3. Do you wish to receive/continue to receive HP Professional?

01 ☐ Yes 02 ☐ No

4. What kind of HP computers does your company own or plan to buy?

23 ☐ HP 3000 33 ☐ HP 9000 49 ☐ HP 1000
79 ☐ HP or HP/Apollo Workstations
97 ☐ Other _____

5. In my job, I specify, approve, purchase or influence the purchase of the following:

39 ☐ Hardware 79 ☐ Software
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99 ☐ None of the above

6. Detach and FAX this form to the Advertising Services department.

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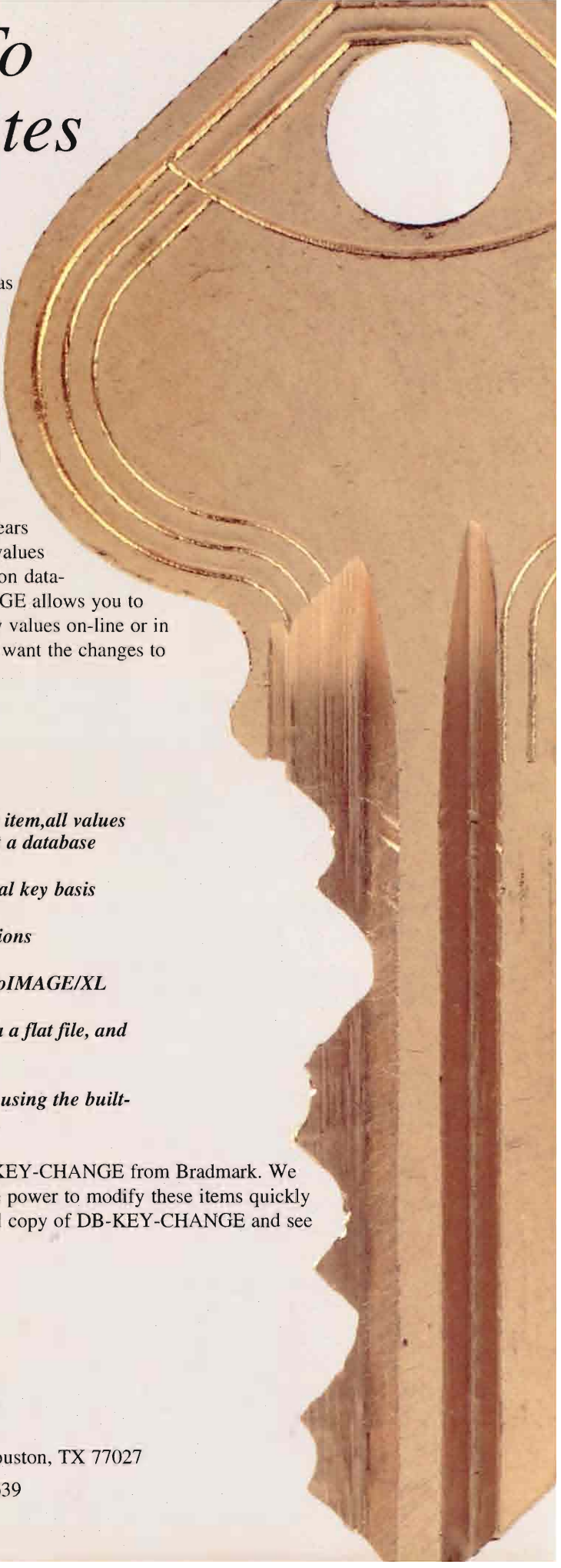
Thank You. Your request will be processed immediately.

We HaveThe Key To Critical Item Updates



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