Forecast '96

Don't even bother with Computerworld's annual Forecast issue if you can't handle a sizzling, byte-size look at 10 of the juiciest technical areas and nine of the sexiest up-and-coming companies.

And if you aren't interested in thought-provoking words from 11 of the top IS leaders, don't take a look either. If that's the case, you won't want to read the fun stuff, such as scintillating facts you just have to know, flippant capsules of the industry's past and predictions of its future, where to find the most bizarre 'net stops and a sneak peek at what our newspaper might look like in the year 2000. So if you can't take the heat, walk away now, because we predict 1996 is off to a blazing start. Forecast begins on page 17.

IS departments will be hiring like crazy in 1996. Our first annual Jobs Outlook Survey reveals the hottest jobs and where to find them, plus the skills most in demand. Page 77.

A done deal?
Novell anxious to sell WordPerfect; Boston firm top suitor

By Lisa Picarille

A Boston-based venture capital firm tops the list of potential buyers for Novell, Inc.'s WordPerfect unit,.Computerworld has learned.

Bain Capital, Inc. is spearheading a group of investors that includes some unnamed former WordPerfect and Novell executives, according to several sources inside Novell and others close to the deal. The venture firm is headed by financier W. Mitt Romney, who lost a 1994 Republican bid to unseat incumbent Sen. Edward M. Kennedy (D-Mass.).

Bain has invested in other software ventures, including Corporate Software, Inc., Josten's Learning Corp. and R.R. Donnelley's Global Software Services.

"We are close to announcing something. Maybe in the second week of January," said Liz Tanner, a spokeswoman for Novell's Business Applications Division, commenting on the rumors of a first-quarter sell-off of that unit. However, she declined to comment on any negotiations. Bain also declined to comment.


IBM’s delay riles users
Yet big iron disk prices to fall as next arrays slip into 1997

By Craig Stedman

Time keeps on slipping, slipping, slipping into the future for IBM's mainframe disk arrays. And that means System/380 users should see disk prices falling, falling, falling during 1996.

IBM confirmed that a promised third generation of its Ramac array won't ship until the first quarter of 1997, six months later than users were led to expect. In a domino effect, IBM's futuristic Seastar family of multiplatform and fault-tolerant RAID devices is being pushed to the end of 1997.

Seastar, which was originally due in 1996, is IBM's great hope for stealing technical leadership IBM, page 105.

Internet wizards keep chaos at bay

Second in a two-part series.

By Gary H. Anthes and Kim S. Nash

The Internet often seems mysterious, chaotic and uncontrolled — the last place users want to put mission-critical business applications.

But the popular image of this hugely distributed network as the height of anarchy is overblown. While it's true that no single entity controls the Internet, its future is being guided and nurtured by an increasingly well-organized army of network wizards.

These wizards are part of the Internet Engineering Task Force and several companion organiz...
Wy 3Com delays 3Com's ATM uplinks and switching products are running three to six months late, the vendor admits.

IS wishes IS managers are putting together their holiday list — and checking it twice.

Telecom reform Telecommunications managers react with a mix of optimism and skepticism to the communications reform bill.

Lotus Notes Notes 4.0 hits the streets. Beta users seem ready to go based on their experiences, especially with Lotus' recent Web strategy announcement and Notes price cuts.

SSA strategy Following charges of fraud and deceptive business practices, System Software Associates executives come clean about the company's client/server software strategy and delivery plans.

1995 PC sales Corporate migrations to the Pentium, combined with the continuing boom in the small business and home markets, resulted in higher-than-expected PC sales in 1995.

OPINION
Hot job market The year ahead will test your personnel management skills as never before, Bill Laberis predicts.

IS and the Web Jerrold M. Grochow says we're witnessing the birth of the Web-connected economy and offers his Web predictions for 1996.

IS budgets Consultant Jane Griffin says decentralized IS budgets (and departmental rivalries) make it hard to fund enterprisewide projects.

Microsoft and the 'net Microsoft's capitulation to its rivals in the Internet community doesn't mean the war is over, Charles Babcock says.

Technical Sections

DESKTOP COMPUTING
Wish list for Microsoft
Windows NT with the Windows 95 user interface is at the top of some users' Microsoft wish lists.

PC hardware
Users consider reliability the most critical requirement when buying PCs.

Sales force automation
SalesKit Software says it has an answer for the high number of failed sales force automation projects.

WORKGROUP COMPUTING
CC:Mail
Lotus looks to client/server, but seems willing to let CC:Mail users loiter on the migration path.

Disaster recovery
IBM and Comdisco introduce LAN-based disaster recovery services.

ENTERPRISE NETWORKING
Switches
LAN-switching costs plummet, but IS managers may end up spending more.

WAN deployment
Paul Hoogenboom's strategy for building a wide-area network has been to stick with AT&T where he can and turn to other vendors where he has to.

A. W. Chesterton's Paul Hoogenboom

APPLICATION DEVELOPMENT
C++
HP will add artificial intelligence features to its SoftBench development environment.

Commentary
Mitch Betts says the customer isn't always right. A wide body of usability research shows that users often prefer an interface that actually makes them perform worse.

Internet applications
Application development tool vendors work on ways to let developers connect to the Internet.

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Application deletion software finds a home in the corporate world.

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WE DARE YOU TO
MAKE THE JUMP INTO
1996 WITHOUT READING OUR ANNUAL FORECAST ISSUE.

TURN TO OUR ANNUAL FORECAST IN THIS WEEK'S ISSUE.
Take heart. If you've weathered the changes in 1995, you'll probably land on your feet in 1996.

But you'll definitely want to read this week's Computerworld Annual Forecast Issue—cover-to-cover—just to make sure.

After all, we're previewing the coming spills and thrills in the turbulent client/server market.

You'll also get a blow-by-blow account of what's shaking in the chicnet network industry.

And we'll show you the wide spread "management gap" in 1996.

We'll even introduce you to the little known vendors and users who are poised for greatness in the coming year.

In short, we'll give you an overview of the important issues headed your way.

And while going through one informative article after another, we hope you'll also notice our new typeface, our new table of contents and all the tabs we've added to make Computerworld as easy to read as possible.

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3Com late with key ATM products

By Bob Wallace

3Com Corp. customers looking to use Asynchronous Transfer Mode (ATM) technology in their enterprisewide Internet networks will have to wait three to six months now that the vendor has missed ship dates for several key ATM products.

A 3Com official confirmed that the company had planned to ship ATM uplinks for two switches, ATM switching for one of its hubs and a Peripheral Component Interconnect (PCI) adapter card by the end of December. But those plans have been moved back by "one or two quarters."

"We want to go with the feature set that best suits our customers' needs," said Amir Ledad, director of ATM marketing. "And once it's written down, we'll throw it out and buy something else from someone else," said Steve Lopez, information systems manager at the National Board of Medical Examiners in Philadelphia. He said he has six LANplex 6000s and has long pressed 3Com for the ATM uplink.

Another user has been waiting for the ATM uplink as part of a project to link LANplex 6000s to an ATM backbone network that will replace the firm's Fibre Distributed Data Interface backbone.

"3Com is at war with itself as are companies after major acquisitions," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "This lateness is probably because they're deciding whether to pursue Chipcom's ATM strategy, which is sold."

Chipcom already has high-end switching hubs with ATM uplinks; the 3Com side of the house doesn't yet have the latter ATM uplinks, said Nolle, who also has other ATM wares, such as 25M bit/sec. ATM adapters, that the latter doesn't, Nolle said.

Users also have a wish list for Microsoft. See page 61.

IS making that list and checking it twice

Dreams of ease of use, openness dance through systems managers' heads

By Computerworld staff

"I want six integrated applications that work right out of the box, five gold consultants, only four calling users, three more months, two SAP Basis gods and another test machine in a pear tree."

—Ralph Fuoco, data center manager at Schindler Elevator Corp., Morristown, N.J.

***

On Gates! On Ellison! On Frankenber and Gerstner! Step lively, Plaat! Get going, Pfeiffer and Palmer!

This holiday season, information systems managers are sizing up vendors and checking them twice. By the way, they would like all that delivered under the "open systems" label.

A random poll of IS professionals across the country elicited a cry common to the industry: "Make our jobs easier, and we promise to be good to you in 1996."

Take, for instance, Geoff Schultz, president of UltraNet Communications, Inc., an Internet service provider in Marlboro, Mass. He is looking for a way to better manage the dozens of communications lines hooked into his Digital Equipment Corp. servers.

"I'd like the industry to bring us a box with a T1 line inside, with 24 digital modems and a communications server built in to one box, with an Ethernet LANalyzer on it, so I can run around [the company] and look at LANs," Harrell said. Her departments use Novell, Inc.'s NetWare. She added that some new advanced switches from Bay Networks, Inc. wouldn't hurt, either.

And Steve Austin, MIS manager at Helicopter Support, Inc. in Orange, Conn., is wishing for "a fully debugged, 32-bit operating system that readily installs, runs right out of the box and works with all our 32-bit applications." If his wish were fulfilled, "we'd be ecstatic."

Along with the practical, there were the covetous, such as the Digital VAX user looking for a new chip to clear his aging system's processing bottlenecks. Or the HP 9000 user who needs the kind of digital audio tape autoloaders from Hewlett-Packard Co. that its Unix-based HP 9000 user-cousins already have. "That would make life much better here," said Michael Kapack, systems manager at B. F. Goodrich Co.'s Aircraft Integrated Systems division in Vincennes, Ind.

There also were the visionaries. David R. D. McFarlane, World Wide Web manager for securities brokerage Salomon Brothers, Inc. in New York, said he wants a technology that combines the ease of use of an executive information system with the data access of a query tool and the Internet on-ramp Web browser.

"You wouldn't have to tell it where to find the information you want. It would already know, or it would know how to find out," McFarlane explained.

"The technology isn't there yet for this, though it's coming — but probably not by Christmas Eve," he added.

Of course, some holiday gift requests fell into the realm of sheer fantasy. For example, "I'd like a brand new operating system called GOS — God's operating system, something that never goes down," said John Philson, operations manager at The Kansas City Star in Kansas City, Mo.

And from an MIS user, a gift wish worthy of Charles Dickens' Tiny Tim character from "A Christmas Carol": "I hope to see a perfectly satisfied and content end user. It's one of those things that hard to get in [information technology]. They always want something else," sighed Michael Pudy, manager of resource management at Barnett Banks, Inc. in Jacksonville, Fla.

**

News

Worldwide ATM switch revenue for Q3 1995

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<th>Vendor</th>
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<td>3Com</td>
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<td>Newbridge</td>
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Total revenue - $4.23M

Source: Dell'Oro Group, Menlo Park, Calif.
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It looks like nothing you've ever seen before — because it works like nothing you've ever used before.

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Managers ponder benefits of reform vs. loss of local focus

Dose of skepticism

Ray Shedly, director of corporate telecommunications at Walgreen Co. in Deerfield, Ill., said his company is looking forward to telecommunications reform, but he isn't expecting miracles, either.

"We will start to convert the streets," said Michael Roberts, network vice president at Educom in Washington, an association of information systems specialists at colleges and universities.

Roberts also hailed provisions in the bill that he said would stimulate the development of new technologies, especially interactive broadband services.

Senior editor Gary H. Anthes contributed to this story.
These two programs do the same thing. But in seconds, Oracle Power Objects automatically generates the application with three drag and drops. Without writing a single line of code.

You can also insert, delete and query data located on a server database without any modifications. Locking and transaction processing are handled automatically. To do the same thing, Visual Basic makes you write, test and debug hundreds of lines of additional code.

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SSA recasts software strategy, object plans

By Julia King

Weeks after being slapped with a fraud lawsuit by a prominent user, System Software Associates, Inc. (SSA) is on the offensive.

The Chicago-based vendor is shining the spotlight on its Unix progress, new object technology and a new set of user-configurable financial applications due in January.

The financial applications will be integrated into SSA's Business Process Control System (BPCS) manufacturing package, and a new object-based order management module will follow in February, Computerworld has learned.

SSA said by the end of 1996 it will convert all BPCS modules to the object-based technology, which runs on AS/400 and Unix platforms.

Mixed environments

SSA introduced a Unix version of BPCS last March. Before that, its software ran only on AS/400 computers.

"We don't expect any customer that has our stuff on AS/400 to throw that AS/400 away and get Unix," said CEO Roger E. Covey.

"They can mix and match AS/400 and Unix today, and they can get the new object technology on AS/400."

SSA demonstrated the object technology to industry and financial analysts in December, at a hastily arranged briefing following the lawsuit filed against SSA by Owens-Illinois, Inc. in Toledo, Ohio (CW, Dec. 4).

Owens-Illinois has accused SSA of fraud and deceptive business practices related to, among other things, a promised but long-overdue Unix version of BPCS for the Sybase, Inc. relational database management system.

Covey said SSA will deliver the Sybase version of BPCS this spring.

At the briefing, SSA failed to deliver on its promise to produce customers in person who would talk about their Unix-based applications.

Analysts instead were shown brief videotaped presentations and heard telephone interviews with executives at companies that have purchased the Unix version of BPCS.

Among these companies is $85 million International Envelope Co., which is implementing BPCS Unix on a Hewlett-Packard Co. HP 9000 platform and Infor-mix Corp. database base.

"One of the first things we liked about SSA is that we could afford it," said George Weiner, director of information systems at International Envelope.

"We called SAP, but for any company that doesn't have deep pockets, SAP is not a real alternative."

In reality, license pricing of software from SAP America, Inc. and SSA is quite comparable, said Bill McSpadden, president of Plantswide Research Group, Inc., a manufacturing software research firm in North Billerica, Mass.

The bigger issue is the cost of implementing SAP's R/3 client/server modules, which McSpadden said can cost between $5 and $10 for every $1 spent on the software.

SSA claims that BPCS implementation, by contrast, costs between $1 and $2 for every software dollar spent.

SSA's new object technology also "leapfrogs" R/3's technical capabilities, McSpadden said.

SSA has developed an object tool set that complies with the Common Object Request Broker Architecture.

"We are using the tool set to gradually generate object-based code for its BPCS applications. Object-ready applications initially will run in AS/400 and Unix operating environments. Windows NT code will be delivered next year, said Terry Osborne, president of SSA.

"We're sheep dipping the whole company in object technology," Osborne said. He said the company's goal is to give customers the flexibility of reusable, reconfigurable software objects.

In 1995, about 130 object experts joined SSA's 500-member development team when it merged with Softwrite, a leading object-based software company in the U.K.

Galileo pulls plug on Covia

Sources close to Galileo International said the company is pulling the plug on its Covia Technologies unit, which was one of the message-oriented middleware pioneers. The move is due largely to competition from IBM's MQSeries software.

Covia, based in Rosemont, Ill., shut down as of Dec. 31, although its Communications Integrator software will still be offered in Galileo's on-line reservations system.

Partners shut down Talignet

Apple Computer, Inc. and Hewlett-Packard Co. are giving up their stakes in Talignet, Inc. IBM will get sole custody of Talignet, which will remain based in Cupertino, Calif. It will continue to develop object technologies that will be integrated with many of IBM's offerings.

Notes 4.0 delayed

Lotus Development Corp. will delay general shipment of Notes 4.0 until the product's official release at Lotusphere '96 in Orlando in January, sources close to the company said. Lotus officials struck with their Dec. 28 target date when questioned last week. But sources said that while a few copies were to be shipped (see story, page 6), large quantities will not hit the streets until mid-January.

Greetings to Bosnia

The Pentagon has added an electronic-mail form on its BosniaLink Wide World Web page (http://www.dtic.mil/bosnia/) that lets users send a general message to U.S. officers through a Web browser.

ARDIS slashes prices

The ARDIS Co. in Lincolnshire, Ill., will lower air-time costs and increase technical support for developers writing wireless applications. The minimum monthly charge per wireless device will drop to $5, down from $30.

Internal Web search

Waterloo, Ontario-based Open Text Corp. will bundle its popular search engine with Netscape Communications Corp.'s Web browser and servers. The bundled Latitude Web Server will ship in January, with prices starting at $12,000. It is aimed at information systems managers building internal Internet or intranet applications.

Workstation sales leap

The worldwide workstation market grew by 24% in 1995, led by Sun Microsystems, Inc., according to International Data Corp. Intel-based workstations sales grew 148%; Windows NT versions accounted for 79% of that total.

Polishing up Platinum

Platinum Technology, Inc. in Oakbrook Terrace, Ill., has integrated changeback functions for its systems management tools and announced plans to adapt some of them to the Spectrum distributed middleware platform from Cahletron Systems, Inc.

Informix buys Illustra

Informix Software, Inc. in Menlo Park, Calif., has bought Illustra Information Technologies, Inc., an Oakland, Calif., vendor of software that manages nontraditional data, for about $380 million in stock. The vendors said within a year they will merge their products to let users store and manipulate spatial, video, text and other noncharacter, nonnumeric data in Informix's relational database management system. Details of upcoming products will be released Feb. 6.

Sterling spins out unit

Sterling Software, Inc. in Dallas plans to spin off its electronic commerce division into a separate firm called Sterling Commerce. The unit accounted for 37% of Sterling's revenue and 46% of its profits during its fiscal year ended Sept. 30. Initially, 10% of Sterling Commerce's shares will be sold on the open market; Sterling Software will hold onto the rest.

Ascend goes to the MAX

Ascend Communications, Inc. has announced MAXLink, client software that will enable a remote DOS or Windows-based PC with an analog modem or Integrated Services Digital Network terminal adapter to become a node on a corporate network. The software comes bundled with Ascend's MAX 200. Prices range from $500 to $2,500.

Lawsuit bill vetoed

President Clinton vetoed a bill aimed at curbing "abusive" shareholder lawsuits. High-tech firms, whose often-volatile earnings have invited many such lawsuits, lobbied hard for the legislation.

CICS for Sinix

Via its Web page, IBM formally introduced a version of its CICS transaction processing software for Siemens Nixdorf Informationssysteme AG's Sinix operating system, set to ship in late March. IBM plans to add support for Sun's Solaris in 1996.

SHORT TAKE Samsung Group has increased its stake in money-losing PC maker AST Research, Inc. to 45% from a current level of 40.5%. As part of the move, Samsung will double its present line of credit with AST to $200 million.

News Shorts

Galileo pulls plug on Covia

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$364 per tpmC $573 per tpmC

The TPC-C is the industry standard test for measuring database On-Line Transaction Processing (OLTP) performance and price/performance. Benchmarks published by Hewlett-Packard show that Oracle7 on a small 4-processor HP server runs faster than Informix on an 8-processor HP mainframe replacement superserver. Amazing. And because Oracle runs so fast on a small computer, you have an opportunity to save a lot of money as well as a lot of time.
Pentium lure sends PC sales soaring

By Jaikumar Vijayan

Widespread corporate migration to Pentium technology, combined with a boom in demand from the small business and home markets, fueled higher-than-anticipated PC sales in 1995.

That growth is expected to continue through 1996 as corporations continue their migrations and hardware upgrades. But it could begin to slow down a bit in 1997, analysts said.

Overall, U.S. PC shipments achieved a year-over-year growth rate of 22% in 1995 instead of the 15% that had been projected, according to early estimates from International Data Corp. (IDC) in Framingham, Mass. IDC pegged the total number of PCs sold in 1995 at 22.8 million, compared with the 18.7 million shipped in 1994. Leading the pack was Compaq Computer Corp., which managed to just barely hold on to its No. 1 spot in the U.S. The Houston-based company shipped an estimated 2.7 million PCs in 1995, a hairbreadth in front of PC retail giant Packard Bell Electronics, Inc., which closed the year with 2.66 million units shipped.

A strong Pentium push in the business sector from vendors such as Hewlett-Packard Co., Dell Computer Corp., Compaq and IBM helped build strong growth in the business market, said Bruce Stephen, an analyst at IDC. In 1994, most of the vendors had focused on Intel Corp. Pentium-based systems for the consumer market.

Also fueling strong Pentium sales were the many people who began buying above their current needs in anticipation of migrating to Windows 95 and Windows NT environments, said analyst John Dunle, president of Workgroup Strategic Services in Portsmouth, N.H.

Because most of those migrations will occur throughout 1996, analysts expect that the strong commercial PC growth will continue through the year.

“We are looking at an ongoing transition in 1996. Any new systems we buy in 1996 will be at least 133-MHz Pentium. And if they reach appropriate price points, we will also consider Pentium Pro systems,” said Linda Rudawitz, MIS manager at Holmes & Narver, an architectural firm in Orange, Calif.

Corporate needs

The availability of high-end Windows NT-based Pentium Pro systems toward the end of 1996 could increase corporate demand somewhat, but it is unlikely to contribute significantly toward mass volumes, analysts said.

However, the growing corporate interest in NT is expected to trigger a flurry of lower-end, Windows NT-based Pentium PC announcements in the first half of 1996, according to some vendors. The systems, most of which will come with at least 16M bytes of RAM and 1.5-Gbyte hard disks, are expected to raise average PC prices in 1996.

Meanwhile, analysts say the small business and home office markets continue to be the fastest-growing segment for PCs. According to estimates from IDC, more than 40% of all PCs and portable shipped in 1995 were in these segments.
Micro Focus Challenge 2000 Program

As challenging as it seems, it's a problem that's only going to get more dangerous with time. Today, 20% of business applications cannot handle dates after the turn of the century. By the year 2000 that number will increase to 90%. Those that aren't converted will fail. The Micro Focus Challenge 2000 Program gives you a comprehensive program of tools and services to fully assess and implement the century date change. Start with the Application Express Offloader™ tool to automatically move the application to a PC. Use Micro Focus' Revolve® Year 2000 analysis tools to inexpensively locate the problem areas. Then, modify the application with Micro Focus COBOL Workbench. You can even choose to replace your date logic with TransCentury® Calendar Routines. It's quick. It's efficient. It's complete. It's also an effective first step towards reengineering your legacy COBOL applications. After all, fixing a business application should be as quick and painless as possible (right Fido?).

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Who's in charge of the 'net?

CONTINUED FROM PAGE 1

nations, where more than 1,000 volunteers from industry and academic groups meet voluntarily to develop technical standards for the 'net (see story below).

Working in parallel with these volunteer groups keeps the Internet independent and allows the industry to develop 'inside-out' standards that may or may not fit with 'outside-in' standards. Unfortunately, a third group — the telephone companies and Internet service providers — isn't doing enough to make the Internet successful. The recent AT&T merger doesn't mean that we're going to have an 'inside-out' solution, said a webmaster at a manufacturer in Richmond, Va. "There needs to be some agreement on procedures for end-to-end troubleshooting," he said. But that's not happening, Gross added.

SIM overview

Still, some users are slowly beginning to trust the Internet — even those who once predicted its collapse. The influential Society for Information Management (SIM) is one example. Several years ago, SIM members publicly predicted the decline and fall of the 'net. But now, growing numbers of them are more comfortable looking up the information superhighway, said Raymond H. Hoving, vice president for issues advocacy at SIM. Larry Landweber, president of the Internet Society, said users who are worried about issues such as security and reliability should get involved as volunteers in the standards-setting process. Particularly crucial are standards for network management and methods for expanding the Internet's infrastructure, Landweber said. Without clear rules for how to use and care for the Internet, users could see a splintered network controlled by uncooperative commercial entities, he noted.

Who's in charge

Groups contributing to the architecture and use of the Internet:

**Organization**
- Internet Society
  - http://www.isoc.org
- Internet Engineering Task Force
  - http://www.ietf.cnri.reston.va.us/html
- Internet Architecture Board
  - http://www.ietf.cnri.reston.va.us/inetab/
- Internet Assigned Numbers Authority
  - http://www.isi.edu/div3/iana/
- Commercial Internet Exchange Association
  - http://www.cix.org/COhome.html
- World Wide Web Consortium
  - http://www.w3.org/pub/WWW/
- CommerceNet
  - http://www.commerce.net/information/about.html

**Description/Mission**
- Is concerned with the evolution of the Internet and its social, political and technical issues
- Develops technical standards for the Internet
- Oversees Internet protocols and procedures and the creation of Internet standards
- Coordinates assignment of Internet parameters, domain names and Internet addresses
- Nonprofit trade association for public data internetworking service providers
- An industry consortium run by MIT that develops standards for the evolution of the Web
- Nonprofit group that works to accelerate the application of electronic commerce on the Internet

**Number of Members/Annual Budget**
- 6,000 members in 120 countries/$1.4 million
- More than 1,000 active participants/$1.1 million
- 16 volunteers/No budget
- Not applicable/Minimal
- 110 members/$1.4 million
- 105 U.S. and foreign companies/$2.9 million
- 135 members/$5 million

**End-to-end troubleshooting**

"It's a terribly difficult and expensive thing to do right," Bradner said. The monthly cost for Internet access via a 56K bit/sec. leased line varies from about $300 to more than $1,200, depending on support and other services. Beyond the issue of finding the right service for Internet care-taking lies a bigger problem, however. Poor coordination between the major telephone companies and Internet service providers is an obstacle for users, said Phil Gross, director of Internet marketing services at MCI in Reston, Va. "There needs to be some agreed-upon procedure for end-to-end troubleshooting," he said. But that's not happening, Gross added.

Record leap

In the four-week period ended Dec. 21, the number of commercial, or .com, domains on the Internet jumped 53%, to 152,000. That's the highest monthly growth rate to date, according to Internet Info Source Inc. in Falls Church, Va. For more statistics, visit http://www.web.com/walsh/.

Lilly & Co., which has been on the 'net since 1991. "You've got to be prepared inside your own company," said John Schwartzendruber, a technical manager in the Internet Services Group at the Indianapolis-based pharmaceutical firm. He advised against putting any significant applications on the Internet or the Web — either internally or externally — until a smart help desk and solid technical team are assembled.

Under IS control

At Eli Lilly, for example, the information systems group has taken control of the Web reins. Marketing, finance and other department contributions are made to data on the firm's various Web sites. However, a six-member IS team controls the technical direction of those applications by providing the groups with a kit of IS-sanctioned Web development tools and utilities. "The Internet is a technical manager in the Internet Services Group at the Indianapolis-based pharmaceutical firm. He advised against putting any significant applications on the Internet or the Web — either internally or externally — until a smart help desk and solid technical team are assembled.

Further, users want Internet service providers to become their Internet point guards, said one webmaster at a major manufacturing and consumer products firm in Richmond, Va. Internet service providers "should be held accountable for the availability of the network just as the phone company must make sure I get a dial tone whenever I pick up the handset," he said. In fact, some Internet service providers are offering to shoulder certain burdens for users. For example, BBN Planet Corp. in Cambridge, Mass., sells a soup-to-nuts service that includes network management and security, operation and maintenance of customers' Web servers, a 24-hour help desk and end-to-end problem diagnosis. "But BBN Planet does not cover the planet," Bradner said. "I can call their hot line and say, 'My E-mail is not getting to Albuquerque,' and they can go off and figure out why that is the case, but it doesn't mean they can fix it."

Nevertheless, Bradner conceded that BBN Planet goes further than many Internet service providers in its attempts to diagnose and solve problems. Some smaller providers don't have the staff to diagnose every problem that arises and may not have experts staffed 24-hour hot lines. Others offer limited guaranteed service. "It's a terribly difficult and expensive thing to do right," Bradner said.

The monthly cost for Internet access via a 56K bit/sec. leased line varies from about $300 to more than $1,200, depending on support and other services. Beyond the issue of finding the right service for Internet care-taking lies a bigger problem, however. Poor coordination between the major telephone companies and Internet service providers is an obstacle for users, said Phil Gross, director of Internet marketing services at MCI in Reston, Va. "There needs to be some agreed-upon procedure for end-to-end troubleshooting," he said. But that's not happening, Gross added.

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Chaos with a hint of order

Y es, it's true. No one is in charge of the Internet.

Even Larry Landweber, president of the Internet Society, admitted that "in the eyes of the public, the Internet is anarchic," said Larry Landweber, who is also a computer science professor at the University of Wisconsin. A number of decrees from the early days of the Internet have been ignored by early adopters. The most recent is a proposal by the Internet Engineering Task Force (IETF) and the Internet Architectures Board. "The technical standards developed by the IETF are critical because they eliminate the argument that there is anarchy," said Landweber, who is also a computer science professor at the University of Wisconsin. Among the key technical standards the IETF is working on is the next generation of the Internet Protocol (IPv6), the cornerstone of the Internet. IPv6 will offer a rich variety of new services — such as enhanced security — that will greatly expand the capacity of network addresses. This new version is critical to the continued growth of the Internet.

The IETF is a group of more than 1,000 volunteers who meet three times a year. "What's impressive about the IETF is how much they have accomplished on an ad hoc basis," said Hal R. Varian, a professor at the School of Information Management and Systems at the University of California at Berkeley. "But some feel more structure is needed in a world where so much is at stake."

While the IETF volunteers have shown a remarkable ability to forge a consensus among standards developers, the telephone companies and Internet service providers haven't done so well when it comes to operational matters. But the solution isn't to have "But BBN Planet does not cover the planet," Bradner said. "I can call their hot line and say, 'My E-mail is not getting to Albuquerque,' and they can go off and figure out why that is the case, but it doesn't mean they can fix it."

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     - (e) Mac OS
     - (f) Windows NT
     - (g) Windows
     - (h) Novell
     - (i) Net/BIOS
     - (j) Other (Please Specify)
   - App. Development Products
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     - (g) Windows
     - (h) Novell
     - (i) Net/BIOS
     - (j) Other (Please Specify)
   - App. Development Products
     - (a) Yes
     - (b) No
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HERE'S A RULE OF THUMB in the computer industry called Moore's Law, which is attributed to Intel co-founder Gordon Moore. It says that the amount of computer power you can get for $1 roughly doubles every 18 months.

If you calculate Moore's Law on a spreadsheet, you find that for what you would have paid for one unit of computing power in 1946, you can now buy roughly 8.5 billion units of that power. But it gets better. In 18 months, you'll get 17 billion units; in three years, 34 billion units; and so on. In other words, every 18 months, the computer industry duplicates the advances that have been made since the first commercial computer was switched on 50 years ago this spring.

Don't underestimate the effect Moore's Law has had on corporate information systems. In the past five years, computers have saturated corporate desktops. They're in more than 30% of homes. As computers become appliances, they will be integrated with our daily lives. They will help us to control other devices around us, communicate with our friends and colleagues, manage our finances, educate our children and find whatever information we need when we need it.

It sounds like magic, but it isn't. These technology marvels will come with a host of unsavory problems with standards, selection, deployment, training and security. IS professionals in business, government and education will solve those problems. It's an enormous and daunting responsibility. It's also an opportunity to change the world in a fundamental way. How many jobs let you do that?

In the following pages, you'll read about a few people and companies that are trying to change the world. Some already have done it; others are just getting started.

Their approaches are as varied as theetchings on a silicon wafer. But they have one thing in common: They know that as the millennium approaches, the IS industry is the place to be.

— Paul Gillin

Eventual world market for computers, predicted by IBM Chairman Thomas Watson, 1943: $5
1994 installed base of PCs worldwide: 200 million

Amount consumers spent on computer software, 1993: $2 billion
Estimated value of Bill Gates' personal fortune: $13.8 billion
Bill Gates' fortune in $1 bills, laid end to end: 3,306,616 miles
Diameter of the sun: 863,000 miles

Total budget of Office of Technology Assessment, cut by Congress for fiscal 1996: $22 million
Estimated amount spent on Windows 95 marketing campaign: $200 million

Number of times O. J. Simpson mentioned in the press since Jan. 1, 1995: 29,219
Number of times Windows 95 mentioned: 29,643
Number of times O. J. Simpson and Windows 95 mentioned in the same article: 203

Estimated number of Internet users: 5.8 million
Average weekly viewers of Home Improvement: 30 million

Software Industry Report estimate of total number of World Wide Web sites, August 1995: 30,000
Business Wire estimate of total number of Web sites, August 1995: 100,000
Investor's Business Daily estimate of total number of Web sites, August 1995: 4 million

Estimated number of electronic-mail messages, 1995: 1 trillion
Estimated number of deliveries by the U.S. Postal Service, 1995: 180 billion

International Data Corp. prediction in 1991 of OS/2 market share in 1995: 23%
1995 OS/2 market share: 5%

Possible weight of a computer "in the future" estimated by Popular Mechanics, 1949: 1.5 tons
Weight of IBM's ThinkPad 700CD: 7.4 pounds

Price per pound of gold on Nov. 7, 1995: $5,535
Price per pound of 133-MHz Pentium processors: $13,371

Estimated number of computer specialty publications, 1970: 10; 1995: 1,900

— Compiled by Laura Hunt and Amy Malloy

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**Technology Forecast**

Here's a guide to what you can expect in the coming year in 10 critical market areas

### Network operating systems

It's shaping up to be a two-man fight in the network operating system arena this year. Users can expect champion Novell, Inc., with its NetWare 4.1, to attempt to stave off No. 1 rival Microsoft Corp. and its Windows NT Server 3.51.

The other players in the network operating system market — Banyan Systems, Inc.'s Vines and IBM's OS/2 Warp Server — boast hard-core and devoted, albeit niche, user populations. But unit shipments of Vines and OS/2 Warp Server are unlikely to rival NetWare 4.1 or Windows NT Server 3.51 in the next year.

All versions of NetWare command 65% to 70% market share among more than 40 million users worldwide. Windows NT Server's market share now stands at about 15%, but it is growing fast, according to International Data Corp. in Framingham, Mass. NetWare 4.1 boasts an integrated enterprise directory services database engine.

NetWare Directory Services lets businesses build complex "directory trees" of the users and objects attached to the network. That makes it easy for administrators to monitor network activities. By contrast, Windows NT Server's strength is as an applications server. After several years of trying, Novell has yet to fashion a cohesive database server applications strategy. Similarly, Microsoft has yet to deliver a full-featured enterprise directory services engine. The Redmond, Wash.-based firm has promised that functionality in its Cairo release of Windows NT Server at midyear. But businesses aren't holding their breath waiting for Novell and Microsoft to plug the holes in their network operating systems. Most users will likely chart a dual strategy — retain NetWare for file, print and directory services and install Windows NT Server as an application server. For now, the network operating system race looks like a dead heat. — Laura DiDio

### Database management systems

This year will see Sybase stabilize, Informix and CA innovate and Microsoft muscle in. But Oracle will overwhelm, two analysts predict. Data warehousing will continue to grow vigorously in a potentially huge market.

With a technologically superior relational database management system as well as forward-looking Internet products, Oracle Corp. will lead the industry next year, according to Rob Tholemeier, an analyst at Meta Group, Inc. in San Francisco, and Rich Finkeinstein, president of Performance Computing, Inc. in Chicago.

Sybase, Inc. recently announced System 11 will remedy past shortcomings and provide some helpful features, but it may not go so far as to restore the technology edge the company once held, Tholemeier says. It won't be for a lack of trying, however. In 1996, Sybase plans to release a new version of PowerBuilder and products to business-enable the Web as well as object-oriented tools, middleware and servers. Informix Corp., a solid company with a solid product, will add support for massively parallel and loosely coupled symmetrical multiprocessing machines by June. It will do well if it doesn't go off in too many directions at once. Oracle may have the resources to pull off such diversification, but Informix doesn't, Tholemeier says.

Computer Associates International, Inc. will announce a more scalable implementation of CA-Ingres by Feb. 1, followed by a business-oriented object DBMS, to be announced by July 1.

Microsoft Corp. has begun benchmarking its SQL Server, and this challenger to entrenched Unix RDBMSs will achieve some significant wins in 1996, the analysts predict. The main obstacles to its success are its Windows NT-only nature and whether it will scale beyond four processors. — Dan Richman
**Client/server applications**

With its nearest competitors trailing it by more than $1 billion a year in revenue, German software phenomenon SAP AG, maker of the R/3 system, will remain the dominant player in the market for enterprise client/server applications. Advanced Manufacturing Research, Inc. in Boston estimates the market for these applications will reach $5 billion in 1996. Among the companies to watch in the coming year are SAP, the German software giant, and Baan, a Dutch firm, which has established a suite of integrated manufacturing and financial applications that are growing in number and breadth. Analysts say PeopleSoft has a growing suite of workflow-enabled applications, and Baan, a Dutch firm, has established a suite of integrated manufacturing and financial applications that are growing in number and breadth.

Another move could cut client/server implementation costs and shorten project completion times—two ongoing user concerns. Large and small vendors will continue to team with even smaller niche software providers as the trend toward capturing vertical markets with preintegrated, industry-specific, best-of-breed software takes shape.

**Desktop operating systems**

The year isn't expected to bring a lot of surprises in the desktop operating system arena. Microsoft Corp.'s megamarketing push for Windows 95 will die down to a dull roar, but Windows 95 will still gain in popularity and become the dominant desktop operating system.

Microsoft's Windows NT will continue its push away from the workgroup computing space to serve on a more departmental level. That might be good news for Microsoft and those who use NT for file and print sharing and application serving. But it is bad news for Novell, Inc.'s NetWare, which is losing market share to NT Server, according to Peter Kantner, an analyst at Aberdeen Group, Inc., a market research firm in Boston. "Users will have one box for all their server needs—one box to buy and one box to manage," Kantner says.

NT also will be bad news for Unix. "Microsoft's NT is aggressively challenging Unix. It offers the same performance at half the price," he adds. And while IBM isn't sounding the death knell for OS/2, NT just might be. IBM executives have long denied they will pull the plug on the 15-year-old operating system. They have instead repositioned OS/2 as a server operating system, but that pits it against NT and could be the final blow for OS/2.

Apple Computer, Inc.'s possible failure this year to ship Copland, the next generation of its Macintosh operating system, could be a major blow to the Cupertino, Calif., firm. Apple already has its hands full with financial problems, questions about its future and a chronic inability to meet product demands. Delivering Copland late will magnify those issues.

-- Lisa Piceriile

**Remote access**

One of the looming questions the remote access industry faces as the new year begins is: "What happened to the wireless revolution? Will 1996 be the Year of Wireless?" The answer, by most accounts, is that 1996 won't be the year when wireless networks and applications take off and flood the marketplace with untethered road warriors. But prognosticators also say real advances will come this year and, at the very least, wireless technologies should gain some steam.

In the coming year, remote users should look for increasingly sophisticated PC cards that provide better connectivity. These PC cards will give notebooks combined functions such as paging and Integrated Services Digital Network access. New devices, such as personal digital assistants with better connectivity features, will also drive the market, observers say.

-- Mindy Blodgett
Portable computers

Portable computers are getting faster, lighter and feature-rich. And all signs point to skyrocketing demand and explosive growth for the laptop sector in the coming year.

Toshiba America Information Systems, Inc. and fellow first-tier vendors Apple Computer, Inc., IBM PC Co. and Compaq Computer Corp. will continue to dominate the market. But smaller companies, such as Texas Instruments, Inc., could eat away at the giants' market share, analysts say.

Industry observers note that the increasingly crowded market has spawned true desktop replacements. Competition among the top makers will ultimately translate into cheaper notebooks with more functionality, such as multimedia. Because the useful life of most notebooks is only about two years — due to constantly dropping component prices and technological advances — analysts recommend buying low-end computers to replace in that time frame or buying at the high end for possibly longer use.

Faster Intel Corp. Pentium chips will be released in 1996, following the lead of the growing power in desktop computers. As mobile workers are conducting more of their business on their notebooks, they are demanding faster and more powerful portables, industry observers say. Analysts expect a 133-MHz chip and higher in the next few months.

Analysts also say integrated chip sets and better battery performance will increase laptop capabilities. Lithium ion batteries are the favored notebook battery because they have the most power and longest working life.

— Mindy Blodgett

PC servers

Intel Corp.'s November launch of its sixth generation Pentium Pro chip is expected to define a lot of activity in the server space in 1996.

All of the major PC server vendors and some traditional midrange vendors will start offering highly scalable symmetrical multiprocessing (SMP) and massively parallel processing (MPP) Pentium Pro servers based on Windows NT.

The servers are expected to rival mainframe performance by late 1996. Users and industry leaders can expect to see some major improvements in network and systems management software, particularly in the areas of remote diagnostics and asset management from the Big Three vendors: Compaq Computer Corp., IBM and Hewlett-Packard Co.

There also will be more emphasis on increased fault tolerance through standby servers and clustered-server implementations.

— Jaikumar Vijayan

Mainframes

The mainframe still won't die in 1996. A third straight year of gangbusters growth is forecast. But a confluence of technical trends should start answering the question of whether IBM's System/390 will continue to enjoy a fruitful life.

Big iron continues to become not so big as customers shift to cheaper air-cooled machines based on CMOS microprocessors. IBM's 9872 family is expected to outship its water-cooled ancestors in the fourth quarter of 1995, and analysts estimate air-cooled boxes will account for more than 70% of the System/390 MIPS installed next year. Air-cooled hardware still can't match the liquid chillers on raw power, but it should be able to handle most processing jobs by the middle of the year, analysts say.

Competition also should enter the air-cooled picture then. IBM's third generation of CMOS processors, expected to run at 40 to 45 MIPS, will be matched and possibly exceeded by first-time products from AMDahl Corp. and Hitachi Data Systems Corp. "That's going to do wonderful things to the price range," says John Young, director of enterprise systems planning at The Clipper Group, Inc., a consultancy in Wellesley, Mass.

Several other attempts to make mainframes less menacing and better able to withstand competition from Unix and other open systems will also come to a head this year.

IBM's OS/390 operating system, which combines MVS with several dozen supporting products that previously had to be bought and installed separately, ships in March and will be updated within six months of that. A new version of IBM's DB2 database was released in late November, so its "parallel nymphet" clustering technology is ready to face the customer jury. This also should be a pivotal year in IBM's campaign to get Unix software vendors to hug mainframes.

— Craig Stedman

High-speed internetworking

The big will get bigger and the small will become fewer as the superpowers scramble to extend their product lines from high-end, all-in-one switching hubs and backbone routers to remote access gear and adapter cards.

Vendors' Asynchronous Transfer Mode (ATM) marketing blitz will continue in 1996, but users will focus on increasingly available and lower-cost technologies such as Ethernet and Token Ring switching to build the front end of emerging switched internetworks. Switched internetworks give users dedicated bandwidth as opposed to the shared capacity on Ethernet lines and Token Ring LANs. For the backbone part, users will continue to use Fiber Distributed Data Interface and back to ATM 100M bit/sec. Ethernet as prices start to drop. Also, the internetworking superpowers — Cisco Systems, Inc., 3Com Corp., Bay Networks, Inc. and Cabletron Systems, Inc. — will be the telephone companies' best friends, and vice versa.

The two will look to exploit each other's strengths by combining wide-area network links and networking gear in packages for end users.

Acquisition-happy vendors such as 3Com and Cisco will struggle to reconcile sometimes overlapping product lines and to support and enhance them in a coherent manner. So it may be quite a while before users have a single point of contact for service and support for 3Com's or Cisco's product lines.

At 155M bit/sec., ATM will be used by large users with super high-end data and video applications. Most users still can't justify the cost or the huge bandwidth. But vendors will have some success selling ATM on the desktop using 25M bit/sec. PC adapter cards.

— Bob Wallace
Places your mom wouldn’t let you go...  
By Kim S. Nash

I’ve always wanted an ant farm. No, really. But my mom, after she finished her “Ugh, that’s awful” face, relegated the notion to the infamous “We’ll see” category. Which meant, of course, that never would a colony of trisectioned insects cross the threshold of our Camel, N.Y., home.

Steve’s Ant Farm, at http://sec.dgsys.com/antfarm.html, has changed all that. Like the opening page at the site says, I watch live ants dig tunnels and move mountains. I don’t have a high-resolution monitor, so the JPEG images aren’t that great. But at least I’ve fulfilled a childhood dream.

(I feel compelled to point out that Steve’s Ant Farm was designed by Washington-based Creative Services — the same company that helped create the NASA World Wide Web site. But I’m sure our tax dollars weren’t at work on both projects.)

When I’m not burning up company time marveling at ant antics, I do put the Web to good use.

First thing every morning, after popping the top of a Diet Coke, I get my news. Lately, my favorite place is Washington-based CompuServe, a ProLiant model using Intel’s 75-MHz 486 chip. (I feel compelled to point out that Steve’s Ant Farm was designed by Washington-based Creative Services — the same company that helped create the NASA World Wide Web site. But I’m sure our tax dollars weren’t at work on both projects.)

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Did your database vendor just pull a data warehousing out of the trunk?

There's a data warehouse ad in the magazine—one of those ads with the big comparison charts—and it's truly misleading.

So why is the company running this ad saying about Informix? Maybe their data-warehouse solution isn't what it's cracked up to be. Maybe they're afraid to admit that their database, unlike ours, wasn't architected with applications like data warehousing in mind.

"It is not clear what is actually going on. Oracle's marketing department is claiming capabilities, and talking about futures."

—Bloor Research, Parallel Database Report, 10/95

Well, we're not afraid to talk about our database, or what it means to data warehousing. Our database core is built for parallel processing. And it's proven to be the most scalable database core there for data warehousing as well as OLTP applications. Together with our industry-leading data warehouse partners, we deliver best-of-breed solutions.

"Informix is well-placed to become the brand leader at the top end of merchant DBMSs."

—Bloor Research, Parallel Database Report, 10/95

Read the quotes the charts; the third-party surveys. Then call us at 1-800-688-IMIX, x78, and get our Data Warehouse Literature Kit, including some revealing information from the Bloor report. But, please, get the whole story.

Informix's DSA is the best all-round parallel DBMS on the market.

—Bloor Research, Parallel Database Report, 10/95

### Comparison Chart

<table>
<thead>
<tr>
<th>Feature</th>
<th>Informix</th>
<th>Oracle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel Hash Join</td>
<td>First Shipped Q1 '94</td>
<td>Promised Q1 '96</td>
</tr>
<tr>
<td>Parallel Index Scans</td>
<td>First Shipped Q1 '94</td>
<td>Promised Q1 '96</td>
</tr>
<tr>
<td>Parallel Aware Optimizer</td>
<td>First Shipped Q1 '94</td>
<td>Promised Q1 '96</td>
</tr>
<tr>
<td>Data Partitioning</td>
<td>First Shipped Q1 '94</td>
<td>Promised Q1 '96</td>
</tr>
<tr>
<td>Partition Level Recovery</td>
<td>First Shipped Q1 '94</td>
<td>Promised Q1 '96</td>
</tr>
<tr>
<td>Parallel Update</td>
<td>First Shipped Q1 '95</td>
<td>Promised 1996</td>
</tr>
<tr>
<td>Parallel Delete</td>
<td>First Shipped Q3 '96</td>
<td>Promised 1996</td>
</tr>
<tr>
<td>Stand-by Database</td>
<td>First Shipped Q4 '93</td>
<td>Promised Q1 '96</td>
</tr>
<tr>
<td>Data Strip</td>
<td>First Shipped Q1 '94</td>
<td>Not yet promised</td>
</tr>
<tr>
<td>Relational OLAP</td>
<td>First Shipped Q4 '95</td>
<td>Proprietary OLAP</td>
</tr>
</tbody>
</table>
solution

INFORMIX®
Where you're headed
Great minds think alike

Information systems and business managers agree a whole lot more than you might think

What's this? IS and business managers singing the same tunes?

We tried — oh, how we tried! — to find discordant voices in our survey of 551 IS managers, IS staff members and business managers. We asked the three groups — who are often believed to be at war with one another — for their opinions on the same issues. We looked hard for disagreement but found mostly harmony.

What's clear from our survey is that the philosophies of IS and business in regard to technology and the role of IS are very close — and much closer than we expected. The following charts show just how similar their credos are. — Kevin Burden
**Section I: Overall IS performance**

**Shaky ground?**
Figures show IS personnel are slightly less confident than business managers when rating their effectiveness compared with the competition.

“Our company uses information systems more effectively than our competitors do.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>39%</td>
<td>34%</td>
<td>45%</td>
<td></td>
</tr>
</tbody>
</table>

**Ouch!**
All three groups agree that their IS support structure could be better.

“Our IS organization is well-structured to meet the needs of end users.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>36%</td>
<td>42%</td>
<td>35%</td>
<td></td>
</tr>
</tbody>
</table>

**Double ouch!**
Business managers don’t think IS relationships are so great; IS disagrees.

“Our IS organization has a good relationship with senior-level business management.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>62%</td>
<td>60%</td>
<td>47%</td>
<td></td>
</tr>
</tbody>
</table>

**Section II: IS/End-user relations**

**Long live the end user!**
Although like-minded, business managers would give end users more power in driving IS.

“End users should be the driving force in determining our IS direction.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>62%</td>
<td>65%</td>
<td>71%</td>
<td></td>
</tr>
</tbody>
</table>

**If you could walk in my shoes...**
Business managers support the belief that IS isn’t always treated fairly.

“Our company treats its IS employees fairly.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>47%</td>
<td>45%</td>
<td>55%</td>
<td></td>
</tr>
</tbody>
</table>

**No sympathy here**
Most in the IS field have accepted that updated skills are necessary for survival. It’s even more clear to business managers.

“Cobol programmers unwilling to update their skills deserve what they get.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>63%</td>
<td>64%</td>
<td>72%</td>
<td></td>
</tr>
</tbody>
</table>

**Section III: The value of information services**

**Whoa!**
Putting the cart before the horse is a bad idea all around.

“IS technologies should be the driving force in designing our business processes.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>27%</td>
<td>32%</td>
<td>25%</td>
<td></td>
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</tbody>
</table>

**It takes two to tango**
All groups agree they need to work together for initiatives to be successful.

“Information systems don’t benefit the business unless accompanied by business practice changes.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>67%</td>
<td>60%</td>
<td>71%</td>
<td></td>
</tr>
</tbody>
</table>

**Some things don’t change**
All groups say technical proficiency is a necessary skill.

“These days, if you’re going to really make it in IS, it’s better to have a business degree than a computer science degree.”

<table>
<thead>
<tr>
<th>Percent who agree or strongly agree</th>
<th>IS managers</th>
<th>IS staff members</th>
<th>Business managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>36%</td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>
Using finely tuned scientific methods (as in, we brainstormed), Computerworld chose nine companies on the edge of doing something big. In many cases, these companies were just smart enough or quick enough to take the newest technological advances and run with them. In some cases, it’s the very landscape of their industry they’re changing. Read on to see how they’ll affect your landscape.

Technology service firm poised to shake up hotel reservations systems

The hotel industry Switch Co. (Thisco) in Dallas is a technology service consortium that aims to save its 20 hotel company owners hundreds of millions of dollars in transaction fees each year. Thisco expects to accomplish this by letting travelers bypass airline reservations systems and book their own hotels over the World Wide Web.

Thisco executives say they expect to process about 200 reservations per day in 1996 through the consortium’s TravelWeb page, which already contains “electronic brochures” from 24,000 hotels. The brochures include detailed descriptions and photographs of rooms. TravelWeb’s Find A Hotel service lets PC users search for a hotel by geographic location, property name, room rate and/or various amenities, such as health club facilities or babysitting services.

“You couldn’t do this before because hotels were limited to using proprietary networks,” such as Galileo International’s Galileo, American Airlines’ Sabre and other airline computer reservations systems, says John Davis, president and CEO of Pegasus Systems, Inc. Dallas-based Pegasus is Thisco’s parent firm.

“The World Wide Web has been a breakthrough,” Davis says.

Thisco’s owners include Best Western International, Hyatt Hotels Corp. and Hilton Hotels Corp. The service essentially acts as a “giant protocol converter” on the Internet, Davis explains.

Thisco’s Ultrawhich proprietary computer system converts users’ incoming messages from the Web’s Hypertext Markup Language into a format that a hotel’s reservations system can read. It then forwards the request to the hotel system.

If, for example, a user was querying a Hyatt hotel, Hyatt’s system would transmit a listing of available rooms and give the customer a choice of three. If the customer opted to make a reservation, Thisco would route the booking directly to Hyatt’s reservations system, which would then return an electronic confirmation to the customer.

The service is free to customers. Thisco charges the hotels a fee that is about half the $3.50 per transaction charged by the airlines. TravelWeb also lets hotels use their reservations databases to better market their facilities, Davis says. For example, it lets hotels describe the difference between a $140 room and a $100 room.

Davis predicts it will be two to three years before TravelWeb — and the inevitable competing services — becomes the dominant method travelers use to make hotel reservations.

In the meantime, Thisco is developing similar Internet-based reservations systems for rental car companies, restaurants and some 14,000 golf courses nationwide. — Julia King
Hyperlinks, wizards and bots, oh my!

Dutch painter Jan Vermeer is known for his brush, vivid paintings of 17th-century life in Holland.

Today, Vermeer Technologies, Inc., a start-up software firm in Cambridge, Mass., wants to make a name for itself as an enabler of similar lasting creations for the World Wide Web. And this being the 20th century, Vermeer (the company) also wants to make a buck.

Judging by the meaty contracts Vermeer has signed with firms such as Fidelity Investments, Inc., Merrill Lynch & Co. and Tribune Media Services, the little company is on to something.

Instead of brushes and oils, the 17-month-old company uses hyperlinks, wizards and bots.

Vermeer’s FrontPage development kit was designed to let users — even Web novices — drag, drop, point and click to create graphical applications that run on the Internet.

Hyperlinks are links to other Web pages. Bots are mini programs prescripted for routine tasks, such as linking database columns to sections of Web pages.

Wizards help developers design those pages.

A peacemaker for battling network tools

Hang on! Help is on the way for network managers who have so many proprietary management tools monitoring diverse components that they don’t know which way to look.

Soon a 2-year-old project by a Palo Alto, Calif., developer will help these managers see the forest as well as the trees.

Start-up firm Network Intelligence, Inc. plans this spring to launch software that gathers data from installed tools and its own distributed agents, then summarizes network behavior and delivers daily reports that point out problems affecting processes. The product acts as a filter, so support staff can drill down with their specific tools to find and fix problems.

One company testing Network Intelligence’s upcoming Contour Network Management System discovered a slowdown affecting some users and then found an erratic router that had been overlooked for months.

For example, FrontPage includes wizards for building a table of contents, laying out page borders and devising registration forms.

“It’s like they’re trying to remove as much work as possible” from Web programming, says Jay Brodsky, a technology coordinator at Chicago’s Tribune Media Services.

Vermeer has signed on six vendors to resell FrontPage, including AT&T Corp. and FTP Software, Inc. in North Andover, Mass. Vermeer wants to line up as many resellers, distributors and other partners as it can to peddle its products, says Charles Ferguson, Vermeer’s chairman and co-founder.

Nearly everyone in the tools and database market is bound to ship Web development utilities in 1996, but Vermeer has beaten many of the big guys to the market. Therein lies “a huge advantage,” says Geoffrey Bock, an analyst at Patricia Seybold Group in Boston.

Also key is Vermeer’s “come one, come all” philosophy, Bock says.

Unlike would-be competing tools from Netscape Communications Corp. or Oracle Corp., FrontPage supports several Web servers and the Top 3 relational databases.

“We don’t want to turn people away just because they don’t happen to use this or that server or the most popular database,” Ferguson says.

Taming the labor beast; Campbell optimizes workforce schedules

Campbell Software, Inc. is offering users in the retail and service-oriented space an innovative way to reduce costs and increase profits by controlling their biggest expense — their workforce.

The Evanston, Ill.-based company offers users a family of customizable products for in-store and enterprise-wide employee management. Campbell’s Workforce Management Suite, which runs on 16 platforms, comprises products that perform time and attendance tracking, forecasting and budgeting, staff planning and optimal labor scheduling.

Some high-profile retail organizations such as The Gap, Inc., Crate and Barrel, Walgreen Co. and Walmart Stores, Inc., have already jumped on board with the software. And half a dozen high-profile technologists have invested in the company — Dan Bricklin, the inventor of spreadsheet granddaddy VisiCalc; Jeffrey Tarter, outspoken industry pundit and editor of “Sellletter”; and Andrew Filipowski, president and CEO of Platinum Technology, Inc., to name a few.

Thomas Friedman, editor and publisher of “Retail Systems Alert,” a Newton, Mass., newsletter that focuses on retail automation, says Campbell Software is remarkable in two aspects.

First, its products are based on an optimization engine that has been adapted for the labor-intensive retail business. Campbell works with its clients in stores, at regional offices and at headquarters to develop algorithms that determine the best staffing schedule. That schedule is based on each store’s requirements, including union rules, preference for scheduling, employee skill levels, pay-roll requirements and performance standards.

Second, Campbell has an inside track on customer needs because it struck a deal with Andersen Consulting, a firm many retailers turn to for help setting up labor rules, Friedman says.

Workforce management is retailers’ single largest expense, and it’s the fastest-growing segment of the $5 billion to $10 billion retail automation business. Friedman estimates the labor scheduling market at more than $2 billion.
Tomorrow, he’ll finalize a merger that puts your company on the international map, and you in charge of 7,000,000 more transactions daily.

Oh yeah, did we mention it all needs to happen without so much as a blip in 7x24 operations? And if it’s not a merger, it’s a takeover, or an acquisition. All adding to the growing sea of information you manage.

So how can you prepare for such an event when you’re the last to know? Symmetrix® Data Migration Services (SDMS™) from EMC.

Only SDMS combines cutting edge Symmetrix-based software with a team of specialists to ensure your migration goes flawlessly, from planning through post-migration verification. Keeping your information on-line and available. Making your move to the high performance, large capacity, and unmatched availability of Symmetrix storage solutions easier than ever.

Planning for golden years goes on-line: Broker offers investment advice on Web

PRUDENTIAL SECURITIES, Inc. doesn't have a magic investment strategy that gives you a fast route to retirement. But the New York securities firm will soon introduce an Internet-based service that will allow customers to plan for their golden years more effectively.

In January, Prudential will roll out a World Wide Web site — www.prusec.com — where customers can order literature and download prospectuses. But unlike Prudential's, those sites don't yet offer on-line investment counseling.

Prudential's "value-added," comes from the electronic connectivity between the firm's financial advisers and clients, Witkowski says. Beginning in January, customers will be able to electronically access financial advice that will be posted for public viewing. In the next phase, later in 1996, Prudential's financial advisers will send out electronic messages with advice for clients, he says.

Nevertheless, the brokerage's lead in electronic access probably won't last too long, says Mark Hardie, a technology analyst at The Tower Group, a Wellesley, Mass.-based financial services technology consultancy. "Within the next year, financial services technology leaders with Web sites will provide similar types of access," Hardie says. — Thomas Hoffman

Expense reports don't have to be such a chore

"Find a NEED and fill it." "Focus on the customer." "Stick to your knitting." These aren't just cliches to Portable Software Corp.

The 2-year-old Bellevue, Wash-based company lives by those platitudes, and its QuickXpense product, a flexible expense reporting package, embodies those values, says Michael Hilton, president and CEO.

Indeed, QuickXpense lets users tally expenses based on their company's accounting categories, and Portable Software will also make up electronic versions of expense report forms for any company that sends in a paper form. And more than 2,000 companies to date, including almost all of the Fortune 1,000, have done just that, Hilton says.

"They pay very, very close attention to what their customers want and do exactly that," says Chris Le Toiq, principal analyst at SoftTracks Software Research, a market research firm in Los Altos, Calif.

QuickXpense "lets you put in your own account categories," says Jon Bosaw, director of sales and marketing at Lynnwood, Wash.-based Symetrix, Inc., a manufacturer of professional audio products for recording studios and live audio and broadcast applications. Bosaw, whose job takes him around the world, began using QuickXpense soon after it came out in late 1994.

"Using our paper forms, I had to look up account numbers or the manually total each category. This is a lot easier," he said.

The company, which Hilton started in 1995 with his own money and funds from private investors, Here's a novel performance pitch: Better queries

PRECISE SOFTWARE SYSTEMS, Inc. has a revolutionary idea for making client/server database applications work better: Fix what's broken, not just what's easy to fix.

In January, Precise will roll out a client/server version of Precise/SQL, a suite of software tools for tuning the performance of database applications.

Most tool sets of this kind were designed to tune the database. Precise's approach is a bit different; its tools help programmers write better queries without forcing them to be database gurus, says Dan Haley, president and CEO of the 5-year-old Braintree, Mass.-based company.

Quicker replies

This translates into better performance, users say. "In some cases, we went from two-to-three-hour queries and some that never came back to (getting a response, on average, in) 15 minutes or less," says Pete Roberts, an information engineering specialist at Motorola, Inc.'s Semiconductor Products Sector in Tempe, Ariz.

Roberts has been using a beta version of the client/server tool to tighten up stored queries in Motorola Semiconductor's Oracle Corp-based data warehouse. Taking what is ordinarily a time-consuming process of individually examining and rewriting stored queries, the Precise tool set reads in an entire set of queries, then uses an expert system to suggest improvements. Roberts estimates that this tool will be able to cut the amount of work by 80%.

"[Precise] plugs a gaping hole in the marketplace," says Michael Abbey, an Ottawa-based database consultant. "People spend inordinate time and money tuning the database because there are tried and tested ways of doing that." But Abbey says he's seen no other vendor with such a workable approach to tuning queries.

"And it's cheap," according to Abbey, who estimates that the $30,000 client/server version, which works with Oracle databases, should pay for itself in a single four-month project by cutting the time needed to do performance tuning.

— Frank Hayes
Five Ways

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**Business Intelligence** You’ve heard all the buzzwords (EIS, DSS, OLAP, Intelligent Query, Visualization). But what do they all mean? As a collection of incompatible products, they could mean trouble. But together and fully integrated into a comprehensive decision support environment, they could mean making good business sense out of reams of raw data. We provide them all. And we can design just the right mix for you.

**Technical and Analytical Tools** Of course, decision making is not unique to the business side. If you have quality issues on the shop floor or need to analyze the results of your market research, we can deliver the industry’s richest set of tools for handling virtually any analytical need.

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**The Bottom Line** Better decision making can give you the competitive advantage you’ve been looking for. And if you’re a Fortune 500 company, there’s an excellent chance we’re already at work helping you. To find out the role our technology and services can play in your organization, and to receive our free guide, give us a call or send us E-mail at cw@sas.sas.com
Virtual credit-card swiper makes banks feel secure

A S INTERNET COMMERCE matures and more consumers turn to the World Wide Web to shop in the next year, look for CyberCash, Inc. to be among the leaders of the virtual credit-card swipe.

Securing credit-card payments over the Internet is the first piece of what the founders of Reston, Va.-based CyberCash hope to make into a digital cash, credit- and debit-card payment system serving banks and merchants internationally.

CyberCash, founded in 1994, is a more comfortable partner to banks and offers an easier system for regulators to audit than those of some rivals, says John Pescatore, research director for information security at International Data Group in Falls Church, Va.

A Netherlands-based firm called Digicash BV, for example, offers a system that ensures a buyer's anonymity as if the buyer were using greensbacks. "And like cash, no one knows where the money came from," Pescatore says.

"An approach like CyberCash would still keep financial institutions in the loop. That's much more palatable to governments and banks and their lobbyists," he says.

CyberCash gives Internet surfers and merchants a virtual gray box. CyberCash encrypts credit-card, purchase and merchant information and zips it over to a bank network. In several seconds, the bank returns an authorization code to CyberCash, and the merchant can approve the sale. CyberCash, which provides software to consumers and merchants, earns transaction fees from banks.

Magdalena Yesil, a vice president at CyberCash, says the company has links to approximately 80% of the U.S. banks authorizing credit-card payments, including Wells Fargo Bank and Mellon Bank Corp., and it is accepted by American Express Co. — Michael Goldberg

Around the corner or around the world, it doesn't matter to Allied

ALLIEDSIGNAL AEROSPACE is looking to a 1996 re-engineering project to help make its aircraft parts repair and overhaul business soar.

The goal is to get the two dozen independent repair centers that make up the Global Repair and Overhaul Operation working and sharing resources as a single business unit. What makes this project ambitious is that the centers are scattered across the globe, so coordination must span national boundaries and language barriers.

"Right now, for instance, the customer in Japan goes to Singapore out of habit. But he might be better off going to England or Phoenix, where the work might be done faster or for less cost," says Paul Hoedeman, vice president and chief information officer at AlliedSignal in Phoenix.

The project puts the company at the forefront of globalization efforts, according to analyst Tom Willmott at Aberdeen Group, Inc. in Boston. "Until now, technology has been too expensive and too inflexible to permit this kind of process to take place," he says. In addition, he says, most companies haven't had the skills to contemplate such a massive shift.

The repair and overhaul business, with about 2,000 employees worldwide, is a key component of AlliedSignal Aerospace's overall business. With $4.6 billion in sales, the organization—a division of AlliedSignal, Inc.—is the largest aerospace equipment manufacturer in the world, making everything from jet engines to cockpit instruments to cabin-pressure systems. Customers include the U.S. military, The Boeing Co., McDonnell Douglas Corp. and Gulfstream Aerospace Corp.

AlliedSignal will re-engineer its business processes and make sweeping changes to the firm's information systems. The goals of both IS and the business units are to centralize management and resources, speed up production and improve long-range planning, says Don Caldwell, vice president of business systems for marketing, sales and service at AlliedSignal Aerospace.

The process will probably take two to three years, he says, although the efforts will be coordinated to roll out in several six-month phases. "We don't want our users to have to wait all that time to see results," he says. — Mitch Wagner

Expense reports don't have to be such a chore

Continued from page 25

now has more than 40 employees. In September, it released a version of QuickXpense for Windows 95. The new version includes a feature called HotelXpert that automatically handles recurring entries such as room charges.

Last summer, Portable Software also inked a deal with GE Capital, issuer of the GE Capital Corporate MasterCard, to provide a link that automatically downloads charge account information into expense reports.

This link to credit-card data provides a first step into the nascent world of electronic commerce, according to Le Tocq.

The decision to add such capabilities didn't come out of thin air. Portable Software has instituted a corporate advisory board of about a dozen large customers to get feedback on what users want.

Next on tap: a set of products that will help automate the workflow process surrounding expense tracking. The organization is planning to release the first of those tools in March, Hilton says.

— Stuart Johnston
Computron Financial Software - In A Field Of Its Own

Computron Software delivers enterprise-wide client/server financial software that's more than a field of dreams and promises. We pioneered the field that changed the role of financial software by combining high-performance accounting systems with high-impact workflow and COOL solutions. Now clients worldwide, such as Pfizer, Deutsche Bank and HBO, are doing more than just moving accounting to a client/server platform — they are transforming business processes into business assets.

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**Looking ahead**

By Paul Gillin

- Lotus will quit the suite market and sell SmartSuite to a Cub Scout pack in Minneapolis. However, the scoutmaster will insist that the troop intends to enhance the product.

- The FCC will totally deregulate the telecommunications industry, ushering in a new era of competition in which every idiot with a spool of wire can — and will — become a carrier.

- ISDN finally will come into its own, probably sometime on July 17.

- The Justice Department will file an antitrust suit against Microsoft over The Microsoft Network. The suit will be dropped, however, with Microsoft agreeing to "try really hard not to be so competitive" and giving each Justice attorney 100 hours of free connect time.

- An election night uproar will occur when an unknown presidential candidate named Bim Chintoh carries Florida. However, further investigation will reveal that the election returns were hand-tabulated on a Newton.

- IBM finally will catch up with the 1994 demand for ThinkPad computers. Unfortunately, it is 1996.

- Microsoft will modify its branding program so that, in order to use the Windows logo, independent software vendors must contribute 40 sheep and a hectare of their best soil.

- Panic will grip the computer security world when a team of German hackers reveals that after applying 40 supercomputers working around the clock for two months, they have managed to decode a secure Netscape message saying, "This is a test."

- A leading market research firm will report that Microsoft has captured 115% of the office suite market.

- AT&T will declare that it intends to be super-aggressive in the network equipment market and will name as president of that division a guy from Atlantic City named Vinny.

- A re-engineering project at a well-known company will result in layoffs, staff tension, bitter political battles and the firing of a prominent CIO. Well, now you know at least one of these predictions will come true.

**Looking back**

By Joseph E. Maglitta

Just because you can, doesn't mean you should. The year's most inane utterances, wretchedly needless products and services, ham-handed press releases, tasteless spectacles and sophomoric promotions:

- OK fellas, we want to see both hands on the keyboard at all times From an "urgent fax" from the Rocktopolis World Wide Web site and Detour Magazine:

  "Newflash! 'Showgirls' star to speak out on the internet (sic) . . . mass virtual phone sex?!!"

- Does it work on outsourcers? Sedona Online in Sedona, Ariz., introduced a crystal amulet designed to ward off computer problems. The "Magical Vortex Energy Charged Crystal" has a no-refund guarantee.

- We're sure they appreciated the silence Microsoft packed European journalists into a submarine and submerged to emphasize what the world would be like without Windows 95.

Bet it was a tiny showing

A party invitation announcing the launch of Willow's Software featured a crude drawing of a man with no pants, holding open his wrinkled raincoat. The tag line: "Expose the Windows API."

- Whadda'ya say we all forward it back to him on the count of three...

For $425, Jeff "Spam King" Slaton will send thousands of the same message to Internet Usenet groups or electronic mailboxes. Most shill a client’s product or interest.

- They should have called it "L.A. Riot" Softdisk Publishing released a demo version of "In Pursuit of Greed." The secret to winning the $39.95 CD game? "If it's not nailed down, steal it. If it's moving around, shoot it."

Computerworld Editor Ginin's flippant, fortuitous, fanciful and feckless predictions have become an irregular feature of the annual Forecast issue. As for the inimitable Maglitta (right), when he's not embroiled in some investigative reporting of a more serious nature, he is Computerworld's senior editor at large.
Larry Ellison

Ellison is almost certainly the only computer-industry figure to hold an honorary degree from Northern Jiao-Tong University in China. He founded Oracle Corp. in 1977 and has been its CEO ever since. Harvard Business School named him Entrepreneur of the Year in 1990.

Q: In the long term, why is it better to control the database standard than to control the operating system standard?

A: Because it's called the Information Age, not the Operating System Age. The better an operating system gets, the more invisible it becomes — therefore, the easier it is to swap out for another one. The ideal operating system arrives across a network when you turn your computer on. Then it lets you easily navigate to the applications you use to operate on data stored in a database — not in the operating system file system. The software that you interact with and rely on every day are the applications and the underlying database — not the operating system.

Andy Hertzfeld

Hertzfeld is Software Wizard (yes, that's his official title) at General Magic, Inc. in Sunnyvale, Calif. He and Bill Atkinson were the original designers of the Macintosh interface.

Q: What do you think will be the next major advance in user interface design?

A: The next big thing will be using physical metaphors to navigate. Users would leverage off the intuition and experience of real life, taking the physical metaphor to the network. I am not a fan of the social interface where cartoon characters interact with you.

The physical metaphor would be like a series of buildings and rooms that five to 10 years down the road would be rendered in 3-D. It would be an explorable world, like Myst, but not oriented to being a puzzle. Rather, it would provide the most clarity possible. It would make it easy to find things, not hide things.

I also see more interfaces that use the human senses, like speech. Speech recognition will really start coming into its own. But it should be seen as a way to augment things, not as a panacea or the only way to interact with a computer.

Vision also will be important. Maybe a computer can look at you and adjust the display based on how far away from the screen you are sitting.

Touch is another. Touching is forced feedback and allows you to manipulate yourself in a virtual world. Hand controls could change texture or their "give" based on feeling.

But speech will be the big one over the next couple of years because it's so practical.
If you've ever wondered who connects the core of the Internet together, the answer is Cisco.

In fact, more than 80% of the routers that connect the core of the Internet bear the Cisco name. And it's these routers that keep our planet's information moving on the Internet, 24 hours a day, 7 days a week.

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Jim Clark

A new billionaire (at least on paper), Clark is chairman of Netscape Communications Corp. In what are now perceived as the old days of the computer industry — the early 1980s — Clark started Silicon Graphics, Inc.

Q: Where does the chairman of what is probably the most widely recognized Internet company go when he's perusing cyberspace?

A: Clark says his first choice for fun is http://clunix.cl.msu.edu:80/weather. That's right: A World Wide Web site devoted to weather. The pages, run by Michigan State University, include national forecasts and local Lansing, Mich., weather. The movies and images showing recent hurricanes, tornadoes and other natural wonders are intriguing, he says.

Clark also loves stock quotation services and miscellaneous on-line news spots. In general, however, Clark says, "I got my original bookmarks from Marc Andreessen's home page. The list is too long" to enumerate.

Andreessen, of course, is the 24-year-old brains behind the Netscape Navigator browser that worked Wall Street investors into a foamy frenzy during Netscape's initial public offering last August.

Clark does have his own home page, at http://www.netscape.com/people/jim/index.html. Curious Web wanderers can check out a brief photo album of the millionaire and former Stanford University professor, including baby pictures and a snapshot of Clark bobbing about on an inflatable raft.

Gordon Bell

As father of the VAX, mentor to high-tech creative minds, overseer of the Computer Museum in Boston and unflagging technology activist, Bell may live to become a legend in his own time. If it concerns technology, he is likely to have a strong opinion about it.

Q: What jobs now performed by humans will computers replace first?

A: The most vulnerable human activities are transactions where a few bits — standing for money, services or tokens — are exchanged. The most vulnerable are bill handling and financial and banking transactions of all kinds. One of my favorites to go [away] is lawyers for simple transactions because they're so vulnerable and easy to replace, but then they have the power to make it illegal. The vast amount of papers they produce will soon be passe as computers take over transmitting, bonded archiving and displaying documents such as wills and contracts.

The publishing industry [typesetting, proofreading] has undergone much change, and the paper form of publication is generally vulnerable. Greeting cards are ripe for change as various forms of user-directed creativity for multimedia become available.

As the Internet and interactive TV become pervasive, more complex transactions requiring descriptions and expertise will become vulnerable as well.

Esther Dyson

Dyson recently presided over the sixth annual East West High Tech Forum in Bled, Slovenia, the western-most part of the former Yugoslavia that borders Italy and Austria. Dyson is founder of this forum and founder of the industry newsletter "Release 1.0."

Q: What can we learn from the emerging businesses in the former Soviet bloc? What are some challenges they face?

A: In the U.S., we know how to do things [information systems-wise] pretty well and, therefore, are less willing to throw out existing technologies and improve. Because people in the former Soviet bloc are starting fresh and are aware that what they had before generally didn't work, they are more open-minded than your typical American about trying new things.

IS managers in Eastern Europe are technically saute and eager to learn. They know that they don't know everything, so they are interested in learning. They are more open to new ideas than their U.S. counterparts and more capable of using them.

The most difficult obstacle to IS growth in upcoming years — the Postal Telephone and Telegraph authority (PTT) — also represents the largest opportunity. It takes a long time to get a telephone line in Eastern Europe. It takes an even longer time to get a leased line.

Though it varies from country to country, telephone services are expensive in addition to being scarce. Despite plans to deregulate in much of the former Soviet bloc, the PTTs generate taxes and revenue for their governments, which may be reluctant to bring in competition.
Vinton Cerf

Father of the Internet and co-developer of TCP/IP, the senior vice president for data architecture at MCI Telecommunications Corp. says he never dreamed the Internet would grow so huge when he defined a 32-bit address space for IP back in the mid-1970s. (The new version will have a 138-bit address.)

Q: Will the Internet ever become a major medium for commerce?

A: The answer is related to the Anthropic Principle in cosmology. In the case of the universe, we should not be amazed that we are here to ask the questions, "Where did the universe come from?" and "Isn't it amazing that life exists?" If the universe did not support life, we should not be here to ask the question.

In the case of the Internet, if it is to become a self-supporting infrastructure, it will have to support commerce. If it does not, then it will not survive, at least not in its present form. So, if the Internet survives, the answer is yes.

It seems to me almost inevitable that we will want to apply convenient computer cycles to the management of business and that doing business in a networked environment tends to enhance the utility of the network. Again, it seems inescapable that the Internet will become a major business infrastructure, or die.

Bill Gates

Gates co-founded Microsoft Corp. 20 years ago with the advent of the first commercial PC. The firm's first software product was the first software product available for that machine. Gates also owns Corbis Publishing, a firm that buys digital image rights to millions of artworks and publishes them on CD-ROM.

Q: In which applications areas do you see the most innovation over the next two years?

A: I'd say Information at Your Finger-tips [a long-term initiative that Microsoft instituted in 1990 to make information easily available to end users through enabling technologies such as client/server computing, OLE technology and several other technologies]. Take something like personnel systems. They used to be something that [only specialists in] some department in Microsoft used.

Today, I have Excel pivot tables where I can say, "How many engineers do we have across the company? How many do we have in this division? How has that changed?" The idea is taking what you think of as classic applications and making the data really accessible to business managers.

Everybody should be thinking about the Internet. That's more of a two- or three-year thing that requires taking internal systems and opening them up, with the right security, so that the boundary of the company almost disappears. This way, consultants, vendors, customers are all in the same information flow.

Charles Wang

Wang, chairman and CEO of Computer Associates International, Inc., wrote a book in 1994 called Techno Vision (McGraw-Hill, Inc.) about the dysfunctional relationships between technology and business executives. Since then, Wang has reached out beyond CA's customer base of chief information officers by sponsoring retreats at posh resorts to help CEOs learn more about the role of technology in their organizations.

Q: Will the CIO title still exist in 10 years?

A: The function of the CIO will exist, but it will take on new dimensions with the advent of new technologies. The sheer volume of users and information will greatly expand the role of a CIO.

The most important role of a CIO will be to provide the infrastructure — hardware, software, communications, policies and procedures — for businesspeople to maintain their competitive advantage. Instead of sitting on top of the glass house, the CIO will be intimately involved in aspects of the business that previously had been relegated to noninformation systems-centric business managers.
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Q: Is greater loss of privacy inevitable as computers and on-line transactions proliferate?

A: While there are new threats to privacy posed by the interactive world, there are also real possibilities for improving privacy rights if we can overcome some barriers. For example, mass-market encryption, which can protect communications privacy and even give citizens the ability to exercise anonymity in political discussions, is around the corner. The issue is going to be whether we can reconcile the strength of the encryption available with law enforcement needs.

Interactive technology can provide citizens with better ways to exercise control over information about themselves and what they want to expose themselves to. If check-off boxes are provided on the screen, citizens can customize what comes into the home and block out the junk mail of the future. They can have viable options for opting in or opting out (of marketing campaigns). I don't want to paint too rosy a picture. With so many companies doing business on the World Wide Web, there are many more companies collecting and using personal information. When you access a Web site, you're telling people a lot about yourself, and right now there are very few controls.

So there is a need for new privacy-protecting mechanisms. I'm not talking about new commissions. I'm talking about, for example, getting the Federal Trade Commission to become a privacy monitor on the 'net.

Q: What challenges will IS face as a result of the explosion of new technology?

A: I think the biggest challenges IS departments face is to be responsive to new technology and be able to adopt it early, while still maintaining the infrastructure to scale upward and do backup, recovery and other necessary functions.

There are times when you're going to err on the side of delivery and be optimistic about delivering new technology and other times when you're going to spend more time looking at the infrastructure. At any given time, you'll be overbalanced one way or the other — but over time, you have to maintain a balance.

Training — both educating the information technology staff on how to build and administer new systems and educating users on how to use them — is another challenge.
The print version of Computerworld, the leading IS management newsweekly

Gates buys time

By Dan Richman

The industry is still shuddering from Microsoft Chairman Bill Gates' successful purchase of the Gregorian calendar from the Catholic Church last week. Rumors that Gates will recalibrate the calendar to make 1990 - the year Windows 3.0 shipped - Year 0 sent calendar makers' stock soaring. Gates was also reportedly considering renaming January after Microsoft executive Steve Ballmer and varying the length of calendar quarters to match Microsoft's shipping schedules.

Interactive at http://www.iown.it/~all.com

High-tech VP?

By Kim S. Nash

California Senator Larry Ellison is mulling a vice presidential offer from fellow billionaire and presidential candidate H. Ross Perot. The two would run on the IndUStry ticket, a party formed last year that seeks to privatize the U.S. government. "We need to re-engineer this nation, which would include the redeployment of Midwestern states to overseas units," said Ellison, who was formerly CEO of Oracle Corp.

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CML
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How did the designers at Macromedia transform Director into an even more powerful multimedia tool? They turned to today's PowerPC microprocessor technology.

The added speed and increased processing power offered by the PowerPC platform set the stage for dramatic improvements in performance. With it, text, video, graphics, sound, and animation can more quickly and easily be combined to create exciting interactive productions. All of which enables Macromedia Director to remain at the top of the charts for creating presentations, educational CD-ROMs, demonstration diskettes, interactive kiosks and more.

Then again, it's just the kind of rave review you'd expect from a technology coproduced by IBM, Apple and Motorola. And it's why more and more leading companies are directing their efforts to the PowerPC platform.

When can it improve the way people interact with your products? To find out, call IBM at 1-800-POWERPC, ext. 1404. Or visit us on the Net at http://www.chips.ibm.com

After all, you can teach an old cat new tricks.

(And interactivity hasn't been quite the same since.)
Adobe Photoshop meets PowerPC technology.
When the software designers on the Adobe Photoshop team set out to give graphic designers on the Macintosh a new way of looking at the world, they turned to today's PowerPC microprocessor technology.

What caught their attention was the added computing power and faster floating point operations the PowerPC platform provided. With it, layers, filters, and other advanced Adobe Photoshop design tools can be used to create wondrous works of art that challenge the imagination. All in much less time and at a lower cost than was previously possible.

It's one more reason Adobe Photoshop continues to set new standards in image editing, graphic design, and production.

Of course setting new standards is exactly what IBM, Apple and Motorola had in mind when they introduced this technology. A vision that Adobe Systems shares with scores of other companies adopting the PowerPC platform.

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In fact, the PowerPC platform enabled Bentley to add all kinds of users faster, more exciting ways to move their biggest ideas off the drawing board.

Of course, that’s just the kind of performance IBM Apple and Motorola were aiming for when they created the PowerPC platform. And it’s the reason why other leading companies have chosen to adopt it for their own products.

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(And modeling hasn’t been quite the same since.)
Men overboard!

You're at your desk starting out the new year and have just thumbed through our Forecast section. There you learned that the breakneck pace of technological change that rocked your world in 1995 will only increase in 1996. Now take this issue and hide it, quickly, before the IS rank and file get their hands on it. Give them some time-consuming assignment. Let them cruise the back alleys of the Internet for the week. Just keep them away from the employment forecast we have in our Careers section.

Why? Because there they will learn just what hot commodities they are and will continue to be for the foreseeable future.

The job market for IS professionals is as hot as it has ever been. Remember Odysseus in the Greek epic The Odyssey? He was lashed to the mast of his ship, while sirens all around him beckoned him to come hither. Now substitute "recruiters" for sirens and place your top IS people on the deck of the Argo. That's what the job market will be like in 1996.

According to our survey, conducted especially for this issue of Computerworld, the job market is hot just about everywhere in the country. It's only a matter of degree. There are companies with literally hundreds of IS positions, begging for help.

The driving force behind this situation isn't the economy, which is just lumbering along. Rather, it is the rush to build distributed, networked enterprise systems that leverage the Internet. Everyone is building a data warehouse. Everyone wants better end-user information access. Everyone wants to program visually, using stored objects in the process.

So everyone wants the people who are skilled to make all this happen.

This really could be the worst of worlds for IS managers. Discrete projects need discrete leaders, who may be the most vulnerable to being recruited away — like in the middle of a project.

The year ahead will test your personnel management skills as never before. Your success may be determined not by your ability to manage technology but by basic blocking and tackling — namely, your ability to create and maintain a satisfying workplace.

Bill Laberis

Bill Laberis, Editor in Chief
Internet: bill_laberis@cw.com

Computerworld December 26, 1995/January 2, 1996

Shock headline

Have you resorted to profanity to sell your magazine (“So what the hell is ODBMS?” CW, Nov. 6)? More and more magazines are going to headlines and graphics that shock, tease and tantalize their audience. I am saddened by this trend.

To the casual reader, the word “hell” is one of the mildest profanities found in American English. But I find its placement in your magazine, especially in a headline, unnecessary.

Profanity, mild or not, has no place in business communications. I ask that you refrain from this practice in the future.

Michael D. Robinet
Baptist Health System
of East Tennessee
Knoxville, Tenn.

Portable problems

Your article “Finding peace in PC purchasing” [CW, Nov. 13] is right on the money, as far as it goes. But it focuses on desktop machines. Portables have the added problems of less scalability and shorter product-support cycles.

I look for manufacturers that provide capacity for more RAM than I could ever want and hard-drive upgrades beyond what is available. Our basic road machine starts with 16M bytes of RAM and a 1G-byte hard drive.

Another problem with notebooks is bloated device drivers for DOS/Windows 3.x. With several newer machines, users have encountered insufficient resources when running multiple Windows applications or even single applications with large data files. By contrast, the older machines functioned with no problems. In all of these cases, the only component that changed was a new machine with the factory-installed version of Windows.

For example, one manufacturer-supplied video driver is twice the size of the plain VGA driver. The stock vendor response to these problems is to recommend a move to Windows 95, which currently isn’t an option.

Douglas G. Moran
Information systems analyst
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Hidden costs?

Stuart Lieberman may be correct that giving IS control to “money-making” units may increase revenue for those units (“Should IS be centralized or decentralized?” CW, Nov. 27). But if he had done his homework, he may have found that many of his money-making units are spending $10 to make their IS in revenue.

Lieberman may well find that his 90% reduction in mainframe activity has resulted in an overall cost increase of 30% (“Five Year Cost of Ownership,” Gartner Group Research Review, September 1995). Decentralized units may in some cases implement new technology faster than their centralized counterparts, but at a return on investment significantly lower to the overall organization. Sorry; Mr. Lieberman; the jury of shareholders, corporate owners and taxpayers finds for Mr. Marais and centralization.

J. Matthew Carroll
Credit Venture Fund
Ventura, Calif.
matt.carroll@mail.co.
Client/server's future is on the Web

Users will access new and traditional IS applications via the Web

I have seen the future, and it is the Web." I'm not sure which minister of computer science first enthralled that epithet, but today it is taking on new meaning. "I have seen the future of corporate IS, and it is the Web." Traditional as well as new corporate applications will be delivered to end users via the World Wide Web — that is the future.

The Internet existed for almost 25 years before anyone outside of academia and the defense industry realized it. But as soon as banks, insurance companies, newspapers and government agencies started using it to communicate with customers, the Internet took on a new role.

Starting with FedEx, which connected its package-tracking system to a publicly accessible Web page, companies began figuring out what used to be internal systems could now be "customer contact systems." For example, Wells Fargo Bank provides account balances and will soon accept payments via the Web. The Web is becoming the universal access mechanism.

Looking for a way to allow customers to check the status of their orders? Contemplating how to provide more direct support to your product clients? Analyzing strategies for making the data warehouse available to sales agents on the road? Trying to figure out how to bring multimedia training materials to your remote offices? Just put them on the Web.

The technical challenge is in merging the formerly internal use-only strategic application with the Web, but the necessary tools are on the way. New versions of Hypertext Markup Language provide more complete and flexible graphical user interface (GUI) programming possibilities. Sun's Java and Netscape's LiveScript (soon to be combined into JavaScript) open the door to delivering full-featured programs.

Furthermore, Microsoft announced Visual Basic Script will be available in about a year. IBM/Lotus has a product to automatically scan Notes databases and put them onto a Web server. And a product from ParcPlace-Digital lets you substitute Web servers and clients for the traditional GUI of the Smalltalk object-oriented programming language. Before we know it, every language will allow (or encourage) co-existence and substitution of local GUs and Web GUs.

Web browsers accessing multiple Web servers is the architecture for the next wave of client/server computing. Carry this approach a little further and we will see the resurrection of big applications running on big servers that are accessed by "skinnier" clients running Web browsers — the modern equivalent of massive time-sharing machines connected to thousands of terminals.

By the end of the millennium, we will see the start of the "Web-connected" society. And we owe it all to a 25-year-old networking protocol, coupled with some clever ideas on how to deliver graphics and data from CERN (the European Laboratory for Particle Physics) to the National Center for Supercomputing Applications.

Grochow is chief technology officer at American Management Systems, Inc. in Fairfax, Va. His Internet address is jerry_grochow@amsinc.com.

Jane Griffin

Turf battles trip up IS projects

A recent luncheon with a Fortune 50 chief information officer, I commented that IS funding seems to be misplaced in many companies. The technology dollars are squired away in the various business departments, such as finance and marketing, making it hard to pool resources for common business goals.

The CIO agreed. His salad fork painted a vivid picture in the air as he explained how departmental turf battles in his own company led to some uneconomic investments and squandered opportunities.

For example, he described one department's purchase of an expensive system that was soon shelved. Instead of contacting other departments in the corporation that could use the equipment, the department locked the system in a closet, hoarding a corporate asset.

For this CIO and many others, IS funding is controlled departmentally, and that control is closely guarded. People in charge of large sums of money often exhibit aberrant behavior. Some hoard it. Others spend it foolishly, never considering a long-term strategy.

Yet many of today's most pressing technology investments — from data warehousing to wide-area networks — are horizontal and enterprise-wide in nature. These IS infrastructure investments require collaboration among the business departments that control pockets of IS dollars.

Getting that collaboration is difficult and time-consuming, especially when departmental rivalries get in the way. It may take years longer than necessary to build the needed infrastructure or a competition-beating strategic system — if it ever gets done at all.

Politics get in the way

IS departments have been beaten up for years for not delivering business value. But sometimes they are impeded by corporate structure, politics and budgets.

When someone comes along and says, "We need a corporate data warehouse," the response is, "Good idea, but who is going to pay for it?" Wide-ranging infrastructure projects are too expensive for any one department to fund, so the challenge is to get all of the affected departments to chip in.

Often, the first department that offers to help fund the project is asked to spend more than its share, so — not surprisingly — it balks. Then it has to sell the marketing, finance and other departments on the project's merits to share the financial load.

This fragmentation of technology budgets is one downside of the sometimes-fashionable trend toward decentralized IS.

The obvious solution is a centrally controlled IS budget — at least for the techno-infrastructure — and a commitment to cross-functional teaming. Actually, if everyone comes to the table ready to collaborate, you don't need to consolidate IS budgets. But if the departments aren't willing to chip in, then there must be a CEO-level commitment to pool resources.

Of course, even centralized IS budgets can be spent unwisely if the IS department makes purely technology-based decisions and ignores business needs. Last year, for example, a large corporation budgeted $50 million to transfer its worn-out, stovepipe systems to a client/server architecture, without business process re-engineering or consideration of the "future state" business model.

It may be easier to bury ourselves in a bundle of technology than to immerse ourselves in a partnership to embrace real change, but the battle to invest wisely in technology must be fought and won.

This isn't such a battle over what to spend and who should spend it as it is a battle against fear — fear of losing control, the unknown and the consequences of putting the organization's needs first.

Griffin is president and CEO of Systems Techniques, Inc., an Atlanta-based IS consulting firm that specializes in business and data models and data warehousing. Her Internet address is jane.griffin@systemsinc.com.
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An NT Christmas

Microsoft to ship Win 95 interface in '96

By Stuart J. Johnston

An upcoming version of Windows NT that will add the Windows 95 user interface topped some users' lists of what they want from Microsoft Corp. in the new year.

Users have said repeatedly during the past 18 months that having a single, common user interface will greatly simplify training and technical support issues for firms that deploy Windows 95 and Windows NT. They will get their wish by mid-1996, according to Microsoft officials.

"Give me NT with the nice, Windows 95 user interface," said Kelly Dwyer, global information consulting unit of Deloitte & Touche. Braxton and Deloitte have associates in Boston, the strategy consulting unit of Deloitte & Touche. Braxton and Deloitte have made major commitments to deploy Windows 95.

"Having the Windows 95 user interface on NT Workstation is important so we can [combine] the two in our environment," said Brian Moura, assistant city manager for San Carlos, Calif.

"I'd love to get NT with the Windows 95 user interface," said Don Barker, associate professor of information sciences at Gonzaga University in Spokane, Wash. Barkeris responsible for 85 PCs in the university's business school.

"What I really want, I'm getting," said Paul Maszczak, director of information systems at C. R. Bard, Inc. in Murray Hill, N.J. "We are seeing it move up as a critical criterion in purchases," agreed Doug Chandler, an analyst at IDC. "With customers moving so many applications to PCs, it has become more important not to have a PC break down," he said.

"Because of the move to client/server, PC systems are now becoming much more relied upon by the general corporate user," said Paul Maszczak, director of information systems at C. R. Bard, Inc. in Murray Hill, N.J.

As a result, PC hardware reliability and support are getting "much fuller consideration from corporate users," Maszczak said. PC hardware quality isn't declining, observers said, it is just getting more attention from users these days.

"We are seeing it move up as an important buying criteria," agreed Doug Chandler, an analyst at IDC. "With customers moving so many applications to PCs, it has become more important not to have a PC break down," he said.

"Because of the growing focus, reliability, page 62

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Users want PCs they can rely on

By Jaikumar Vijayan

As the need for quality monitors expands into more homes and businesses, the appreciation of Nokia excellence grows with it. And, as more people look into Nokia, the appreciation of Nokia value grows too.

So if you're considering a new monitor, consider a Nokia. Obviously, experts already consider them the best you can buy. For more information, please contact our Major Accounts Group at 415.331.6622.
Vendor tries to simplify sales force automation

By Mindy Blodgett

The high rate of failed sales force automation projects has software companies scrambling for ways to make implementation faster and easier for customers.

According to industry analysts, as many as 75% of sales force automation projects fail. Those projects can cost hundreds of thousands of dollars to implement. One of the main reasons they fail is through lack of time it can take to implement a program, observers said.

To keep user interest levels up, vendors now realize they must address these issues, and fast.

Help on the way

James Dickie, an analyst at InSight Technology Group, Inc. in Boulder, Colo., said several companies, including Auresm Software, Inc. in Santa Clara, Calif., and Siebel Systems in Menlo Park, Calif., are working on products with more open standards and ease of use.

SalesKit Software Corp. in St. Louis also claims it has an answer. Version 5.1 of its SalesKit Open package offers the Rapid Product Deployment method, which the company claims can have sales force automation projects up and running in days or several weeks.

The key to the fast rollout is an extensive object library of more than 2,000 objects, including calendaring, business analysis, contact management and forecasting.

The library comes with a kit that lets users modify and customize the system.

The typical sales force automation rollout takes several months, Dickie said.

"We took a look at 325 projects last year, and we found that 77% of sales force automation projects were late on average by 7.1 months," he said. "We have a lot of clients who [would be] very interested in a project like this if they don't have [to take] 18 months to get a project up to speed."

The feasibility of the SalesKit Base System means users can customize the product without altering the underlying code of the data model, company officials said. The process is called authoring—screens are data-driven, so altering data involves system tables, not source codes.

This is important for fast deployment, Dickie said. "You don't want 500 versions of the source code," he said. "You want to separate the functionality code from the look-and-feel code."

Peter Keers, sales and marketing information manager at St. Jude Medical, Inc. in St. Paul, Minn., uses SalesKit Open 4.3. He said he is considering upgrading to Version 5.1 for the 40 or so mobile users at his company because of the ease of customization.

"The new version has a much more relational database," Keers said.

"Right now, we have some data connections that are a bit strange. It would be much easier to set up relationships. For instance, one of the focuses we have is on hospitals. We call on both physicians and hospital administrators in a hospital, but connecting the data on the two groups is kind of difficult now," he said.

The software also is made more open by incorporating Microsoft Corp.'s Visual Basic and Visual C++ object libraries. SalesKit Open also uses a Microsoft-centric object-oriented model. The kit costs $699 per user and $14,999 per server.

Reliability

CONTINUED FROM PAGE 61

a number of top vendors are beginning to implement strategies aimed at boosting the overall quality of PC hardware and support, analysts said. "PC vendors are finding that to validate themselves in mission-critical roles, they have to differentiate on service and support," said Joseph Ferlauso, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H.

Punch list

According to the IDC report, vendor strategies in this area include the following:

- Companies are investing in automation tools and technologies to improve service delivery.
- For example, companies such as IBM and Compaq Computer Corp. are bundling remote communications software with every PC. Such software lets companies remotely access customer PCs to do things such as remote diagnostics and support.
- PC companies are investing heavily in automation tools in their internal support infrastructures. Compaq, for instance, uses a help desk automation system based on case-based reasoning technology. Support staff can access information based on thousands of hours of engineering and problem-solving expertise.
- Vendors are making systems easier to use with better graphical user interfaces, point-and-click features and plug-and-play capabilities.
- Flexible support programs are aimed at giving users a range of choices. For instance, Dell Computer Corp.'s SelectCare service offerings let users choose varying levels of service and support, including certified solutions partner programs, from a wide range of choices.
- Life-cycle services. These go beyond traditional support offerings by giving customer organizations the ability to off-load some or all distributed systems management functions for a set fee. A growing number of companies, such as Hewlett-Packard Co., Digital Equipment Corp. and IBM, already offer such services.

In a bid to keep component failures to a minimum, top vendors are also beefing up hardware quality through extensive testing and by procuring top-quality parts from reliable suppliers, said Doug Chandler, an analyst at IDC. "There is a direct connection between product reliability, service and support. If something breaks down, customers need to be able to fix it quickly, easily and at the lowest cost possible," he said.

The IDC report also concludes that despite the popular notion that PC brands aren't very different from one another, reliability differs significantly from vendor to vendor. Buying cheap could mean big problems later on. When it comes to overall reliability, the Top 5 vendors in the PC business were Apple Computer, Inc., Compaq, HP, Digital and Dell, the study found.

"You get what you pay for. My experience is that if you get a cheap, no-name computer, you probably are going to have a problem—" said Chandler. "There aren't really any big differences only up to a certain point," said Dennis Guerrero, an independent consultant and former computer consultant to the city of New York. "Overall, though, I would say that hardware reliability is getting better these days."

Briefs

Firms sign with IBM

Four leading suppliers of office products and computer equipment—MicroAge, Inc., Staples, Inc., Stream International, Inc. and Ucroo, Inc.—will make their catalogs available on IBM's forthcoming Electronic Purchasing Service. The service links buyers and suppliers electronically. It is slated to go live in 1996.

Stage3 boosts backup

Boole & Babbage, Inc. is shipping the first Windows NT-to-mainframe backup program from Stage3.

Stage3 extends the services of Arcada Backup Exec, a Windows NT backup program, by sending backup files to an IBM MVS mainframe via Microsoft Corp.'s SNA server or a TCP/IP link. Pricing begins at $7,500 for the MVS mainframe and $2,900 for the LAN segment.

New notebook

Zenith Data Systems has released the Z-Star 486 DX/4X/100, a low-end notebook computer. For just under $1,600, it has Windows 95 capabilities, 4M bytes of memory, dual-scan color video and space for a PC card. It weighs 7 pounds. It is available now.

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Windows 3.1 or later requires 4M bytes of RAM. It costs $499. 

Tadpole Technology, Inc. has introduced AlphaBook 1, a notebook computer driven by Digital Equipment Corp.'s Alpha 21066 microprocessor.

According to the San Francisco company, AlphaBook 1 has the computing power of a Digital Alpha workstation, including support for the OpenVMS operating system, in a rugged 7.5-pound notebook.

It features an integrated Peripheral Component Interconnect system bus interface, PCMCIA and SCSI interfaces. Removable 21/2 in. SCSI-2 hard disk drives are available in 520M-byte, 810M-byte and 1.2G-byte capacities.

AlphaBook 1 includes a 3Com Corp. Ethernet card and supports an optional 28.8K bit/sec. fax/modem PC card.

Pricing starts at $13,950 for a system bundled with OpenVMS, the Ethernet card, 32M bytes of dynamic RAM and a 520M-byte hard disk drive.

Product shorts

Maxi Switch, Inc. has introduced the Nova 9500W, a Windows 95 keyboard with rounded corners, an applications key for recalling the context menu and two Windows keys for accessing the Windows user interface. Cost: $22. Maxi Switch, Tucson, Ariz., (520) 746-9378. ... Group 1 Software, Inc., has announced StreetRite 4.2. StreetRite lets users standardize and correct address data to improve mailing accuracy. Pricing begins at $285. Group 1 Software, Lanham, Md., (301) 731-2300.
Lotus supports CC:Mail users while continuing its client/server push

By Tim Ouellette

Lotus sees client/server as the future of messaging but will let its CC:Mail users take their time getting there.

With the Dec. 13 introduction of feature-rich client/server mail and price cuts to Notes, Lotus Development Corp. is providing an enticing reason to move to client/server messaging on Notes.

Add to that pending updates to CC:Mail (see chart) and users have several messaging options: They can stick with the familiar file-sharing architecture of CC:Mail, move to a client/server version of CC:Mail or move to database-oriented Notes Mail.

Client/server messaging systems move more processing to the server, freeing up client processing. This lets mobile users set rules to sort their mail on the server side, so when they log on, the laptop doesn't have to process all their mail messages, for example.

Several users interviewed showed interest in Notes Mail, though they said they will take their time evaluating and installing the software. One user still loyal to CC:Mail said he is frustrated by recent CC:Mail upgrade delays.

"We've been burned a couple times," said Thomas Bridges, network administrator at the Internal Revenue Service in Austin, Texas, which runs Notes and CC:Mail. "They've blown their credibility on their promises. I have a vested interest in CC:Mail, and I am still ready to throw it out."

But one analyst cautioned against moving to Notes fast. "If CC:Mail is working for you, stick with it. If you have areas where you need Notes, install [it] in departments where you need it, and wait out the storm," especially if server prices drop, said Tim Sloske, an analyst at Aberdeen Group, Inc. in Boston.

Then again, those with a large number of CC:Mail users may feel left out in the cold as Notes 4.0 makes its way into companies. Client/server CC:Mail 7.0 clients will be hosted by a Notes 4.0 server, but older versions of CC:Mail clients won't be directly supported. Instead, these older versions can connect to a Notes environment via the CommServer message transfer agent, Lotus spokesmen said.

Customer support

But Cambridge, Mass.-based Lotus said it will support whatever its CC:Mail users choose.

"We are continuing to invest in CC:Mail," said Larry Jones, group product manager for Notes messaging at Lotus. "We are providing a full-feature set of tools to migrate to client/server systems or to integrate existing systems."

"That's a wonderful thing to hear about. We need to know deploying CC:Mail will be OK," said Anthony Citrano, information services manager for the state of Maine. Maine is currently rolling out CC:Mail to all of its state employees, but Citrano said there are plans to add Notes to the mix.

But the extra capabilities of Notes Mail, including a subset of Notes, and what users and analysts say is a reasonable price make the investment pretty strong. Under the new pricing scheme, a stand-alone version of Notes costs $55.

"The idea is that users are going to buy mail anyway, so why not get E-mail along with Web access and document management and workflow and full Notes?" said David Marshak, an analyst at Patricia Seybold Group in Boston.

"The nice thing is there will be choices — CC:Mail will continue to offer some nice options, and not everybody will go to Notes," said Judith Ross, president of Worldscape Strategies, a consultancy in Half Moon Bay, Calif. She said the same thing will happen with Microsoft Corp.'s Mail, which won't necessarily go away with the release of Exchange in early 1996.

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WinFax Pro 7.0 faster, fuller and first-rate

But hardware problems confound TalkWorks add-in

By Howard Millman

The increased performance, reliability and extensive feature set of Delrina Corp.'s WinFax Pro 7.0 make it especially well-suited for use in the enterprise.

This version integrates elements of faxing, electronic mail and graphics applications.

Imperfect match

With the introduction of the new TalkWorks voice messaging add-in, however, Delrina must wrestle with incompatibilities between its software, modems and Windows 95.

Among the 100 or so new features in WinFax Pro 7.0, the most important gains come from leveraging Windows 95's multitasking capabilities. For example, Windows 95's preemptive multitasking lets users reliably transmit and receive faxes in the background while they work on something else in the foreground. Under Windows 3.x's cooperative multitasking environment, background faxing often resulted in a disconnect when the foreground task demanded too many CPU cycles.

Improved data compression will reduce transmission time by up to 50% when transmitting to a fax machine or another computer running WinFax Pro 7.0. In our informal tests, faxes went through in about one-third less time than they did with the predecessor, WinFax Pro 4.0. We used a 66-MHz 486DX2 clone with 16M bytes of RAM for your review, complying with Delrina's recommended hardware configuration.

Stability has likewise improved. Even when we accidentally locked up our machine by opening too many DOS programs, faxing continued in the background.

WinFax Pro 7.0's tight integration with Windows 95 includes support of Microsoft's extended Messaging Application Programming Interface (MAPI). One benefit of this tight integration allows WinFax Pro 7.0 to handle fax, binary and voice messages.

Delrina said WinFax Pro 7.0 will work with any E-mail package that supports extended MAPI.

Telephony Application Programming Interface (TAPI), another Windows 95 feature that WinFax Pro 7.0 supports, manages call discrimination.

In other words, TAPI samples incoming calls and determines if it is a fax, data or voice message. Depending on the receiving machine's hardware, TAPI routes the call to the associated application. This feature worked well in our tests.

We also compared Windows 95's built-in faxing application to WinFax Pro 7.0's. Some of the key differences between the two programs include WinFax's nimbler, viewer, its Preview function and its Xerox Corp. TextBridge optical character recognition (OCR) utility.

Moreover, our tests of WinFax Pro 7.0's OCR utility proved...
Firms offer LAN-based disaster recovery service

By Thomas Hoffman

Mission-critical client/server systems continue to explode across America's corporate landscape, yet scant attention has been paid to recovering data in these environments when disaster strikes, experts say.

To help address this conundrum, IBM Business Recovery Services in Sterling Forest, N.Y., and Comdisco Disaster Recovery Services in Rosemont, Ill., have recently introduced LAN-based disaster recovery services.

The lack of corporate attention is due, in large part, to the inexperience of departmental business managers who have inherited responsibility for these systems, analysts said.

Disaster-savvy information systems managers, with years of glasshouse mainframe security expertise, often have little control over departmental systems. They are left to act as little more than absentee landlords.

And even in those situations where IS happens to preside over LAN-based data, the task is complex. Organizations may have hundreds of servers and thousands of workstations scattered across multiple time zones.

To help IS staffs address this, IBM's LANProtect service is "productized" and packaged so that a user knows exactly what they're going to get and what it's going to cost," said Fred Joy, an analyst at Meta Group, Inc. in Stamford, Conn.

New package

Although LAN-based services from IBM and Comdisco aren't new, the simplified packaging is, analysts said.

For example, within 24 hours of declaring a disaster, IBM LANProtect customers receive on-site installation of their basic LAN configuration, including a preloaded operating system and 48 hours of on-site technical support. Each Intel Corp.-based LAN configured with up to 24 workstations is covered for $360 per month, while Unix-based LANs are priced at $550 per month.

That type of modularity appeals to Baxter Healthcare Corp. In January, the Deerfield, Ill., firm will begin testing the IBM service at one of its 350 remote locations.

The customer's way

HyperDesk Corp. recently introduced GroupWorks 2.0, a task organizer for small teams of people working together.

GroupWorks lets users share, edit and annotate documents. It allows users to put all information about a project into one location for quick access.

GroupWorks was designed for simple projects, including organizing a company party or working together in groups to create a proposal for a custom area of communications for a consulting firm in Los Angeles.

GroupWorks has unveiled Office Hours.

According to the Portland, Ore., company, Office Hours is a client/server software that gives networked users access to information and allows them to locate team members. It includes four functions: an I/O board for locating people; a browser that displays extensions, pager numbers, cellular and home telephone numbers; a Timecard that provides productivity and billable hours analyses; and a Calendar that lists upcoming company events and functions.

An installed copy of Office Hours provides access for up to 50 users per network server. It is currently available in a 16-bit Windows version.

HyperDesk offers product for managing small projects

By Suresh Mohan

HyperDesk Corp. recently introduced its GroupWorks 2.0, a task organizer for small teams of people working together.

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GroupWorks was designed for simple projects, including organizing a company party or working together in groups to create a proposal for a custom area of communications for a consulting firm in Los Angeles.

The customer's way

Most customers have their own preferences for spreadsheets, word processors or schedulers.

GroupWorks takes all that information, centralizes it and organizes it for a project. In essence, it creates a common workplace for people on a project.

"I can't tell you how many hours in a day are lost in organizing documents," Lucas said. "GroupWorks drops [all documents] into a repository, and people can annotate documents created using different software work in two ways: They can be attached to a view as OLE objects or as images.

But while these features work well for simple tasks, this product suffers, like every product in the groupware arena, from a comparison to Notes—collaborative computing environment. GroupWorks, however, doesn't pretend to compete in the same category.

A different approach

"GroupWorks is different from Notes or project management," said Ronni Marshak, editor in chief of "WorkGroup Computing Report," published by Patricia Seybold Group in Boston. "It is a personal environment for organizing work on a project basis.

"If you're trying to get scientists to speculate on the origin of the universe, Lotus Notes with its discussion databases might be better," said Jim Garvin, director of syndicated services at WorkGroup Technologies, Inc. in Hampton, N.H. But if users are trying to collaborate on a simple project, GroupWorks might be the better choice, he said.

Other features include search filters, import/export capabilities, Vendor-Independent Messaging and Messaging Application Programming Interface support and color-coded outlines.

GroupWorks will have a street price of $199 for the first license, which includes unlimited offline team traffic, and $99 for every license thereafter.

Millman

CONTINUED FROM PAGE 65

Spicer Corp. has introduced Imagenation 4.0, a document imaging tool.

According to the Kenner, Ontario, company, Imagenation 4.0 is technical document imaging software that lets users view, redline, mark up and edit files. It can handle overlays, markup documents, grayscale images, mixed page formats and portraits within a document. It supports more than 100 industry-standard file formats for computer-aided design, raster, color and text.

Imagination 4.0 includes an Expand feature that lets users access individual AutoCAD or Intergraph layers and control their color and visibility.

Pricing for Imagination 4.0 starts at $129 for Windows, Macintosh and Unix versions.

Teamaker Corp. has unveiled Office Hours.

According to the Portland, Ore., company, Office Hours is client/server software that gives networked users access to information and allows them to locate team members. It includes four functions: an I/O board for locating people; a browser that displays extensions, pager numbers, cellular and home telephone numbers; a Timecard that provides productivity and billable hours analyses; and a Calendar that lists upcoming company events and functions.

An installed copy of Office Hours provides access for up to 50 users per network server. It is currently available in a 16-bit Windows version.

Office Hours costs $150 per server copy.

More needed

We finally got TalkWorks running. TalkWorks could evolve into a useful application but currently lacks critical features.

For example, we would like to see password protection for stored messages, easier access to custom messages and a display that shows messages for all mailboxes rather than individually.

Delrina has acknowledged room for improvement. We separately installed two internal modems, Zoom Telephonics, Inc.'s 28.8K bit/sec. Cometstar and Creative Lab. Inc.'s 14.4K bit/sec. Phone Blaster. We experienced problems, including communication port conflicts, failure to open or close the telephone line, poor sound quality and dropped carrier. Part of the problem seemed to track to Windows 95's mercurial Plug and Play.

Millman is based in Croton, N.Y. He operates the Data System Services Group, a networking and problem-solving service. He can be reached at rhmillman@mcimail.com.
Until now making the move from SNA to TCP/IP was quite an undertaking.

If you'll pardon the pun, there's a remarkably "swift" route from NetManage. In one integrated package, Swift gives you everything you need to migrate from SNA to TCP/IP quickly, easily, and with a minimum of disruption.

For example, we've included many of the popular terminal emulators you need, allowing you to connect your PCs to the IBM mainframes and AS/400 midrange systems you use today. Swift even supports advanced SNA capabilities such as 3270 APA graphics, 3287 print emulation, and OfficeVision/400 text assist support.

Swift Includes 8 terminal emulators and TCP/IP:
IBM 3270 • IBM 5250 • DEC VT320 • Televideo 950/955
• Wyse 50/60 • SCO ANSI • AT386 • TTY.

But the best part is that NetManage is offering complete host access for the unheard of price of just $99 per PC. Not only that, once you're up and running with Swift, you can easily move the rest of your enterprise to TCP/IP with Chameleon™ Desktop – the industry-leading TCP/IP applications suite for Windows. Chameleon Desktop includes a full suite of Internet applications for Web browsing, FTP, e-mail, and more!

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Industry company moves from phone and fax to mix of vendors and services for international communication

By Neal Weinberg
STONEHAM, MASS.

Two years ago, when Paul Hoogenboom became director of communications at A. W. Chesterton Co. in Stoneham, Mass., the company's wide-area network consisted of telephones and faxes. Not that the 110-year-old maker of industrial seals, pumps and gaskets didn't need a more sophisticated system. With manufacturing plants in Ireland, Mexico and Massachusetts, and a global sales and distribution operation, its workers wanted a WAN that could do it all: electronic mail, Internet access, trans-Atlantic high-speed data connections and wireless and dial-in links from anywhere in the world.

Hoogenboom's strategy has been to use every method at his disposal, including threats, to get as much as possible out of AT&T Corp., the vendor he inherited when he joined A. W. Chesterton. And when AT&T comes up short, Hoogenboom moves to other service providers. The result is a mix of frame-relay, ISDN, X.25 and dial-up service for long-distance data transfer, Internet access and leased lines to connect four nearby sites in Massachusetts and provide global dial-in service to laptop users.

While Hoogenboom isn't an AT&T zealot, he decided to stick with the vendor to protect A. W. Chesterton's investment. Other reasons included AT&T's technological prowess and a new, more attentive attitude from the Basking Ridge, N.J.-based company.

Hoogenboom's faith in AT&T was sorely tested when he ordered a frame-relay connection between Dublin and Stoneham in June 1994 and was still waiting for it in December.

At that point, he gave AT&T an ultimatum: a frame-relay connection in two weeks or all the AT&T equipment gets thrown out.

Hoogenboom got frame relay for Christmas that year, and from then on, AT&T has responded to his requests "extraordinarily quickly." He went on to add a frame-relay connection between Stoneham and key sales offices in Chicago and New Orleans.

But AT&T couldn't provide global dial-in connections for A. W. Chesterton's mobile sales force of about 275 people, so Hoogenboom decided to use GE Information Systems for a private, high-speed network based on X.25 packet technology.

Other sources
Hoogenboom also is negotiating with vendors for global wireless services that AT&T doesn't offer. He said his remote sales force needs wireless connection when traveling in locations where the telephone system is unreliable.

The old switcheroo: Costs drop, but switching prices rise

By Bob Wallace

The cost of LAN switching is plummeting, but information systems managers may end up spending more, not less, on switching.

Because of falling prices, more business units and departments are buying their own switches. They are doing this without an eye toward corporate technology direction. This makes those departmental purchases bad buys.

And bad buys are bad news because IS managers often must spend additional money for gear that enables the department's switches to work with the corporation's switches. In extreme cases, the departmental switch must be prematurely replaced.

"False starts and write-downs are nightmares for IS managers," said Tom Nolle, president of CIMI Corp., a consulting firm in Voorhees, N.J.

Analysts say bad buys create the following problems:

- **The technology mismatch.** For example, a corporation is moving its switching architecture toward Asynchronous Transfer Mode (ATM), but a department buys an Ethernet switch that won't work with ATM.

- **The network management nightmare.** A department buys switches that can't be adequately managed, or managed at all, from the company's network management system.

- **The falling vendor headache.** A unit buys switches from a company that goes under or hits a technology dead end after it is bought out.

Blair Sanders, a senior member of the technical staff at Texas Instruments, Inc. in Dallas, said he hasn't run into any bad buys so far, but they exist and can cause problems.

"If that were to happen, our general rule would be to say to that department, 'You manage your side of the router, and we'll handle ours.' That would at least shield the rest of the corporation from any problems on the other side," Sanders said.

Another user said letting departmental and business unit buying to PCs and workstations is a solid solution to the bad buy problem.

"We at corporate buy all the other equipment and bill-back end users for network connectivity as well as service and support," said Paul Watson, director of network systems at Commercial Union Insurance Cos. in Foxboro, Mass. "Limiting the size of their budget limits what they can buy and addresses this problem."

Switches, page 71
Stalled on the I-way
Many still confused by Internet and networking technology
By Suruchi Mohan

Manually sitting the wheat from the chaff may be easier than separating the hype from the reality of the Internet. Users watching packets fly by on the information superhighway certainly find it a daunting task.

"I don't know what questions to ask," said Tom Cavagnaro, a systems administrator at Boston University Hospital in Boston. "I don't know how to run [the Internet]. There is no need to run it in the workplace.

This sentiment was echoed by many others, who asked not to be identified, at the recent E-Mail World conference in Boston. For example, one user said, "I still can't understand why I can't keep my corporation onto the Internet.

However, he added that even though he was just exploring the on-line world, the availability of development tools might aid the process of getting his organization onto the Internet.

But Mark Gibbs, president of Gibbs & Co., a consulting firm in Ventura, Calif., said he is "sickened by how hard it is to learn" to use the Internet. "Why don't [users] bite the bullet and learn how to use it? People tend to be limp about it. It's pathetic," he said.

As users try to figure out the technology, vendors are seeking to outdo one another by offering gee-whiz features. The trend here seems to be to embed uniform resource locators in an electronic-mail message so that when users click on it, they are immediately transported to the relevant World Wide Web site.

Banyan Systems, Inc.'s Beyond-Mail for SMTP, Lotus Development Corp.'s InterNotes Web Navigator and a product from InterCon Systems Corp. all offer this feature.

And in an effort to make corporate mail easily accessible, vendors are providing the ability to retrieve mail from the company server over the Internet. Lotus in Cambridge, Mass., and Infinite Technologies in Owings Mills, Md., separately announced in September CC:Mail for the Web and WebMail, respectively. WebMail supports CC:Mail and Microsoft Corp.'s Mail. Further, Lotus announced it has made the Internet the new focal point for its strategy [CW, Dec. 18].

"It's not as much hype any more," said Judith Rosall, president of Worldscape Strategies in El Granada, Calif. "Software companies will bring end-user companies onboard because they'll be guided." This means companies such as Lotus will be able to help customers leverage their existing technology to access the Internet.

But industry watchers advise caution because, with this kind of access, what will stop corporate data from flowing out? Companies can build firewalls to prevent unauthorized entry to their databases, but disgruntled employees can cause great damage by copying information onto disk, said David Ferris, president of Ferris Research in San Francisco.

Clear course
"Companies have the attitude that their staff will abuse the system," said Mark Gibbs, president of Gibbs & Co. Businesses need to develop a user culture that promotes effective use of the Internet by setting guidelines for access and making security provisions clear, he added.

Browsing for spreadsheets
By Kim S. Nash

Users of Netscape Communications Corp.'s Navigator browser will be able to view and manipulate spreadsheets on the World Wide Web now that Visual Components, Inc. is shipping an add-on module that does just that.

With Web browsers, users typically can't see spreadsheets but can view Web documents. But this tool lets users embed spreadsheet tables with calculated values from outside the Web into Web applications, which then can be viewed with a Web browser.

For example, a company that sells mutual funds over the Internet may want to give Web-users customers the ability to calculate what-if financial scenarios while they are browsing the site. Or firms that sell products on-line could let users run a tab that appears in the form of a miniature spreadsheet within their browsers.

The product, dubbed Formula One/Net, is one of the first spreadsheets built for Navigator since Netscape published its application programming interfaces several months ago.

How much?
Formula One/Net will come in two flavors: a $39 end-user version for plugging into Netscape's Navigator to view on-line spreadsheets; and Formula One/Net Pro, a $79 product that helps developers who are building Web applications handle spreadsheets.

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Enterprise Networking

Briefs

Cinco adds NT analyzer
Network managers and application developers who prefer Windows over Unix can add a protocol analyzer to their tool kits. Atlanta-based Cinco Networks, Inc. upgraded its NetXray analyzer and network monitoring software recently, adding a version for Windows NT. New capture/decode support covers Token Ring and 100VG-AnyLAN networks.

Middleware agrees
PeerLogic, Inc. in San Francisco and Sybase, Inc. in Emeryville, Calif., will make their middleware systems compatible. PeerLogic's Pipes Platform works over conventional networks, while Sybase's Enterprise Messaging Services is a wireless messaging system from the company's Complex Architectures division in Burlington, Mass. The compatibility project, which is slated for completion in the first half of 1996, will let customers seamlessly link networks based on the two middlewares, the companies said.

IBM goes on-site
Gandalf Technologies, Inc., a remote access network equipment vendor recently announced it has struck a deal with IBM under which Big Blue will provide on-site maintenance for Gandalf products in the U.S. The Nepean, Ontario, vendor is best known for its remote LANaccess wares, which use Integrated Services Digital Network lines.

E-mail gateways ship
SoftArc, Inc. in Markham, Ontario, is shipping gateways from its First-Class workgroup communication system for Lotus Development Corp.'s CC:Mail and Microsoft Corp.'s Mail. The CC:Mail gateway will be able to replicate the contents of CC:Mail bulletin boards to First-Class workgroup conferences. The Microsoft Mail gateway connects to a single post office and routes messages to a system with several post offices. Both gateways cost $495.

NT backs up to MVS
Boole & Babbage, Inc. has begun shipping Stage2, a Windows NT-to-mainframe backup program. Stage2 extends the services of Arcada Backup Exec, a Windows NT backup program, by transporting selected backup files to an IBM MVS mainframe. It uses LU6.2 links via Microsoft's SNA Server or a TCP/IP link to the MVS mainframe. Pricing for Stage2 begins at $7,500 for the MVS mainframe component and $2,900 for the LAN segment.

Switches
CONTINUED FROM PAGE 67
Analysts say the issue won't go away. "We're talking about an age-old problem, centralized control vs. distributed control," said Charlie Robbins, president of Aberdeen Group, Inc., a consulting firm in Boston. "But it's made worse by the fact that switching is seen as, and is, a panacea," he said.

Consensus decision making
Companies could form committees that include individuals from different units. These committees then could make buying decisions with the firm's overall technology direction in mind, Robbins said. Groups can gain flexibility by having the freedom to choose a vendor, as long as the product fits into the company's master technology plan.

The issue has left IS managers between a rock and a hard place. After having promised investment protection to top management when shelling out big dollars for high-end switches (see chart page 71), IS managers then force the company to prematurely write down those lower-level department switches. This doesn't impress corporate higher-ups.

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It's What You Read.
By Craig Stedman

**PHOENIX**

"There was a huge, pent-up demand to be heard. So many people wanted to have a voice."

John Palm Sasso

MIS director, Electoral Tribunal, Panama

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**Large Systems**

**HARDWARE ● SOFTWARE ● CORPORATE STRATEGIES**

Where do you send the bill?

<table>
<thead>
<tr>
<th>Charge ahead</th>
<th>Options that data centers have available for recovering client/server processing costs from user departments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat allocations</td>
<td>Uniform fees spread across multiple departments based on number of users, data center costs or other metrics.</td>
</tr>
<tr>
<td>Transaction fees</td>
<td>A flat cost for each individual processing task, with prices based on the time it takes to complete a transaction.</td>
</tr>
<tr>
<td>Telephone-style service</td>
<td>A base charge for IS services along with additional costs for each transaction.</td>
</tr>
<tr>
<td>Cable-style service</td>
<td>A bundle of services ranging from basic data processing for sophisticated departments to complete setups for less skilled users.</td>
</tr>
<tr>
<td>Service-level pricing</td>
<td>Fees derived from predefined service levels such as response time, help desk response or system availability.</td>
</tr>
</tbody>
</table>

Source: Gartner Group, Inc., Stamford, Conn.

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**DECEMBER 26, 1995/JANUARY 2, 1996 COMPUTERWORLD**
Large Systems

Oracle renews its Rdb commitment
Version 7.0 to ship in second-quarter '96

By Michael Goldberg

Oracle Corp.'s Version 7.0 of the Rdb database is expected to give users the ability to load up to 14G bytes of data in main memory. The new release, announced in early December, was also designed to let database administrators establish an up-to-date backup system at a remote location. Just as important as these new features, users said, is that Oracle has demonstrated a commitment to the future of Rdb, a product that runs on Digital Equipment Corp.'s OpenVMS-based systems. Oracle purchased it from Digital a year ago.

Anxieties eased

Attendees at the Digital Equipment Computer Users Society (DECUS) conference in San Francisco in early December said they were anxious about Oracle's plans for Rdb after the database vendor took over the product from Digital. Rdb Version 7.0, related enhancements and Oracle's promise to move Rdb further into the open systems world eased these concerns, users said.

"Oracle has made it very clear they are very serious about the product," said Philip Kurjan, principal engineer at Consilium, Inc., a Mountain View, Calif., developer of factory management systems that work with Oracle technology. At DECUS, Oracle officials said Rdb7, a new 64-bit version designed for large-memory systems on OpenVMS-based computers, would be ready in the second quarter of 1996 (CW, Dec. 11). Pricing information is due in January.

Oracle officials said they are bringing new graphical user interfaces to Rdb7. They are also adding new application development tools such as Rally, a fourth-generation language, that already are available for the Oracle7 systems.

These developments, and others expected in the future, give Rdb users a technology path to follow, said Jonathan Eznice, an analyst at Illuminata in Nashua, N.H. Making Rdb available on other Digital-supported operating systems, such as Digital Unix and Windows NT — will help users, Eznice said.

"The Rdb people learned it would be done in [Digital's] own VMS systems, and therefore there was no future. Digital Unix is a migration enabler," he said.

Barry Walls, a database architect at PacificCare Health Systems in Cypress, Calif., said Rdb supports the core business systems at his health care firm. Walls said he is considering setting up a hot standby database with Version 7.0.

Jeff Phelps, senior database administrator at Network Telephone Services, Inc. in Woodland Hills, Calif., said he enlisted as a beta site for Rdb7. He expects his firm may need large memory capabilities in the future. "Everyone wants to archive data, to pull up some records from six months ago" for historical reports, he said.

Panama

CONTINUED FROM PAGE 73

were conducted at the usual five-year intervals, but they were far from fair, said John Palm Sasso, MIS director at Electoral Tribunal, the Panamanian government agency in charge of elections.

Violence wasn't unusual. The military leadership felt free to disregard election results, installing its preferred candidates instead of the legitimate winners.

Notorious dictator Gen. Manuel Antonio Noriega was overthrown in 1989, and the winner of the 1989 elections, Guillermo Endara, was declared the rightful president. One of his major goals was to make elections meaningful again.

In pursuit of that goal, Palm, in 1991, replaced a hierarchical, Digital Equipment Corp. VAX-based database management system with a client/server implementation. A Sybase, Inc. DBMS runs on two IBM RS/6000s and two

AT&T Global Information Solutions' 3400s. DOS PCs replaced dumb terminals for the 150 users in the Electoral Tribunal's nine provincial offices, providing them with more computing power, Palm said.

The elections of May 8, 1994, were the largest in Panama's history. More than 25,000 candidates vied for 1,400 elected offices. "There was a huge, pent-up demand to be heard. So many people wanted to have a voice," Palm said.

Computer add-ons

The agency leased three additional servers and licensed Sybase's Replication Server, an add-on to the Sybase relational database management system that allows data to be copied to multiple sites nearly instantly without human intervention.

As results poured into the agency's headquarters from the country's 1,500 polling places, they were replicated to the Conception Center five miles away, where hundreds of journalists, U.N. observers, members of human-rights groups and representatives of the country's 14 political parties could analyze them in minute detail. Working from 125 DOS PCs, those users could review results for any given candidate, province or even polling place.

The system worked.

Within 24 hours after the polls closed, the results were 99% complete, and the usually contentious parties agreed the results were fair and accurate.

The official recount found an error rate of only 0.013%. The system wouldn't allow polling places to be deleted without an elaborate protocol being followed, as protection against tampering that could influence the outcome.

"The elections were free and fair, very different than in the past 20 years," said Ramon Ochoa, a sales representative for American Airlines who lives in Panama City.

Besides client/server benefits, Palm said that no change is planned for the next elections, in 1999, Palm said.

Data centers

CONTINUED FROM PAGE 73

tem depreciation and the amount of disk storage on individual servers, Maggs said.

One hard hurdle IS managers face in recovering costs for their distributed systems is a lack of usage measurement tools, which still are taking only baby steps in client/server environments.

At the Principal Financial Group in Des Moines, Iowa, for example, charges to user departments are essentially "done by hand by figuring out our people cost," said Douglas Gumm, assistant director of technical support. "[Fees] are based on the amount of time [data center operators] work on a particular system.

The financial services firm has more than 50 Unix and network servers in its data center now and wants to move to a more mainframe-like method of charging distributed users, Gumm added. "But that's pretty difficult to achieve in the near term," he said.

Even if better client/server measurement tools become available, basing cost recovery purely on resource consumption could be tough sledding in distributed installations where pieces of applications are split between multiple servers and desktop PCs.

Bruce Stewart, a Gartner Group analyst, said data centers should steal a page from the outsourcing playbook and move to fixed-price charges for client/server systems. Metering could be done "only to see if a department falls within range" of system usage levels agreed upon in advance.

Digital is target of European probe

Digital Equipment Corp. offices in Great Britain, Germany and the Netherlands recently were raided by European Commission officials investigating complaints of anticompetitive practices against the Maynard, Mass.-based company. The complaints charge that Digital used its dominant position in hardware sales to gain an unfair advantage in winning software development deals. Digital said its practices were in compliance with European Union antitrust rules.

Israeli HMO picks AS/400

Athena, a health maintenance organization in

BrieFs

Digital is target of European probe

Digital Equipment Corp. offices in Great Britain, Germany and the Netherlands recently were raided by European Commission officials investigating complaints of anticompetitive practices against the Maynard, Mass.-based company. The complaints charge that Digital used its dominant position in hardware sales to gain an unfair advantage in winning software development deals. Digital said its practices were in compliance with European Union antitrust rules.

Israeli HMO picks AS/400

Athena, a health maintenance organization in Jerusalem, has selected the IBM AS/400 as the foundation of its distributed client/server computing and networking environment.

Israel, bought 60 IBM AS/400 midrange systems to run a client/server medical history application. The AS/400 beat out Unix systems from Digital and Data General Corp. to win the order. The systems will allow Meshedet doctors to examine medical records, order laboratory tests and perform other tasks from PCs connected to the IBM machines.

SAS will expand consulting staff

SAS Institute, Inc. in Cary, N.C., has announced plans to double its U.S. consulting staff by the end of 1996 to 140 employees if demand for consulting services continues to meet the company's expectations.
New tools make it easier to understand complex code

By Frank Hayes

C++ has a pretty un-friendly reputation among corporate developers. It is a write-only language, they complain; its code can be cryptic and almost impossible to understand by anyone except the programmer who wrote it. That presents a major problem for corporate information systems shops, where code will have to be maintained by many developers in its lifetime.

But the tools for making sense of C++ code are improving. Hewlett-Packard Co. early next year will ship SoftBench 5.0, a new version of its C++ development environment that focuses on making code easier to understand.

**Decomposing code**

"For a while we've needed tools that will decompose C++ code and let you better understand it," said Dave Groening, a senior engineer at Alcatel Network Systems, Inc. in Raleigh, N.C. Groening has been briefed on SoftBench 5.0.

"Better than ever"

An improved class editor simplifies the task of specifying how one C++ class inherits characteristics from another. Developers can use a mouse to make or break connections between classes, and the tool set automatically will generate or modify the underlying code.

But just as important are SoftBench 5.0's tools for understanding existing C++ code. Badham said. He also has been briefed on the product.

"The new editors have all kinds of color coding, and you can do things like make a change in one class and have it propagated throughout the entire code," he said. "These are the kinds of things we've been screaming for out in the industry for a long time."

**Why is C++ so hard?**

Traditional IS languages such as Cobol were designed to make code easy to understand. For example, Cobol allows only one operation per program line and encourages long, descriptive variable names. But C++ variable names traditionally are terse because some early compilers allowed only short names. And like its predecessor C, C++ lets programmers write extremely complex code that can include many operations in a single line — a feature that can encourage code that is complex and almost impossible to understand.

**Snapshot**

**Preference vs. performance**

Users say they like a colorful interface, with realistic three-dimensional graphics and icons gauges for point-and-click action. So, of course, we give it to them.

If we learned nothing else in this age of total quality management, user-centered design, rapid prototyping and customer service, we've learned that the customer is always right. We trot out a few prototypes of graphical user interfaces and ask users, "Well, which one do you like best?"

But the customer isn't always right. A wide body of research shows that the computer interfaces users prefer sometimes make them perform worse.

This is heresy, I know. The user is king! Surely users would know if the interface actually shows them down or leads to more errors.

In fact, we humans aren't very good judges of our performance. The usability literature is full of counterintuitive studies demonstrating — as Robert W. Bailey, president of Computer Psychology, Inc. in Salt Lake City, put it — that "users can perform well and not like a system, or like a system and still not perform well."

For example, a 1990 study compared five

**Preference vs. performance**, page 76
Developers focusing more on Web apps

By Frank Hayes

Developers, focusing more on Web applications, are beginning to focus on the Internet. A new wave of development tools has been designed to let developers create applications that use a Web browser as a user interface.

Users can access applications through the browser, rather than have to log in through a remote access program.

“We have information kiosks so the public can obtain property tax, recycling and other information,” said Greg Stoddard, systems manager for the distributed processing team at Riverside County General Services Agency in Riverside, Calif. “We want to do those applications with Web pages, too.”

Same info everywhere

The same information should be available to users whether they are looking at a Web page, desktop computer or public information kiosk, Stoddard said. And the information should be available from the same program so that developers don’t have to rewrite applications two or three times, he said.

Development tool vendors are beginning to respond. Some companies, including Microsoft Corp., have developed long-term plans to support the Internet with their tools.

Texas Instruments, Inc., in Plano, Texas, last week said it plans to add Internet support to its Composer development system, which can be used to create client/server applications for everything from mainframes to PCs. And Power- erSoft Corp., of Mountain View, Calif., earlier this month said future versions of PowerBuilder will support the Internet, allowing Composer scripts to be built on the fly from Sybase databases.

Endless

Developing Web-based applications is getting more complicated than have to log in through a remote access program.

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Preferences vs. performance

CONTINUED FROM PAGE 75

computer system prototypes, each with a different interface. The interface that produced the best user performance showed the worst preference ratings.

Likewise, the one that produced the worst user performance had the best preference ratings.

Several studies also have shown that the highly popular 3-D graphics used to view two-dimensional data — such as the cartoonish 3-D bar and line graphs seen in USA Today — actually impair users' ability to interpret the information and lead to errors.

This “performance/preference dissociation” is spelled out in the October issue of a scholarly little magazine called Ergonomics in Design, published by the Human Factors and Ergonomics Society in Santa Monica, Calif. (72133.1474@compuserve.com). The article, “When Users Want What's Not Best for Them,” was written by human factors specialists Anthony D. Andre and Christopher D. Wickens.

So, does this mean we reverse course and ignore users' likes and dislikes? No, but it means we need to include performance measures such as speed and accuracy during application development and postimplementation studies. And if the system is safety-critical, accuracy should be given top priority.

Measuring the speed and accuracy of the user's work is more complicated than just shoving a user onto a computer and recording his or her time. But, after all, enhancing user productivity is the main reason we build information systems.

The best approach may be to tell users which interface really helps them from the important information and lead to errors.

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The best approach may be to tell users which interface really helps them from the important information and lead to errors.
Jobs Survey: Outlook '96

For IS job seekers, the 1996 market is absolutely on fire. In every industry and region, and at every career level, the corporate cry will be . . .

HELP WANTED!

BY KATHLEEN MELYMIKA

Perfect for the job

With her impressive resume, Betty Bitzenbytes knows she can write her own ticket to gainful employment as an information services professional. In fact, based on results from a recent Computerworld survey of 225 IS managers nationwide, Betty is just about the perfect composite job candidate. She lives in the hottest area of the country for IS hiring. She has worked with businesspeople and IS staff, demonstrating the "soft skills" that are crucial in today's IS market. And Betty has skills in networking and on both sides of client/server, the hottest platform in the industry. She also has experience with the industry's "next big thing," the Internet.

Betty has earned a business degree, which puts her a step above candidates with just a bachelor's degree. She has four years of increasingly responsible experience at a midsize company, and she is applying for jobs at companies of similar size and type. Small- to midsize companies are doing most of the hiring, and most employers say experience in the same type of business is important.

Betty is just sitting back and watching the job offers pour in.

If you don't fit the mold as perfectly as Betty, don't worry. The IS hiring picture for 1996 is so good, you'll find opportunities in every nook and cranny of the industry.

"We're hiring like crazy," says Karin Wacaser, a spokeswoman at Sabre Decision Technologies, the IS development arm of American Airlines, Inc. in Fort Worth, Texas. "We have 400 positions open worldwide, and we're expecting our growth to continue in 1996."

IS executives and recruiters across the country say the hiring outlook is very favorable.

"The market has been absolutely on fire," says Greg McConnell, a senior consultant at Winter, Wyman & Co., a recruiting firm in Boston. "There are actually three markets right now: There are the older mainframe and midrange markets. People have made huge investments in those, and they want to keep them up and running. The whole client/server market — the PC-based Unix server environment — is exploding. And the big-
**Information Technology @ Intel: When can you start?**

Not many companies can offer you the opportunity to apply next generation IT technology to an enterprise that spans the globe with thousands of users. But Intel is an unusual kind of company.

The following positions are challenges available immediately in both the greater Sacramento Area and in Santa Clara.

**SAP R/3 Systems Engineer**
You'll be a part of the R/3 Technologies group and will assist in developing hardware, software, and interfacing technical solutions for R/3 SAP platforms across Intel. The successful candidate must have a BS in CS or equivalent, with a minimum of 2 years experience in developing enterprise computing solutions, and have experience supporting enterprise applications and database technologies. Knowledge of UNIX and/or NT system, SAP, Windows 3.1, Oracle and C++ desirable. Excellent team/customer service skills and knowledge of client/server applications and application interface solutions are a plus.

**SAP R/3 Basis Systems Engineer**
This opportunity allows you to work with a dynamic SAP Basis Support team that provides Intel with SAP BC software solutions. You will work on SAP Product evaluations, research and development based on Intel software needs, as well as define operational support procedures, and provide BC consulting services to both business and application development teams. The qualified candidates must have a BS in CS or equivalent, a minimum of 2 years experience in Enterprise Operations, Code, Database, and Development systems support environments required. Must be willing to learn new SAP technology with experience in SAP BC Module support. Knowledge of client/server, Windows 3.1, NT, and Oracle are desirable.

**SAP EIS Analyst**
Join the team to design, implement and maintain data structures for the SAP Executive Information System decision support tool. As a SAP EIS Analyst, you will work with end user programmers to determine data needs, code SQL for data retrieval and design efficient data management objects. The qualified candidates must have a BS/BBA and a minimum of 2 years experience, or equivalent, and have knowledge of SQL coding, database design and performance and full life cycle of development. Familiarity with Intel reporting applications, client server experience, and decision support tool experience are all a plus.

**Internetworking Architects**
Within our large multi-vendor, multi-platform distributed computing network, you'll design, architect, evaluate and integrate new leading-edge networking technologies with legacy networks. Your knowledge of TCP/IP, DECNET, Banyan Vines, Novell, Ethernet, FDDI, SNMP, UNIX, and a solid understanding of bridges/switching, routing and ATM concepts will allow you to design, manage and troubleshoot these next generation networks. An MS in CS, CE or EE or equivalent and combined with a minimum of 2 years large networked computing systems experience are necessary.

**Messaging Systems Engineer**
You will troubleshoot and provide problem resolution for issues within Intel's LAN Messaging environment, evaluate and recommend LAN based messaging products, position, recommend and implement changes to the messaging architecture to respond to changing business needs. Position requires a BS/BA or equivalent and 3-5 years of directly related experience, including MS Windows, LAN/WAN environments, OS/2 or NT and PC hardware. The demonstrated ability to resolve network messaging issues by interfacing with application development teams, third party developers, suppliers and Intel IT support staff is essential.

**LAN Design Engineer**
As part of our Telecom and Network Transport team, you will provide overall network design (including preparing project plans, network diagrams, schedules and procedures, and performing related tasks). You will also provide troubleshooting support to Intel sites worldwide for LAN and cable plant systems and work with other teams to determine data communication requirements. Position involves extensive use of ATM, Fast Ethernet, and Category 5 cabling technologies. A BS in CS or EE and 3-7 years of related experience including network design, LAN, WAN, trouble shoot and communication management are essential. The ability to travel 25% of time both within the U.S. and internationally is essential.

Send your resume with cover letter indicating position of interest to: Intel Corporation, Staffing Dept., Code 6442. Or send to Internet address: staffing@smtp.gw.gdis.com, or Manager Professional Staffing, 1000 Lawrence Rd., P.O. Box 2072, Warren, MI 48090-2072. We are an Equal Opportunity Employer.
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The fast pace of technological change is the major factor driving hiring demand. The need for client/server and object-oriented development skills is providing vast pools of opportunity virtually everywhere. Growth in industries such as manufacturing, health care and services also is boosting employment. In the Great Lakes region and the Mississippi Valley states, for example, ups and downs in manufacturing are reflected in hiring activity.

Whirlpool Corp. in Benton Harbor, Mich., is experiencing heavy recruitment in telecommunications and networking because of changing technology and its expansion to global markets. "Networking, telecommunication and linking of [the two] are the technical skills we are looking for more and more," says Pascal Desbourdes, human resources manager at Whirlpool. "By net-

Help wanted, page 80

WHAT THE FUSS IS ALL ABOUT

THE TOP FACTORS DRIVING THE IS HIRING DEMAND WILL BE:

48% TECHNOLOGY TRENDS

36% INDUSTRY GROWTH

35% GENERAL ECONOMIC CONDITIONS

22% INDUSTRY RESTRUCTURING

22% OTHER FACTORS

Source: Survey of 225 IS executives and recruiters, with 25 from each region

THE RIGHT PERSON FOR THE JOB

Job titles ranked as most in-demand by region:

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<th>New England</th>
<th>Mid-Atlantic</th>
<th>East North Central</th>
<th>West North Central</th>
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Source: Survey of 225 IS executives and recruiters, with 25 from each region
HELP WANTED!

CONTINUED FROM PAGE 79

working, I mean local-area and now, even more important, wide-area network computing.

"One reason for this is information systems-related: The technology is moving that way," Desbourdes says. "The other is business-related: Whirlpool, every day, is more and more a global company. The investment we're making in information systems has to be consistent with worldwide communication."

Sensational support

Igor Tooplease is finding that growth in the New England health care market has pushed his resume to the top of the pile. He is a custom-fit for potential employers such as Beth Israel Hospital in Boston, where community outreach programs depend heavily on centralized help desk functions.

Igor has help desk experience and experience in the most sought-after networking, communications and database environments. And although his experience is limited to three years, it is specific to the health care industry.

"We need people with experience with help desk and network support services," says Audrey Feinberg, a human resources representative at Beth Israel. "We're moving from older systems into new. We're looking for people experienced in conversions from one type of database to another," she says. "We're also expanding into the community with new centers in two suburban towns, and we're [pairing up] with physician practices in the community. We need to develop centralized databases accessible to all of those," Feinberg says.

Evolving skills

Just as Beth Israel is migrating from older systems to new ones, there is a skills evolution emerging — from established technologies such as Novell, Inc.'s NetWare and Unix operating systems to upstarts such as Microsoft Corp.'s Windows NT, the World Wide Web and object-oriented tool sets. The net result is a wider job market.

"Novell skills was a huge market for us this year, and it's still very hot," McConnell says. "But the trend we're seeing is a push toward NT, and we're gearing up for a big call for NT in '96," he says. "[We still need] NetWare folks, but less so," says Larry Lundin, technical recruiter at Levi Strauss & Co. in San Francisco. He says Levi Strauss is moving away from Novell's networking system and leaning toward Windows NT.

"Someone who knows both would be a good candidate and [eventually] would be working strictly in NT," Lundin says.

The Unix world may be experiencing a similar, very gradual erosion. "Windows NT is getting stronger. In many places it's replacing Unix," says Bud Thompson, president of Computech Software Services, Inc., a New York firm that recruits IS professionals for custom development projects.

But there still are plenty of opportunities for Unixphiles. For example, "people who know the Unix world" are high on the recruiting list at FedEx Corp. in Colorado Springs, says John Hoffman, senior technical specialist at the firm. And Unix also is the most wanted operating system skill at Sabre.

Remote control

Norman Net knows he will get a warm welcome at KFC National Purchasing Cooperative, Inc. in Louisville, Ky., where the networking focus is on the big picture. Norman's experience in wide-area and remote computing puts him on the cutting edge — just where KFC wants to be.

"We still don't have enough expertise in [wide-area networking] and remote computing," says Tim Vogel, manager of field computing, "but have the same need for information. We're trying to come up with remote computing solutions. If an individual had successfully implemented remote computing solutions for a significant number of people, we would bend over backward to get that person."

Logical next step

As help desk manager, to supervise the design, development and maintenance of centralized help desk functions for a decentralized community health care organization.

EXPERIENCE

1993-present Help desk operator

1992 LAN manager

SKILLS: NetWare, TCP/IP, Oracle

HOT CLIMATES

Six out of 10 survey respondents in the South Atlantic states plan to increase their hiring in 1996, making it the most lucrative recruiting area in the country. But other regions aren't far behind.

SOUTHERN HOSPITALITY

Starting salaries for IS professionals will increase the most in the Southern states, dramatically outpacing all other regions.

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*Includes Hawaii **Includes Alaska
Source: Survey of 225 IS executives and recruiters, with 25 from each region

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*Includes Hawaii **Includes Alaska
Source: Survey of 225 IS executives and recruiters, with 25 from each region
Jobs Survey: Outlook '96

"There's a real push throughout the development industry to create products that can be transmitted," Miller says. "The whole concept of sharing work: the virtual company, the virtual office, workers in different places sharing ideas and concepts via the Internet. That's a very strong push. They're looking for development skills and experience in those areas."

The need to share information on the network also puts an increasing focus on groupware.

"There's a huge market for groupware (skills), especially Lotus Notes, and we expect growth there," McConnell says. "We're keeping an eye out for Microsoft Exchange, too. It's relatively new and not as robust as Notes, but looking at Microsoft's market share, we have to expect them to be a player," he says.

At Levi Strauss, networking means tying newer client/server systems to older mainframes. "A lot of companies such as Levi have mainframe technology that they're trying to get away from and go to object-oriented development, but it's really hard to just dump it and go," Lundin says. "So middleware is probably going to be big at Levi: systems and software that will tie together client/server-type technology and mainframe-type technology," he says.

FedEx is taking things further; its new system is beginning to usurp the mainframes. "Here in Colorado Springs we're setting up a new data center that will be entirely client/server. So there will be opportunities for people who know client/server hardware and C++ programmers," Hoffman says.

"On the application development side, what has been and continues to be strong is Visual Basic and C++," Thompson says. "On the client/server side, our clients are asking for people with skills in rapid application development tools," McConnell says. That includes experience with PowerSoft Corp.'s PowerBuilder, Microsoft's Visual Basic and Visual C++.

Those (skills sets) are very, very hot in the market now," McConnell says.

SOFT SKILL PROFICIENCY

Technical skills aren't enough; top IS candidates also must have people and business skills

The need for various technical skills is well-established. But many firms are adamant about the need for their information systems staff also to have more subjective skills.

"Even from a technical perspective, today's environment doesn't allow us the luxury of having the classic programmer who goes heads down," says Tim Vogel, manager of field systems at KFC in Louisville, Ky. "Developers have to interact with end users. Soft skills are exactly what we need."

KFC is looking for "two types of people," according to Neal Bronzo, director of information services at the company. "Some really want to be pure technical people. They want to find a niche and be the best in that niche. We need people like that. If all our [applications] are built on DBs, we need somebody who eats, breathes and sleeps it," he says.

"The second type of person has a focus also on the business, the ability to understand what we're doing so they can participate in the design phase," Bronzo says. "We're trying to get away from the order-taker philosophy where we pick up orders and clients take a number and we get back to them in three months."

"Priorities need to be set based on the business impact and also on the effort required, and the client has no concept of effort," Bronzo says. "So setting priorities is a combined effort of clients and [information technology]. If our developers understand the business, they can help to set priorities. If they don't understand the business, they can't."

At Whirlpool this business focus is called the "process partner focus," and it's regarded as crucial. "It goes back to the ability of the information systems community to work closely with, and be part of, key business processes. [The IS community must] understand how an IS project and executed," Desbourdes says. "These people need the ability to speak the business language. Put them together in 1996 and it's party time."

Bronzo says. "We're focusing on object-oriented development and programming so we're looking for people skilled in C++, Visual Basic and Smalltalk," Wacaser says.

"We're looking for individuals who have technical skills in an [object-oriented] language that builds on reusability of code and encapsulation," Vogel says. "[We're looking for individuals who] understand how ancestors and inheritance hierarchy works. The specific applications they would be developing would be in C++ and PowerBuilder."

Development dream

Ona Object's single-minded focus on state-of-the-art development makes her a top candidate for a company such as Sabre. "Ona, too, might make Ona an offer. "We're looking for people who are able to understand how to develop in an [object-oriented] language that builds on reusability of code and encapsulation," Vogel says. "We're looking for individuals who have technical skills in an [object-oriented] language that builds on reusability of code and encapsulation," Vogel says. "We're looking for individuals who understand how ancestors and inheritance hierarchy works. The specific applications they would be developing would be in C++ and PowerBuilder."

Ona can choose from among eager employers because object-oriented development skills are at a premium. Companies can't train object-oriented programmers fast enough, so Ona would be welcomed virtually everywhere. She may even be wooed away from her new job by a more ardent employer.

All this concentration on state-of-the-art technology doesn't mean that the mainframe is dead, however. Far from it. DB2 and Informix are the two database management systems we use extensively. We have to keep those skills finely honed," Vogel says. "If a person were extremely strong in that area, along with other skills, he or she would be a better candidate for us."

DB2's popularity backs up recruiters' claims that mainframe database skills still are in demand. "The mainframe is very hot, at least in the New York financial services industry," Thompson says. "People have so much data that a lot of them are enhancing their mainframe systems using CICS or DB2. They're using DB2 as the server from the mainframe down to the workstation."

Icing on the cake

IS skills are in demand throughout the country, and thousands of jobs are waiting to be filled. Prospective employers stress, however, that there is more to IS jobs than just technical skills.

"There's a set of core competencies we look for in individuals coming to us for employment, and they don't necessarily have to do with the latest and greatest tool," Vogel says.

"From a technical perspective, they revolve around knowledge of data and how it works and how it's associated," Vogel says. But they also relate to working with non-IS people in the real world, he says.

"We're looking for people who are able to work with end users to design an interface that works for the end user and is maintainable, programmable and doable from the technical perspective," Vogel explains.

Yu could say technical skills are the icing and core competencies, the cake. Put them together in 1996 and it's party time."

— Kathleen Melymuka

Bronzo says. "So setting priorities is a combined effort of clients and [information technology]. If our developers understand the business, they can help to set priorities. If they don't understand the business, they can't."

Melymuka is a freelance writer in Duxbury, Mass.
At Compaq, there is drive — people infused with enthusiasm, motivation, and momentum. And in the same space, there is direction — individuals with the strength and tenacity to keep an objective in sight and steer towards it. Together, they bring talent, skill, and perspective from many places of origin and many cultures. And these traits have helped make us the number One supplier of personal computers in the world, ranking first in sales and profits. Our direction was our goals even higher; our drive will ensure our success.

Electrical Engineers, Chipset Development

In these positions, you will participate in the design, development, evaluation, development and qualification of 180- and 460-pin chips from the top chipset vendors. A minimum of 5 years of experience in advanced computer architecture is required. You will interface with hardware and software, develop and debug, as well as analyze and C/C++/language development skills are essential. Excellent communication and interface skills are very important.

Dept. A03P-03

Hardware Engineers

The successful candidates will contribute to the design and development of next generation, high-performance, microprocessor-based products. Additionally, you will maintain technical interfaces with Intel vendors, review schedules, develop test platforms and suites, debug initial and intermediate designs, as well as provide single point of contact for technical questions. A PC background development and excellent board level digital design and debugging skills are required. Dept. A03P-011-16

Software Engineers, DSP

You will develop audio algorithms for a new DSP architecture. These positions require an advanced technical degree (IEEE preferred) with 3+ years of experience in a digital audio processing area. Familiarity with audio algorithms such as MPEG audio, Dolby AC-3 and FM synthesis is sought. Experience with PC architecture is a definite plus.

Dept. A03P-001-S6

Software Engineers, Multimedia

In these positions, you will write device drivers for new Windows 95 multimedia APIs. We require 3+ years of experience in a software development environment using C or C++ and development and XML Assembly languages in Microsoft Windows development environments. Experience with Windows APIs, II/graphics, MPEG video or PC audio is a definite plus.

Dept. A03P-001-M6

Systems Engineers, Software Development

The successful candidate will participate in the design, development, maintenance and support of new device configuration and software interfaces for our high end multimedia products. You will also interface with other software/hardware teams and test teams to design and test new programs to define program requirements, resolve technical issues and ensure that high quality products are delivered within aggressive time constraints. These positions require proficiency in C++ Assembly and C++ languages with a working knowledge of 32-bit/68K architecture. Windows and OS/2 environments are a plus.

Dept. A03P-001-S6

Electrical Engineer

You will participate in the development of the overall test strategies, schedule, and plan ensuring technical completeness and effectiveness of graphics/multimedia software deliverables. Additionally, you will develop test driver applications and tools as needed and interface with other groups both within and outside the graphics/multimedia functions on testing technology, project specific and state. These positions require at least 3 years of experience in a microcomputer software test environment. Familiarity with Windows display drivers, virtual drivers and applications is highly desirable, as is OS/2, Windows 95 and C language development.

Dept. A03P-001-B6

Technical & Analytical

Qualified candidates will have experience in large project work, the ability to travel, and a commitment to continue our presence in the exciting world of consulting. We seek individuals with experience in the following areas:

- Deposits  
  - Branch/Teller

- Loans

- Trust

- Global Custody  
  - Systematic

- Wire Transfer

- AML

- Bank Card/ATM

- New York

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A new position has been created within the IS Professional area to assist with the development of the IS Professional area. The position will be implemented under the direction of the IS Manager and the Senior Vice President of Technology. The IS Professional area will be responsible for the development and implementation of the IS Professional area. This position will require a broad knowledge of the IS Professional area, as well as the ability to organize and complete projects within tight deadlines. A minimum of a Bachelor of Science in Computer Science or related field is required, with at least one year's experience. A valid driver's license is required.

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We provide an excellent opportunity for a results-oriented, Novell CNE who is also a team player with 3-5 years experience in local area networking and wide area networks. You will be responsible for the design, installation and management of network environments, and troubleshooting of network problems. You must be able to install, configure and maintain TCP/IP, Novell Netware, LANs and WANs, and be able to effectively communicate with customers. The position requires a high level of technical expertise, as well as the ability to organize and complete projects within tight deadlines. A minimum of a Bachelor of Science in Computer Science or related field is required, with at least one year's experience. A valid driver's license is required.

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Organizational Skills:
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Technical/Industry Expertise:
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- Technical expertise and understanding a plus
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Educational Background:
- (Not requirements)
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References are required and will be contacted.

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- Strong analytical, organizational, and problem-solving skills.
- Excellent oral and written communication skills.
- Experience with interface design and implementation theory (SDL/C, DOCD).

**Preferred qualifications:**
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__For consideration, forward resume to:__

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<th>1. BUSINESS/INDUSTRY (Circle one)</th>
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<td>19. Manuf (other than computer)</td>
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<td>21. Health/Drug/Insurance</td>
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<td>26. Mining/Construction/Utilities/Petroleum/Agriculture</td>
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<td>27. Manufacturing/Computer/Computer Systems and Equipment</td>
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<td>28. Systems Integrators, VARs, Computer Service Bureau, Software Planning &amp; Consulting Services</td>
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<td>29. Computer/Peripheral Dealer/Distributor/Reseller</td>
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<td>32. Business/Industry Management</td>
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<td>35. Technical Management</td>
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<td>36. Sales/Marketing</td>
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<td>38. Professional Management</td>
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<td>44. Information Technology Management</td>
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<th>CORPORATE MANAGEMENT (Circle one)</th>
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<td>45. President, Owner/Partner, General Mgr.</td>
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<td>48. President, Owner/Partner, General Mgr.</td>
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<td>49. Vice President, Asst. VP</td>
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<td>50. Treasurer, Controller, Financial Officer</td>
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<th>3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)</th>
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<td>Operating Systems (a) Solaris (b) Netware (c) OS/2 (d) Unix (e) Mac OS (f) Windows (g) Windows NT (h) Linux</td>
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<td>App. Development Products (i) Yes (j) No</td>
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The purpose of this announcement is to present the Department with the technical skills and experience to maintain existing legacy applications and, over the course of the contract, to engage in applications take advantage of new technologies that will provide the benefits for the duration of the program period.

Firms bidding on the RFP will be required to submit statements and documentation detailing their qualifications in the area of human services information systems operations and management. The deadline for submission of the mandatory letter of intent to bid is January 26, 1996. A pre-proposal conference will be held on January 19, 1996 at 9:00 a.m. in the DHS Conference Room, Government Plaza West, 4th Floor, 15th Street in Little Rock.

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Computer Careers
Help with the housekeeping
Application-deletion software makes disks run smoothly
By Lynn Haber

At a time when applications consume increasing amounts of hard drive space, disk housekeeping can improve system performance. Application-deletion software was designed to do just that: clean out unused applications and files.

On the market for only a few years, application-deletion products were designed to help Windows users automate what they had previously done manually. Many organizations still manually rebuild hard drives, a process that can take the better part of a day. "Unattended hard drives can, after a period of time, affect productivity and cost the organization for the technician's time as well as have the potential to introduce viruses," says Jim Garden, director of syndicated services at WorkGroup Technologies, Inc. in Hampton, N.H.

"An application-deletion program is like a wish tool to consider — it frees up disk space and is a better investment than buying a bigger hard drive," Garden adds.

Gor Falo}, a software industry analyst at Computer Intelligence Incorp in La Jolla, Calif., reports that the three leading product vendors — MicroHelp, Inc., Quarterdeck Corp. and Vertisoft Systems, Inc. — showed dramatic sales increases in early fall. "We expect to see volumes increase further because these products offer users a much-needed capability," he says. With the migration from Windows 3.1 to Windows 95, freeing up hard-disk space is important, he adds.

Deletion packages also remove bits and pieces of files located in various directories and Dynamic Link Libraries. Because files are spread across directories or shared by applications, it is often difficult for even the most sophisticated computer users to thoroughly remove applications, according to vendors.

If the job isn't done completely, unwanted files can be left on the hard disk, which means less hard-disk space for new applications or, worse, shared files are deleted, which can leave other applications inoperable.

With more than 50 million Windows 3.1 machines running 16-bit applications, compared with a few million Windows 95 devices running 32-bit applications, the market for Windows 3.1 deletion products is wide open.

Analysts caution, however, that application-deletion software vendors will have to enhance their products as more users move to Windows 95. That is because applications for Windows 95 must include an application-deletion feature.

Deletion software vendors say the uninstall feature in Windows 95-compliant applications is a step in the right direction and works best in a pure 32-bit environment. However, they say, it is much less robust than what is available in third-party products.

Application-deletion software vendors have continually added features to their products. Vertisoft Systems' Remove-It includes a tool called Upgrade Assistant to help users upgrade to Windows 95. It was designed to make a dual boot scenario a viable option, letting users return to Windows 3.x applications if they have problems with Windows 95, says Elliott Lowe, vice president of marketing.

Another example of added features is MicroHelp's new application management capability. It is intended to help users move applications from one drive to another or to another directory. It lets users archive frequently used applications by compressing them on the hard drive and restoring them at the click of an icon. MicroHelp also helps identify files that are candidates for deletion.

Michael Gartenberg, research director at Gartner Group, Inc. in Stamford, Conn., says users turn to these products to clean up the slack that other products leave. However, he suggests users test these products to make sure they do what they want them to do.

Analysts say there are several potential problems users can run into if application-deletion software is used incorrectly. For example, an "any clean" function, in which users can select all files with a common prefix, can result in deleting the wrong files.

Vendors have just begun to release Windows 95 versions of their software. Older releases will remove Windows 3.1 applications under Windows 95, but vendors advise waiting for the Windows 95 versions for complete functionality.

Haber is a freelance writer in Norwell, Mass.
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IBM

CONTINUED FROM PAGE 1

back from EMC Corp. and other big iron disk vendors. But with Seastar now two years away from hitting the beaches, users and analysts said IBM has to rely on lowball pricing to keep Ramac enticing.

Its rivals will have no choice but to follow suit. Market watchers Meta Group, Inc. and International Data Corp. (IDC) now predict prices will fall by 40% or more in 1996 — well above the typical 30% annual decline (see chart).

Several Ramac users agreed that customers should reap a dividend from IBM's delay. "The only thing IBM has to deal with is price," said Joel Van Dyke, manager of hardware planning at Chrysler Corp. in Centerline, Mich. Chrysler stores 10TB of data on Ramac arrays and is intrigued by the fault-tolerant promise of Seastar. But there is now "probably a good chance" that the automaker will turn away from Ramac when it adds more mainframe disk capacity in mid-1996, Van Dyke said.

"I'm sure IBM is going to continue trying to bring its way into keeping [Ramac] on the floor," Van Dyke said. "But if alternative vendors stay with IBM on price and have better products, why shouldn't I buy from them?"

Langton said, "I think it's probably a good idea to be among those parties, according to sources close to the negotiations. But Novell put too many restrictions on the sale, turning off potential software suitors, sources said. For example, it wants the new owner to assure that no jobs will be cut, that employees won't be relocated and that product development will continue. With these stringent conditions, Fastie said Novell is likely to get only $300 million. For the WordPerfect applications business, not reported the news $400 million it thought WordPerfect would fetch.

Novell purchased WordPerfect in June 1994 in a stock swap valued at $855 million. Whether it remains in the Ramac camp is "going to become an issue of price," said Michael Pudly, manager of resource management at Wall.

Ramac 2 still relies on IBM's aging 3990 Model 6 stand-alone controller, while EMC and other vendors integrate controllers with their arrays. A single 3990 also supports only 180G bytes of data, far below what rival products can handle. IBM will double that when the third Ramac ships, it will still face footprint and cabling disadvantages, Pudly said.

Barnett Banks is considering building a 500G-byte data warehouse with one of its mainframes in 1996. "It would be nice if I could just pop in one [storage] box as opposed to needing three or four with cables scattered all over the place," Pudly said.

IBM spokesmen insisted the company's "plan of record has always been to ship [Ramac 3] in the first quarter of 1997." The development schedule was just finalized in December, but James Vanderlicle, general manager of IBM's Storage Systems Division, said in late October that it was shooting for a 1996 release.

Users and analysts said they were told by IBM insiders to look for Ramac 3 in the third quarter of 1996. The later shipment makes it harder for IBM to stop the free fall of its mainframe disk market share, said Carl Greiner, an analyst at Meta Group in Stamford, Conn. EMC should slightly outship IBM in 1995 and then widen the gap in 1996, Greiner added. "It's not a pretty picture for IBM."

WordPerfect: A done deal?

CONTINUED FROM PAGE 1

Waxton, Mass. "Novell wants to convert the WordPerfect assets to cash immediately. But Novell can't just do a handshake deal on the 31st. They have to work through the deal all worked out and signed to complete it by that date."

Outside of Novell, there is little surprise that it has taken more than two months to find a buyer.

"Novell thought they could say WordPerfect was up for sale and a flood of people would come to their door with suitcases full of money. But that didn't happen," said Amy Wahl, editor of "TrendsLetter," an industry newsletter in Narbun, Pa.

"Novell thought they could say WordPerfect was up for sale and a flood of people would come to their door with suitcases full of money. But that didn't happen."

— Amy Wahl, editor of "TrendsLetter"

The running for a short period was a group of investors headed by Will Fastie, an independent consultant in Baltimore. But that group dropped out of the bidding in December after six weeks of trying to raise the cash. "I just couldn't raise the money," Fastie said. He added that former WordPerfect President Pete Peterson was halfheartedly behind the group but seemed to lose interest along the way.

By Neal Weinberg

IBM and Ameritech Corp. are joining the ranks of network integrators — those companies that offer one-stop shopping for users who want to outsource their desktop-based computing and communications systems.

Under a recently announced alliance, Ameritech and an IBM subsidiary will manage PC hardware and software, telephones, private branch exchange equipment, LANs and videoconferencing systems.

Ameritech is the Chicago-based regional Bell operating company; Integrated Systems Solutions Corp. (ISSC), the IBM subsidiary, specializes in systems integration.

All in one

Network integration is a fast-growing field that takes traditional systems integration and adds the telecommunications component.

The benefit to users is the opportunity to obtain an all-encompassing, long-term agreement that addresses a wide range of thorny issues such as global connectivity, or the integration of voice and data over the network. Ameritech, said an analyst at Aberdeen Group, Inc. in Boston.

Ameritech is the largest of about 300 similar arrangements for users are made with Microsoft, other OEMs and users

IBM and Microsoft licensing deal stalled

By Stuart J. Johnston and Lisa Picarre

With the new year upon us, it looks like it will be out with the old but not necessarily in with the new at Apple Computer, Inc.


However, Apple has been unable to come to a license agreement with Microsoft to sell Windows 95 in place of those systems, Apple and Microsoft officials confirmed.

The sticking point for Apple is a requirement in Microsoft's license that Apple indemnify Microsoft, other OEMs and users from any patent infringement claims.

"We are not willing to meet Microsoft's demands on that issue," said Pam Miracle, a spokeswoman for Cupertino, Calif.-based Apple.

Not renewing its license with Microsoft, Wash.-based Microsoft will affect Apple's ability to bundle copies of Windows with Apple's products but will have little impact on users.

"Our systems will still be Windows-compatible, but users will have to purchase their own shrink-wrapped copy of Windows," Miracle said.
Microsoft more dangerous now as 'follower'

Charles Babcock

In the commander's genuflection, he bent his knee, but he didn't throw away his weapons or dismiss his army.

The Back Page

PC prices keep on tumblin'

Watch for the next big round of PC price cuts in early February. Intel is expected to roll back prices on its entire Pentium lineup and possibly even its newly released Pentium Pro chips, said a source close to the company. The price cuts are expected to make way for Intel's latest 166-MHz Pentium chip, which is scheduled to be released in the first quarter. The cuts will range from at least 16% to 30%. The biggest cuts will be on 75-MHz and 90-MHz Pentiums, the source said.

Prelude to an IPO?

Systems management vendors Tivoli and McAfee are about to take minority stakes in Netgenesis, a hot-and-getting-better Web tools maker in Cambridge, Mass., according to a source at Netgenesis. The threesome is expected in 1996 to build graphical utilities for the care, feeding and troubleshooting of internal Internet, or intranet, applications — an ugly task in need of technology. Tivoli and McAfee each got a seat on the board of privately held Netgenesis. Finance firms Robertson, Stephens & Co. and Hambrecht & Quist also are close to signing pacts to inject cash into the small company, the source said.

Godzilla deals

IBM recently filed with the Securities and Exchange Commission to sell off $1.7 billion worth of debt securities. That would bring IBM's available cash to $10.7 billion. Wall Street watchers say Big Blue is likely to use this money to make a large acquisition, possibly a deal involving Intel's x86 processor, which the computer giant is rumored to be trying to buy. Babcock used his near-monopoly power in desktop operating systems and applications to gain a monopoly in core Internet technology, some deep thinker in government would say, "Enough. This overbearing tendency is restraining competition."

In an interesting companion move, Microsoft licensed Oracle's PowerBrowser OCX for use onOLE controls on the Internet, and Oracle licensed Microsoft's Visual Basic Script. Oracle was an early backer of Java and remains interested in the promise of Java as a standard but-
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