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Tough times put new pressures on harried IS shops

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Oracle CASE lets you develop applications anywhere. And run them everywhere.
IN THIS ISSUE

MANAGEMENT

Cover story
2 "My three biggest issues are cost management, cost management and cost management," says Jim Sutter, vice president and general manager of IS at Rockwell International. He's not alone. Greater visibility, tight budgets, outsourcing and higher expectations by business managers are all contributing to unprecedented pressures on IS departments to produce higher quality work in less time with fewer resources.

2 Keeping customers happy will be a top corporate priority in 1992. And, increasingly, the burden is falling on the shoulders of IS. Electronic mail, electronic data interchange and imaging are key driving technologies, but IS chiefs say you needn't spend a lot to gain a lot.

Average annual increase in IS budgets

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>1990</td>
<td>6.9%</td>
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<tr>
<td>1991</td>
<td>5.3%</td>
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<tr>
<td>1992</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

6 Technology spending is rising at only half the rate of two years ago, although equipment budgets are up slightly. Find out what's being spent, how and where.

INDUSTRY

Cover story
21 Vendor alliances, partnerships and consortia gained new popularity in 1991, but many users doubt such team-ups will produce anything other than vapor. Even so, a shrinking, suffering industry is likely to continue seeking safety in numbers in 1992. Analysts say that in the best case, vendor unions could lower prices, improve functionality and shorten corporate buy lists. Worst-case possibilities include confused product direction, waste of time and money and lip service to open systems.

21 Body count: Hard-pressed computer makers slashed more than 56,000 jobs this year.

TECHNOLOGY

Cover story
35 Open systems is no longer a computer nirvana. But interoperability in '92 will be propelled less by industrywide standards than with links between individual products. Vendors of networks, databases, operating systems, user interfaces and application development tools are scrambling to add open features to meet growing user demand. Meanwhile, various standards bodies will continue efforts to draft larger "open" schemes.

35 Client/server systems will grow up this year, thanks to the announcement of key multiprocessing operating systems and applications development tools. But analysts advise users to migrate slowly.

SYSTEMS & SOFTWARE

53 Predictive software showed advances at the Computer Measurement Group '91 conference.

PCs & WORKSTATIONS

57 IBM's reorganization is not expected to hurt OS/2 development.

NETWORKING

61 The path Smith Industries chose for its companywide network operating system is DEC Pathworks.

61 The University of Michigan's football team tracks its workouts on IBM PC/ATs.

MANAGER'S JOURNAL

63 Young & Rubicam made a decision that was ahead of its time: It outsourced. Waiting until the mid-1980s to implement major technology may have given the firm a head start on the '90s.

COMPUTER INDUSTRY

65 National High Tech Group helps an on-line publishing company identify ways to improve business.

DEPARTMENTS

48 Editorial
49 Viewpoint
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Job outlook mixed. Atlanta, Miami and Seattle are hot; Denver, Boston and Detroit are not. Health care is best on the East Coast, banking in the Midwest. Top titles are chief information officer, programmer and database administrator. See job map, pages 12-13.

IS seeks dollar-stretchers. Tactics include end-user training, re-engineering, downsizing and a back-to-basics approach. See Buck Bangers, pages 16-17.

Re-engineering top concern. More than 90% of IS shops say they are currently working on projects. Advocates say business process redesign is workable for both high-fliers and struggling companies. Page 8.

Budget growth slowing. Average increase dipped to 3.5%, down from 7.5% in 1990. Staff spending slipped, equipment spending rose. Biggest cuts are in airlines and computers/electronics, while media/entertainment and transportation get the biggest increases. For other budget information, see page 6.

Europe adopts tough safety rules. By the end of 1993, employers will have to conform to new ergonomic rules for user health and comfort, including work environment, software design and job composition. Page 7.


Management

Faster! Better! Cheaper! Now!

Tough times put new pressures to do more with less on harried IS shops

BY CLINTON WILDER and CAROL HILDEBRAND

Watch out — you might get what you've after.
— Talking Heads

For years, information systems departments battled for recognition as key partners in business success. Today, all but the most backward organizations view information technology as critical to success in the 1990s.

Alas, that recognition has also brought unprecedented pressure (and often pain) to IS professionals. Constant demands to "do more for the business" have arrived smack in the middle of a stubborn recession that has frozen or even gutted technology budgets.

To make matters worse, the outsourcing phenomenon — fueled by corporate giants such as General Dynamics Corp. and Continental Bank Corp. — has captured the fancy of company presidents and chief financial officers everywhere. As a result, even well-managed IS shops are under the gun to prove they can do the job better than outside contractors.

"The instability in the IS profession right now is just terrible," says Rich Koeller, chief information officer at Whirlpool Corp. in Benton Harbor, Mich. Aside from outsourcing pressures and high CEO turnover, Koeller bemoans the lofty and often vague technology expectations of business executives. The whole state of affairs, he says, "causes some people to wander if they want to be in this line of work — just at the time when we need the best and the brightest."

But IS chiefs are buckling down to find new and creative ways to cope.

For Koeller, that has meant freezing IS spending at 1991 levels and asserting more control over new and ongoing IS projects. All IS projects must now be detailed on a two-sided form, explaining costs and business benefits on the front and technology budget details on the back. Projects are planned by joint IS/business teams, but it is the business team that sets funding priorities.

"We have to align [technology] expenditures with the business goals. It's that simple," Koeller explains. "Only the business can do that."

Koeller has plenty of company. In a CSC Index, Inc. survey of 444 companies, 70% have indicated outsourcing was their number one concern for 1992.

Companies needn't make huge investments — or any at all — to improve customer service with technology.

BY DEREK SLATER

For retailer Nordstrom, Inc., "customer service" means having shelves and racks filled with exactly the fashions postholiday shoppers are looking for. For trucking firm Consolidated Freightways, Inc., it means quicker response to customer inquiries.

While the term means different things to different businesses, nearly everyone agrees on one thing: Happy customers are the key to survival. As the recession lingers, many companies in every industry are realizing they can't afford to risk losing precious customers with poor service. And as the talk grows louder, much of the conversation centers around information systems and technology.

"IS is the best game in town in terms of servicing customers in a new way," says John Cunningham, president of Competitive Technologies, Inc., an Easton, Conn.-based consulting firm. One reason, he says, is that technology lets companies learn more about customer preferences and priorities. Thus, companies can give customers what they want — and more quickly.

One-fifth of top IS chiefs in Computerworld Premier 100 companies named customer service as the single biggest challenge facing their industry in 1992. Similarly, nearly 500 top IS executives in a recent survey by CSC Index, Inc. listed order processing, postsales customer service and product delivery as the top areas of technology investment in '92 (see chart page 6). CSC Index analysts say the results clearly reflect growing concern for satisfying customers.

Savvier companies are already using technology and taking their lead from the customers themselves.

For instance, Nordstrom recently turned to its IS department to find a way to help its 68 stores quickly and flexibly change inventory on demand. The solution: a project now under way that replaces telephone communications with the store's 20,000-plus suppliers with electronic data interchange and electronic mail. The bottom line, says Pat Adkins, implementation supervisor, is that "the system lets us..."
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Faster! Better! Cheaper! Now! CONTINUED FROM PAGE 2

North American IS executives, the No. 1 issue for 1992 is "aligning IS and corporate goals." "Re-engineering business processes" fell to second place after two years on top (see story page 6).

Ironically, aligning IS and business was also the No. 1 issue back in 1988, when technology was seen as the key to gaining competitive advantage. But better teamwork is no longer just "nice to have"; it's a matter of survival — for both IS chiefs and their companies.

One result is that a system's success is increasingly judged by whether business efforts such as retraining, redesigning business processes and changing customer expectations also come to fruition.

"Lots of CIOs are realizing that they can't create a silver bullet for their business," says Robert Dantowitz, a CSC Index principal.

As management realizes that pouring a variety of strategies (see box below), they are increasingly rethinking their investment recession and [information] has been one of the biggest investments," says Robert Severy, chief quality officer at Profit-Oriented Systems Planning Program, a Carrollton, Texas-based IS research consortium. "Like real estate, we have overbuilt and overinvested. It's time to slow down and sort it out."

Budget growth slows

IS spending is indeed slowing. In the CSC Index survey, projected hikes in technology spending for 1992 dropped for the third straight year. Average increase: 3.5%. Not surprisingly, aerospace and defense was hardest hit, suffering a projected 7.3% plunge in 1992.

"My three biggest issues are cost controls, cost management and cost management," says Jim Satter, vice president and general manager of IS at aerospace giant Rockwell International Corp. in Seal Beach, Calif. "We make all these cost cuts, and yet at the end of the day, users still feel we're not moving fast enough."

So far, expense containment tactics have included personnel reductions, data center consolidations and encouraging more bidding wars among vendors seeking Rockwell business. The company is even beginning to question the number of redundancies and backup systems in place. "We are starting to review those to see if users can still afford to pay for them," Satter says.

In every industry, companies are searching out sacred technology cows and taking a fresh, hard look at their practicality.

Nothing is beyond closer scrutiny — even maintenance of older applications.

"Some little enhancements that we spend a lot of resources on don't give us very much of a payback," says Bob Ierkenhoff, vice president of information services at Sears Merchandise Group in Chicago. "We've been very mindful of the dollars that you don't need."

Most IS executives want to test those new enhancements carefully before plunging in, however. "You can't tell me that client/server is less expensive, but there isn't enough experience yet to know that," notes Jim Marston, CIO at Ameri- can President Co., in Oakland, Calif. The company has formed a "platform placement committee" to review new and existing applications and match them to the architecture that makes the most sense.

With most analysts predicting another tough year economically, IS shops aren't likely to see new ways to trim costs, improve service and deliver bigger business benefit.

The mandate could not be more clear: 67% of CSC Index survey respondents report feeling pressure from senior and line executives to quantify the value of IS spending. Only 14% said they feel so pressure. However, quantifying is easier said than done. "We all know that what systems can provide is critical and necessary," says Al Hyland, director of the Systems Management Division at Polaroid Corp. "Yet it remains difficult to draw clear return-on-investment benefits to the systems infrastructure."

Will IS be up to the task? In many cases, the answer may be no. Executives whose technology strategies are not in sync with the business will find them- selves in serious trouble. More CIO heads are likely to roll, and mega-outsourcing deals will become more commonplace as the year progresses.

If there is any bright spot to be seen, it's that IS seems to understand the magnitude of the challenges it faces in the new year.

"We know from the get-go that costs have to go down, and quality has to go up," says Bob Leto, manager of information services for the Orange County, Calif., operations of struggling Unisys Corp. "That's a given. That's our job."

The tactics they're taking

Hard-pressed IS chiefs are employing numerous tactics to maximize their IS operations — and to safeguard their jobs.

Outsourcing. It is becoming increasingly popular to hire an outside contractor to take over commodity IS operations, such as data center operations and software maintenance. A hefty 64% of 1991 Computerworld Premier 100 companies said they have evaluated the possibility of outsourcing some or all of their IS operations.

By 1995, 60% of all large U.S.-based firms will outsource some part of their IS operations, according to Meta Group, Inc., a market research firm in Westport, Conn., with 10% outsourcing the entire function.

Downsizing. Many firms plan or have started to move applications to smaller platforms and, in some cases, get rid of mainframes altogether. One piece of evidence: Client/server technology was the second most frequently cited emerging technology of the greatest interest (behind imaging) in the CSC Index annual survey of IS executives, up from ninth place a year ago.

Re-engineering. Another favorite. Working with business units to rethink or "re-engineer" processes was cited by no less than 81% of Premier 100 companies. Winners said it was "very likely" they will redo business processes over the next 12 months. Only 6% said it was unlikely (see story page 8).

New metrics. As pressures mount to justify technology, companies are seeking new ways of demonstrating the business value of IS.

More people focus. In the CSC Index poll, "improving the human resource" jumped from 13th place in 1990 to the fifth most important concern of IS executives.
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Spending slowdown continues

<table>
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<tr>
<th>Average annual increase in IS budgets</th>
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<tr>
<td>1989</td>
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<td>1990</td>
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<tr>
<td>1991</td>
</tr>
<tr>
<td>1992</td>
</tr>
</tbody>
</table>

Base: 444 senior IS executives in U.S. companies

Source: CSC/Index

Where leaders spend

Computerworld Premier 100 companies expecting budget increases will spend on:

- Hardware
- Software
- IS staff
- IS training
- Capital investments
- Application systems development
- Other
- Don't know

Base: 58 companies; multiple responses allowed

Source: Computerworld Premier 100

Tech watch

Based on a scale of 1 to 4, with 4 being extremely important, IS chiefs rated the following technology areas worth watching:

- Client/server
- EDI
- Optical discs
- CASE
- Imaging

Base: 370 high-level executives

Source: Society for Information Management

Hot priorities

<table>
<thead>
<tr>
<th>Where IS says it will invest</th>
<th>Percent of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order processing/handling</td>
<td>48%</td>
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<tr>
<td>IS development</td>
<td>48%</td>
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<tr>
<td>Postale customer service</td>
<td>46%</td>
</tr>
<tr>
<td>Product delivery/ logistics</td>
<td>43%</td>
</tr>
<tr>
<td>Manufacturing/operations</td>
<td>42%</td>
</tr>
<tr>
<td>Presale customer service</td>
<td>30%</td>
</tr>
</tbody>
</table>

Base: 444 senior IS executives in U.S. companies

Undisputed heavyweight: Four of six investment areas reflect growing interest in customer service, increasingly a differentiator for companies in a lagging economy.

Surprise contender: While it didn't make it into the top six, accounting/billing/finance technology made the biggest leap in interest.

CEO POLL

Boss' pet tech

If you could choose one thing to spend money on for information technology in 1992, what would it be?

- Dale Johnson
  CEO
  SPX Corp.: "I would spend it on training for our people because they are the key to our company's future."

- Josh Weston
  CEO
  Automatic Data Processing, Inc.: "We already spend a substantial amount on information technology R&D. If we had both the extra talent and the extra money, we would especially speed up the decentralization of more client services from our mainframes to client site micros in a DOS/Windows environment."

- William L. Weiss
  Chairman and CEO
  Ameritech: "Ameritech is especially interested in using information technology to add more intelligence to the public switched network. We believe that meeting our customers' needs in the future requires us to make such an investment now. Ameritech is committed to giving customers the capabilities they need, when they need them, to make telecommunications a more valuable part of their households and businesses."

Media flies high, airlines plunge

Of 16 vertical markets, only four budgets will increase in the coming year:

- Aerospace
- Aircraft
- Automotive-related
- Banks/financial services
- Chemicals
- Computers/electronics
- Consumer, food products
- Insurance
- Media and entertainment
- Mining and metals
- Oil and energy
- Pharmaceuticals
- Retailing/restaurants/wholesale
- Telecommunications
- Transportation
- Utilities

Base: 444 senior IS executives in U.S. companies

Source: CSC/Index

CEO and Executive Poll

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Base: 250 Fortune 1,000 firms

Source: Gartner Group, Inc.
Europe adopts tough rules for user health

BY RON CONDON

What if one of your users told you, "This software is too hard to use and is stressing me out. I'm reporting you to the authorities." Don't laugh, for your sake. You'll soon have to take complaints like that very seriously. If you're wise, you'll avoid the whole problem by making doubly sure that the software, hardware and the entire working environment - furniture, lighting and even working patterns - conform to new European Community (EC) rules to be implemented by the end of 1992.

Satisfied customers are top job for IS

Continued from page 2

have the merchandise that customers want in the store.

"Fast response" is a big part of customer service for most companies, whether that means quickly spotting consumer trends or providing on-the-spot remedies for customer complaints.

Until recently, Consolidated Freightways would take up to 20 days to answer a customer complaint — a long time to be searching for sales documents when a client is screaming about a shipment of dented refrigerators, says Marty Lulay, general manager of the Portland, Ore.-based company's Image Services business unit.

So with $10 million worth of imaging technology, Consolidated Freightways now has almost instant access to three million worth of shipping and billing documents, equal to about 56 million pieces of paper. Now, the company can send all the pertinent documents to a displeased client within five to 10 minutes of receiving the request.

With the economy still sputtering, some companies may wince at a $10 million investment. But Consolidated Freightways says it's important to keep an eye on long-term savings but also on less quantitative benefits.

In fact, companies needn't make huge investments — or any at all — to improve customer service with technology. When Hertz Corp. wanted to make renting a car easier for customers, says Gary Orrell, staff vice president of MIS at Hertz, "We looked at our existing technology and said, 'How can we use this better?'"

Hertz reasoned that customers really care about things like the amount of time they have to spend leaning on the counter and filling out forms, Orrell says.

So the company set out to find ways of using installed systems to offer clients added convenience. One approach was to create the "#1 Club Gold" program. For $50 a year, members can have their rental preferences — such as model — stored in a Hertz database. When it comes time to rent, customers go straight to the parking lot, where all the necessary paperwork is waiting in the desired car.

Many IS chiefs are betting that the emphasis on technology for customer service will intensify as the decade progresses. "Customer service has to evolve as people evolve," Adkisson says.

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Never fear — 're-engineering' is here!

BY CAROL HILDEBRAND and CLINTON WILDER

A depressed economy, leaner budgets and tougher competition are forcing IS managers to re-evaluate their operations

IS heads changing hats

BY CLINTON WILDER

You might call it job insecurity. Not so long ago, the top information systems job in most companies was also among the most stable of management positions. If you kept the systems running, stayed within your budget and kept the applications backing reasonably in check, you were pretty much assured of continuous employment until gold watch time.

No longer. The new demands on IS as a critical partner in business strategy, combined with a strong wave of cost-consciousness, have taken their toll on some of the brightest names in IS management.

Some firms have placed a business executive in charge of the IS function to better integrate technology into the business. In Du Pont Co.'s case, the aim is to coordinate the firm's billion-dollar cost-cutting initiative in IS. However, chief information officer turnover is not all negative or involuntary. The same new demands have dramatically raised both the status and salaries for the brightest minds in IS. A new breed of 'IS superstar' is being lured to new employers like baseball's free agents — with very lucrative compensation packages.

The past 12 months also saw the retirement of some of the most highly regarded executives in the business, including Dale Fieldcamp at Caterpillar, Inc. and Ken Bender at Southwestern Bell Corp. The chart to the right is a list of key chief information officer departures during 1991.

### IS chief

<table>
<thead>
<tr>
<th>IS chief</th>
<th>Left</th>
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<tr>
<td>Laurence Burden</td>
<td>S.C. Johnson</td>
<td>None</td>
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<td>Allan Ditchfield</td>
<td>MCI</td>
<td>Fannie Mae</td>
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<td>Progressive Co.</td>
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<td>Mike Heschel</td>
<td>Security Pacific</td>
<td>U.S. Sprint</td>
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<td>Network Management, Inc.</td>
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<tr>
<td>Jon d'Alessio</td>
<td>McKesson</td>
<td>Retired</td>
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<td>Ken Bender</td>
<td>Southwestern Bell</td>
<td>McKesson (new position)</td>
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<td>R. Anne Payne</td>
<td>EMI Music</td>
<td>Consulting</td>
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<td>Albert Cinorre</td>
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<td>Dale Fieldcamp</td>
<td>Caterpillar</td>
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<tr>
<td>Charles Hamlett</td>
<td>La Quinta Motor Inns</td>
<td>None</td>
</tr>
</tbody>
</table>

is too high," says Ray Manganelli, chief executive officer at Gateway Information Services, a New York-based consultancy specializing in outsourcing and re-engineering.

Success not a given

But even hitting the bullet and launching into a long-term, probably messy project doesn't guarantee success. A well-oiled internal machine can quickly seize up once it hits the outside world. Thornton May, co-founder of Praxxis Consulting Group in Burlington, Mass., advises companies to pay more heed to linking cogs outside corporate walls, such as customers and suppliers, when re-engineering internal processes.

Otherwise, "it's like rearranging deck chairs on the Titanic," he says. "It can really make things worse."

Another stumbling block, experts say, is proceeding without buy-ins from non-technical groups affected by the project. "Re-engineering is not an IS function," Darnell says. "If they don't involve the value chain, they're not only rearranging deck chairs, they're hiding the damned lifeboat."

But it's not always easy to get the crucial people on board. "Initiating change is the hardest thing in business," says James G. Connolly, group vice president of hospital sales and distribution at Baxter International, Inc. "Even if it's good, people don't want to do it."

Despite such big potential obstacles, Manganelli predicts that the triple pressures of recession, leaner IS budgets and tougher competition that first stimulated interest in re-engineering will also transform it.

The biggest difference, he predicts, will be shorter projects lasting one or two years.

### CW Chart: Janell Genovese
Informix has over half a million installed UNIX licenses. That’s more than Sybase, AS/400, and Oracle. Why do so many companies rely on Informix software to manage their critical data?

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- INFORMIX-SQL was recently voted “#1 DBMS for Multiple Environments” by readers of Government Computer News.
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In fact, the VAXft is the only fault-tolerant computer to have no single point of hardware failure. Because every component is duplicated. Right down to the power cord.

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It even has redundant power supplies. Uninterruptible. So your system will never black out. That goes for disk drives, CPUs and databases, too.

And in the event that your office undergoes a calamity of seismic proportions, we offer something called disaster tolerance. Which automatically shifts crucial applications to another VAXft in another place. You can't get more fault tolerant than that.

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**DIGITAL. THE OPEN ADVANTAGE.**
The cold reality: The employment forecast for 1992 doesn't look much better than '91. While the federal government predicts the number of computer-related positions will grow 50% to 80% by 2005, that's hardly consolation for job hunters or job changers today. This map will help guide your trek across the current rough terrain.

Compiled by Catherine Duffy and Lory Zottola. Design by Janell Genovese.

**National outlook**

<table>
<thead>
<tr>
<th>Industry forecast</th>
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</thead>
<tbody>
<tr>
<td>Biotech</td>
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<td>Health care</td>
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<td>Aerospace</td>
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<td>State government</td>
</tr>
</tbody>
</table>

See map for regional, city forecasts

**Wise words for hard times**

What IS pros can do to gain a job-hunting edge in a tough year

**Rick Bawsel**
Southeast region staffing manager
General Electric Consulting Services
Atlanta

Be flexible in the types of projects you'll work on. Don't limit yourself by saying you'll only do new development or only want to manage.

**Ralph E. Jones**
Data processing manager
Association of the U.S. Army
Arlington, Va.

If you list only programming skills on your resume, that tells me you sit at the keyboard. If I know you've helped put together a newsletter or arranged a speaker or given a presentation, these are skills that make a person promotable.

**Harvey Daniels**
Employment administrator
Federal Reserve Bank of Chicago

Be self-confident without being arrogant. There is no greater winning trait.

**Nancy Thompson**
Staffing specialist coordinator
Cap Gemini America
Atlanta

A job applicant we ended up hiring prepared a presentation with overheads on why we should hire him, what his goals were, where he wanted to be and how he was going to get there. Be creative.
Experts say specializing in these technologies can boost your marketability:

1. Networking/LANs
2. Unix
3. CASE
4. Windows development
5. AS/400, systems integration

Best jobs

Tried-and-true titles will shine next year, as companies emphasize the basics to get through the economic slump. What will be the hottest job titles in '92?

Percent of respondents

- CIO: 15%
- Programmer/analyst: 16%
- Database administrator: 16%
- Network technician: 24%
- Network manager: 14%
- Consultant: 14%
- Project leader: 14%
- Data architect: 15%
- LAN administrator: 14%
- Unix administrator: 14%

Up & comers

- Knowledge engineer
- Manager, advanced technology
- LAN/WAN specialist
- Client/server designer
- Internal systems integrator
- GUI developer
- CASE specialist
- Strategic planner/IS

Key

Bright spot
Mixed forecast
Stormy

Hot area for jobs
Warm area for jobs
Cold area for jobs

Layoff alert

- Northeast: Severe, due to bank mergers, failures and sluggish real estate market.
- Midwest: Moderate, as automakers and steel and manufacturing firms continue layoffs.
- California: Milder, but recession will trim banking, aerospace and high-tech payrolls.

Highest salary in nation for this position

DECEMBER 23, 1991/JANUARY 2, 1992
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*Candle*

*Making your systems perform*
Pacific Stock Exchange keeps eye on business

Forget technological genius, says John Parady at the Pacific Stock Exchange. The key to creating efficient, economical systems is a near religious adherence to classic systems development methodology — and an unshakable focus on the bottom line.

Parady, executive vice president of technology services at the San Francisco-based exchange, has the numbers to prove his approach: New information systems projects at the Pacific Stock Exchange typically yield a return of 15% or higher.

To get such impressive gains, Parady follows a simple principle: “If it doesn’t make sense for business, don’t do it.”

A good example of this principle is the exchange’s $5 million options exchange trading system, known as Poets. The system provides automated order routing and execution, book maintenance and other services to traders in Los Angeles and San Francisco, as well as to member firms throughout the country. Begun in 1987, Poets was completed on time — and under budget — in July 1990.

Minimum ROI set early

How does the Pacific Stock Exchange determine if an IS project makes good business sense? The first step is to clearly define how the proposed system will solve a particular business problem, from forecast travel patterns to scheduling requirements. Similarly, in-house staff members use data collected from the System One reservation system to determine the correct number of airline meals needed on a particular flight.

All employees — many of them already highly PC-literate, according to Haslund — are also trained in the basics of computer operations and applications. They are taught in a customized program developed by an outside consulting firm and based on Alaska Air Group’s IS standards.

“We basically allow end users to get what they want,” Haslund says.

At a substantial number of corporate files in whatever way they want,” Haslund says.

A key goal is to free the 84-member IS department from routine data processing in order to focus on applications development and other strategic projects. Today, IS seems primarily as a support group, Haslund says.

Indeed, one of the chief benefits is decreased reliance on IS for routine analyses and reports which workers throughout the company now prepare themselves.

More self-sufficient users let IS focus on systems integration and optimization, the company’s other key IS containment strategies. The idea is to customize existing systems, software and applications programs instead of building new ones.

The approach seems to work very well. Since 1984, Alaska Air Group has kept IS costs under $10 million, thanks largely to its end-user focus, Haslund says. In 1992, he expects IS spending to total about $7.5 million, up about 10% from the previous year.

Haslund says he doesn’t foresee IS costs dropping dramatically in the next year. But he does anticipate further IS productivity gains, especially new applications.

“IS isn’t growing as fast as the airline, yet we’re still putting in more applications. The moves we’ve made so far have brought phenomenal productivity. We’ll stay on this course.”

JULIA KING
When The Turner Corp., a $3 billion international construction firm, threw open its computer systems to employees and the public, it didn’t bargain on promoting teamwork in the process.

The company that invented re-inforced concrete 80 years ago set out to build a new technological foundation in 1985. Today, Turner officials say, successful downsizing to a personal computer and local-area network system has yielded both hard and soft benefits.

“When we stopped paying support costs for big iron, we avoided a million dollars per year,” says Dick Schell, director of information systems.

Thanks to downsizing, Schell says, IS spending shrank from $25,000 per month maintenance costs of any of the 341 mainframe plus the $2,500 per month charge to maintain midrange machines. Over the last six years, corporate IS staff has been reduced from 50 employees to 22 employees.

Turner began to look beyond mainframe approaches after officials realized that centralized computing was increasingly unsuited to a highly decentralized company with 40 U.S. offices and 30 more overseas.

Downsizing spurred idea-swapping with the business side, Schell says.

IS to develop a strategy for placing a common platform in the field. The PCs started arriving in 1986, and the “big iron” metallaphosis quickened two years later with the elimination of 22 IBM Series One midrange machines and a nationwide, multiplexed local area network.

Today, Turner has 2,000 PCs, mostly Intel Corp. 80386-based machines, on a Banyan Systems, Inc. Vines network. Users run applications ranging from project management to word processing and accounting.

Permits them even more important than cost savings, Schell says, is the bigger part IS plays in daily business. Downsizing has strengthened partnerships with everyone from the chief executive officer to scattered operating units, he says. And because standards are set at a project’s start, there is greater confidence that IS dollars are being well spent.

Like the Pacific Stock Exchange, Turner has discovered that downsizing automatically brings users more into the loop.

“Technical and business users regularly swap ideas for improvement, which Turner says has boosted individual and business unit productivity,” says Gary Garver, chief information officer at the American Legion.

So two years ago, the 73-year-old service group called in consulting firm Price-Waterhouse to help develop a new, flexible, integrated system. “We knew the postal rates were going to increase dramatically over the next one to three years, and we had no time to develop software in-house,” Garver says.

Requests for proposals went to some 30 software vendors before the legion selected an IBM Application System/400-based membership package from Computer Systems Consultants, Inc. in Landover, Md. The $2 million conversation went smoothly, and today, three AS/400 B series machines handle all membership processing.

The switch-over necessitated an increase in the legion’s annual IS budget — $1.8 million in 1990-91 to $2.1 million in the current fiscal year. The 50-member IS department trimmed two staff members during the NCR scrap- ping, but the increase made possible a two-thirds cut in maintenance costs, worth it, Garver says, making it very much worthwhile.

Now, AS/400-based applications and a dozen new Apple Computer, Inc. Macintosh desktop publishing systems help the legion save a million dollars each year in maintenance and camera-ready data production costs. Legion staff members now handle their own mail sorting, bagging and palleting for direct pickup by U.S. Postal Service trucks, which also eliminates costs.

Another $150,000 to $175,000 per year is saved by publishing legion literature in-house instead of contracting work out, as was previously done.

Add to that maintenance savings of approximately $300,000 per year. Even with the $46,000 yearly cost of IBM’s five-year extended maintenance plan, the legion figures it’s still way ahead.

Beyond economic gain, Garver says, the system frees up the legion to think about higher goals. “We have to figure out ways to use computers to bring more people into community service,” Garver says.

Sally Cusack
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When you need more power or options, upgrading is fast, easy and affordable. RAM expands up to 64 megabytes with industry-standard SIMM modules. Storage grows to 22.2 gigabytes. Without exaggeration, the COMPAQ SYSTEMPRO/LT has the greatest capacity and flexibility in its class.

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Setup is easier, too. COMPAQ Integration ToolKits tell you just how to do it. We've already tested and proven reference platforms—combinations of hardware and software that you'd likely use—including Banyan, Microsoft, Novell and SCO UNIX operating environments. We know the ropes.

Once you're up and running, the new COMPAQ System Manager keeps you in control. It continually monitors server performance and instantly notifies you if something is wrong. You can even diagnose and correct problems from remote locations.

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It simply works better.
By Peter G. W. Keen
Harvard Business School Press, $16.95
If your boss loses patience when you drag out the old “think of the network as a highway” analogy, this is a handy volume to have around. Keen puts technical terms and concepts such as the client/server model into everyday language and untangles commonly confused terms, including “intercon-”eizable” and “interoperable.” A dip into these pages could make future conversations with nontechnical managers a lot more pleasant and enlightening.

Cyberpunk: Outlaws and Hackers on the Computer Frontier
By Katie Hafer and John Markoff
Simon & Schuster, Inc., $22.95
Pull up the covers and turn on the night-light — Cyberpunk will chill the blood of hackers in absorbing detail: Kevin Mitnick, a “phone phreak” who wreaked havoc with computer networks; Pengo, a West Berliner who offered his hacking services to the Soviets; and Robert T. Morris, author of the Internet virus.

Information systems professionals can find some helpful hints about prevention in these stories.

The Customer Driven Company: Moving from Talk to Action
By Richard C. Whitley
Addison-Wesley Publishing Co., $21.95
This book takes the reader step-by-step through what it takes to make an organization truly customer-driven. Creating intimacy between company and customers is a good profit strategy, Whitley says. For example, Easton, Pa.-based Binney & Smith, Inc., maker of Crayola crayons and markers, occasionally heard complaints about crayons staining clothing. When the company decided to create a product that answered those complaints — washable Crayola markers — its marker sales doubled.
Swing your partner, do-si-dough
Computer industry alliances continue to be popular, but are they just a fancy dance?

BY JAMES DALY and MICHAEL SULLIVAN-TRAINOR

I t was a moment once believed unthinkable: Apple Computer, Inc. Chairman John Sculley stood behind a rostrum in a crowded hotel ballroom pumping the hand of IBM President Jack Kuehler. Cameras clicked, backs were slapped and lavish promises were made as the pair beamed over details of their sweeping technological alliance.

When the hubbub died down, however, buyers were once again left to wonder if another much-ballyhooed alliance — Sculley had described the IBM/Apple pact as a "renaissance in technological innovation" — would really deliver the goods.

Many users have their doubts. "We see a lot of these large alliances as vaporware," says Bill Remmert, an information systems veteran who served as manager of end-user computing at GTE Spacenet before becoming an independent consultant. "If we know it's coming down the road, it can help back up a decision. But we never, never base a strategic decision on them."

Few fruits
Such skepticism can hardly be blamed: Over the last few years, many loudly touted partnerships have proved paper tigers or downright flops. The greatly hyped 1987 Apple and Digital Equipment Corp. pact, for example, took years to bear fruit and then only managed to trickle out a few communications products. The Advanced Computing Environment (ACE) consortium — which includes Compaq Computer Corp., DEC, Mips Computer Systems, Inc. and Microsoft Corp. — also has accomplished little in its drive to develop a high-performance computing platform.

Yet partnerships continue to be popular. In fact, in an industry reeling from massive layoffs (see chart below), alliances have become the latest, greatest hope for prosperity.

And little wonder: Now that users want to link all kinds of diverse equipment, life is more complex for industry vendors. "Everyone realizes they can't be all things to all men," says Martyn F. Roetter, director of Arthur D. Little, Inc.'s information technology practice. "They are willing to be partners in one segment and fight tooth and nail in the other. It's the new way of life."

When recession flattened much of the computer industry in 1991, many vendors headed for the safety of alliances. "When you're faced with eroding margins, you go for any port in a storm," says Mark Schmidt, vice president of information technology at Wal-Mart Stores, Inc. in Bentonville, Ark.

Competition abroad is also driving partnerships. According to the U.S. Department of Commerce's 1991 "U.S. Industrial Outlook," strategic alliances with foreign companies will probably increase as U.S. firms seek out partners in Europe and Asia to share mounting research and development costs and gain access to low-cost, high-volume manufacturing capacity.

Dozens of big alliances have been formed during the last 12 months, including IBM and Apple, DEC and Microsoft, Apple and Information

Continued on page 25

Body count
A look at the January rosters shows that many major computer makers will start 1992 much slimmer than 12 months ago

<table>
<thead>
<tr>
<th>Company</th>
<th>1992</th>
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<tr>
<td>Apple</td>
<td>12,000</td>
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<td>Compaq</td>
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<td>Lotus</td>
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<td>Wang</td>
<td>14,000</td>
<td>18,700</td>
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CW Research: Stefanie McCann CW Chart: Marie Haines

DECEMBER 23, 1991/JANUARY 2, 1992
By any standard, one company is the premier supplier of CASE (Computer-Aided Software Engineering) tools for business applications development. KnowledgeWare was the first to use a Graphical User Interface. First to deliver an integrated, PC-based COBOL code generator. First to offer OS/2-based full life-cycle solutions. And first to incorporate Rapid Application Development techniques. KnowledgeWare's comprehensive CASE tools are already serving more than 64,000 users in 3,300 companies. And our partnership in IBM's AD/Cycle™ vision protects the value of your investment. Today, KnowledgeWare is moving vigorously to meet customers'
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Making connections

A guide for rapid transit through today's interconnected computer industry

Legend

Technology alliance
Strategic alliance
Equity partnership
Joint venture partnership
Inactive strategic alliance
Law suit

Equity Partners

Stratus
Motorola

Computer Associates

Novell (DRI)

Compaq

Olivetti

Platform Partners:
- NAS
- EMA
- Path works

Systems Center

Tandy

Accumaster Partners

Microsoft

Sybase

HP (Apollo)

Sun

Lotus (CC:Mail)

Borland (Ashton-Tate)

IBM

Service to most major points also available via Oracle, Ask's Ingres Division and Information Builders

Compiled by Jodie Naze. Design: Tom Monahan. Note: Graphic shows representative alliances and is not intended to be comprehensive.
Partnerships continue to swing around the industry

CONTINUED FROM PAGE 21

 Builders, Inc., and Novell and IBM (see chart at left). Industry observers expect an equal or larger number in ’92, especially in the hard-pressed personal computer industry.

“...there’s still a lot of consolidation coming,” predicts Saff Qureshy, president of AST Research, Inc., a PC maker.

But amid all this activity, larger questions loom: What effect will the growing number of partnerships have on computer buyers? On the future of technology? On the vendors themselves?

Analysts and users agree the answers will have far-reaching impact in an U.S. business for years to come — starting now. Predictably, opinions vary.

Some financial analysts say they see the urge to partner as positive. “Companies are trying to add more value to their products, while adding in as little overhead as possible,” says Laura Consiglio, computer industry analyst at Prudential Securities, Inc. “Partnership is the only way to do that, and we’ll see many, many, more.”

The general attitude is more caution, however. “Users are evaluating the partnerships one by one, trying to figure out the permutations and combinations,” says Robert Tasker, vice president of International Data Corp., a Framingham, Mass.-based research firm.

Experts agree the outcome of partnerships varies greatly according to the original purpose. Generally, the team-ups can be broken into three categories.

### Technology alliances: High hopes.

In technology alliances, partners agree to create new products or technologies by combining research and development efforts. Examples: IBM and Apple, IBM and Borland International, Inc., DEC and Novell.

Raised hopes are among the biggest fruits of technology pacts. “Hot partnerships can offer dramatic opportunities for new technology developments,” Consiglio says. These deals also can affect the offerings of competitors trying to stay abreast of new technologies. Apple and IBM’s plans to build an object-oriented operating system, to name one recent example, is undoubtedly being heard within the R&D labs at Microsoft, now busy preparing its next-generation Windows. 2.0. “When one vendor moves, it keeps the others on their toes,” says Jeff Van Skyhar, manager of end-user services at Rose Corp. in Framingham, Mass.

Of course, technology alliances also carry great risk, because exciting new frontiers may not pan out into popular products. A classic case of a high-flying union that crashed and burned in IBM and Microsoft’s joint development of OS/2.

Another risk is that collaborating vendors may inadvertently strengthen a competitor by sharing revenue and design secrets. That’s exactly what happened when Apple joined with Sony Corp. to build a next-generation laptop.

Both companies exchanged R&D information that otherwise would have been kept secret.

### Strategic alliances: The price is right.

In strategic alliances, partners join together to market current products or improve commonability. Example: IBM and Novell.

What partnerships can produce

**Best case**

- Lower priced products
- Integration of key technologies
- Better product functionality
- Shorter buy lists
- Progress toward open systems

**Worst case**

- Withering of established and widely installed products
- Waste of user and vendor energy
- Confusion of product direction
- Lip service to open systems

While specific results obviously depend on the type of union and companies involved, experts predict the biggest immediate effect of strategic alliances is lower prices. Partners may rethinks marketing plans, while competitors may offer similar products at a discount in hopes of stealing some thunder.

While that’s good news for users, ultimately it may not mean much. “We’ll save a few dollars here or there,” says Mike Bailey, a systems integrator at Lockheed Missiles and Space Co. in Sunnyvale, Calif. “But most of these unions don’t mean a thing to us.”

Occasionally, however, the impact of a strategic team-up can be both swift and far-reaching — particularly for users struggling to make sense of a bewildering multivendor environment.

Recently, for example, Apple has aggressively used licensing agreements for its Data Access Language (DAL) — connectivity software that lets Macintosh users access relational database information from servers or hosts — to create partnerships. That was good news for Gary Gray, chief of management systems at the Marshall Flight Center in Huntsville, Ala. Gray says he enjoyed the benefits from DAL packs early by getting an easy way to unite information from a wide variety of sources. In addition, DEC, Data General Corp., Hewlett-Packard Co., IBM and Cray Research, Inc.

### Standards alliances: Safety in numbers.

In standards alliances, partners agree to create industry standards for technologies sold by multiple vendors. Examples: The Open Software Foundation (OSF) and Unix International.

Most standards pact today involve some version of open systems (see story page 36). Vendors try to convince buyers that their participation signals a willingness to merge proprietary architectures or technologies, thus advancing open systems efforts.

Ironically for their part, users don’t necessarily see these kinds of standards partnerships as necessary. Many, in fact, are dead set against them. Rather than making two proprietary systems work better,” says Jerry Johnson, standards analyst at the Department of Information Resources for the state of Texas in Austin, vendors “should migrate the products to a strategically open environment.”

Many open systems proponents also feel burned by the “partner by the hundreds” trend, which so far has resulted mainly in competing consortia, such as the OSF vs. Unix International and ACE vs. Sparc.

“If we’re the bottom line of all this action for 1992? Keep a wary eye on the enthusiastic roar of partnerships. A product that comes out of an alliance is like one from any organization,” Elms says. “You have to have your eyes open and know its position in the market. There’s nothing inherent in alliances that enable them to produce better products.”

Frank Elms, president of technology assessment at Technology Investment Strategies Corp. in Framingham, Mass., advises buyers to avoid “promise” alliances in favor of “product” teams pushing firmer standards with an established base.
An industry in turmoil

This year won’t be for the faint of heart. Change and new directions — some radical — will be in store for many computer firms. Companies that created their own markets — such as Lotus Development Corp. and IBM — will restructure and diversify in hopes of keeping leadership positions. Others that have made their mark in the personal computer world — including Apple Computer, Inc., Novell, Inc. and Microsoft Corp. — will continue to strive for acceptance in larger environments. And once-proprietary vendors — such as Digital Equipment Corp., Sun Microsystems, Inc. and Data General Corp. — will try to advance into the commercial open systems market. Stay tuned.

**Company and CEO**

**Apple Computer, Inc.**

John Sculley

- Expand power, range, connectivity of Macintosh to appeal to corporate IS. Demonstrate progress in high-profile alliance with IBM.

**AT&T**

Robert Allen

- Realize promise of Open Cooperative Computing (OCC) architecture introduced last February. Finish assimilation of OCR organization, marketing, R&D and products.

**Banyan Systems, Inc.**

David C. Mahoney

- Use Vines network operating system to halt eroding share against market leader Novell. Ease user worries that the $100 million company will be acquired, go public or lack funds to enhance Vines without courting small and medium-size sites.

**Compaq Computer Corp.**

Eckhard Pfeiffer

- Survive restructuring, execute new distribution strategies, maintain reputation as high-quality producer.

**Data General Corp.**

Ronald L. Skates

- Grow Unix-based RISC Aviion servers while continuing to enhance, support MV/Eclipse products.

**Digital Equipment Corp.**

Kenneth H. Olsen

- Retain market share. Keep installed base satisfied with latest VAX/VMS products while customers await RISC-based Alpha VAX line later in year.

**IBM**

Eckhard Pfeiffer

- Continue to merge NCR and AT&T product lines, establish reseller relationships, find customers to prove value of open systems computing at commercial sites.

**Compaq Computer Corp.**

Eckhard Pfeiffer

- Continue to merge NCR and AT&T product lines, establish reseller relationships, find customers to prove value of open systems computing at commercial sites.

**Computer Associates International, Inc.**

Charles Wang

- Continue to modify sales efforts in hopes of boosting current average of five packages per customer.

**Ocean Computer Systems, Inc.**

Robert Allen

- Use Vines network operating system to halt eroding share against market leader Novell. Ease user worries that the $100 million company will be acquired, go public or lack funds to enhance Vines without courting small and medium-size sites.

**Companies**

**Biggest challenges**

**Key strategies**

**Key product rollouts**

**Outlook**

- Expand focus to encompass mass market and low-end, low-margin hardware products. Build new distribution channels outside traditional dealer channel. Maintain high-end systems development and roll out first ACE RISC-based products. Cut costs and maintain quality.

- Push PC software to achieve greater low-end visibility. Digest recent acquisitions (De-Line Software and Pinnacle), keep customers happy while pursuing other acquisitions. Meet projections that Unix will account for one third of revenue by mid-1990s.

- Increase use of Vines through continued alliances with key open systems vendors, including OSF/1 participation in major consortia; compliance with networking and management standards. Port servers to other platforms beyond Banyan's proprietary version of Unix.

- System 7.1 scheduled to ship first quarter. Lighter Powerbooks (as small as 3½ pounds) by midyear. Ongoing re民心 with IBM of connectivity products to connect both makers' platforms. The 16-MHz 68030-based Macintosh LC by summer. Macintosh IIS/IISL successor with faster 68030 chip, priced below $3,000. Color version of Classic II, priced below $2,000, by year's end. Performance upgrades to Quadra 760 and 900 in early fall.

- Continue to merge NCR and AT&T product lines, establish reseller relationships, find customers to prove value of open systems computing at commercial sites.


- "I don't see Novell's dominance faltering unless the firm should stumble on network management or directory services." — Mary Modahl, director of network strategy research, Forrester Research, Inc., Cambridge, Mass.

- "Unix will contribute to a whole new story for CA. They'll be able to tell customers they can keep their investment in existing software and use open systems, too." — Terence Quinn, software analyst, Kidder, Peabody & Co., New York.


- "DEC needs a really big success in 1992 to make it a hot company again." — David Evansch, analyst, Workgroup Technologies, Inc., Hampton, N.H.
<table>
<thead>
<tr>
<th>Company and CEO</th>
<th>Biggest challenges</th>
<th>Key strategies</th>
<th>Key product rollout</th>
<th>Outlook</th>
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<tbody>
<tr>
<td>Groupe Bull</td>
<td>Return to profitability by year’s end, continue development of both open and proprietary products, improve customer service.</td>
<td>Consolidate factories, reorganize worldwide sales and service operations. Carry out major systems integration thrust. Continue to refine Distributed Computing Model, Bull’s strategy to combine proprietary and open products.</td>
<td>Workstations under $10,000 and over 50 MIPS. Laser and ink-jet printers in $200 to $1,000 range. Posix programmer interface on proprietary operating system.</td>
<td>“Bull needs to restructure its organization in line with products developed out of its transition phase.” — T. Joseph, senior analyst, International Data Corp., Framingham, Mass.</td>
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<td>Francis Lorentz</td>
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<tr>
<td>Hewlett-Packard Co.</td>
<td>Continue efforts to match product quality with marketing quality.</td>
<td>Continue selling both proprietary and open systems hardware from PCs to high end, while improving support for all. Work with Microsoft to develop object-oriented software. Hold lead position in workstation price/performance against IBM, Sun.</td>
<td></td>
<td>“I’m not optimistic about the personal computer side, but their workstations will do well.” — Tom Kucharvy, analyst, Summit Strategies, Boston.</td>
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<td>John Young</td>
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<td>IBM</td>
<td>Execute massive restructuring plans unveiled in December. Demonstrate progress in high-profile alliance with Apple. Convince more users of mainframe’s critical role in enterprisewide competing.</td>
<td>Push ahead with nimbler, more autonomous product units, while avoiding conflict and confusion between them. Deliver on promises for open systems support, including System/390 architecture. Gain credibility with OS/2. Support of open systems initiatives, including Posix, Open Software Foundation’s Distributed Computing Environment.</td>
<td>OS/2 2.0, scheduled for March. Several lower end, new generation ES/9000 mainframes. Continued price/performance upgrades for AS/400, including three-way processor by midyear. Delivery of long-awaited low-end RS/6000 for under $10,000.</td>
<td>“The unfortunate thing is that changing organizational charts is easy, and changing behavior is a long-term, difficult process.” — Frank Gens, analyst, Technology Investment Strategies Corp., Framingham, Mass.</td>
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<td>John Akers</td>
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<td>John Development Corp</td>
<td>Halt slipping sales of market-leading spreadsheet. Strengthen and expand nonspreadsheet products such as groupware by shifting resources into promising areas. Continue restructuring to reduce costs.</td>
<td>Help IBM engineer reversal of fortune for Officevision LAN and OS/2. Gain market presence and respect in Macintosh market. Simplify upgrade process. Get IS consulting services going. Develop and expand Notes, quickly roll out suite of Windows products. Buy, build or back leading desktop database engine. Continue efforts on E-mail messaging protocol standards.</td>
<td>Windows 3.1, due out around March. New Technology due out by midyear, followed by software developer’s kit by year’s end. Technology for Excel to run 1-2-3 macros, due in the first half of the year. Software developer’s kit for the Open Database Connectivity application programming interface and related drivers. Pen for Windows Computing pen-based operating system.</td>
<td>“As they come out of the year, they’ll be in a much better position, assuming they follow through with the [restructuring] plan. They’ll see strong growth in communications, and they seem to be on the right track with Notes. But spreadsheets and Windows will remain in the forefront next year.” — Mary McCaffrey, analyst, C. J. Lawrence, New York.</td>
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<td>Jim Manzi</td>
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<td>Microsoft Corp.</td>
<td>Leverage Windows 3.0 as leading desktop operating system and mission-critical applications platform. Gain acceptance of networking users and corporate IS. Define Federal Trade Commission investigation of unfair or monopolistic trading practices. Deflate image as PC industry bully.</td>
<td>Get Windows New Technology out to all OS/2 users. Strengthen Windows ease of installation, learning, performance and stability. Push development in pen-based computing, multimedia and E-mail. Improve LAN Manager to compete with Netware. Ramp up Network Courier E-mail package to compete with Lotus. Sell refocused consulting business to corporate IS. Push SQL Server.</td>
<td>Notes groupware, including traditional applications/facilities such as database access, E-mail, message tools and Chronicle groupware spreadsheet. Work with IBM on Officevision. 1-2-3 for Macintosh, new version for Windows plus Improv for Windows.</td>
<td>“Microsoft is facing a number of challenges. The FTC investigations and the Apple lawsuit are numbers 1, 2, 3, 4 and 5. Either one of them could deliver a severe body blow. There are people thinking that if OS/2 2.0 is good enough, there could be enough of a defection rate [from DOS] to make it significant. Novell is also eating their lunch on the networking side. They have plenty to keep them honest.” — Robert Kleiber, researcher analyst, Piper, Jaffray and Hopwood, Minneapolis.</td>
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<td>Bill Gates</td>
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<td>Novell, Inc.</td>
<td>Migrate customers of market-leading Netware Version 2 to Version 3. Convince buyers its PC network operating system is reliable enough for company-wide use.</td>
<td>Chase Bayramp from large IS shops by matching Vines features, including naming service. Develop Netware connectivity for all heterogeneous hardware and software environments. Possible Capitalize on new partnership with Digital Research to offer MS-DOS alternative. Continue work with IBM to tighten links with Netview.</td>
<td>Netware 3.2, slated for delivery by year’s end. Possible: Patentable new technology allowing Netware to work with OS/2 and AIX on servers.</td>
<td>“Novell will continue to introduce high-end solutions geared toward more enterprisewide networking and internetworking.” — Michael Haylin, analyst, Creative Strategies Research International, Inc., Santa, Clara, Calif.</td>
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<td>Ray Noorda</td>
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<td>Sun Microsystems, Inc.</td>
<td>Provide fully functioning Solaris 2.0 operating system by midyear to meet or beat competing ACE system to market. Get chip partners to provide next-generation Sparc CPU for multiprocessing and high MIPS/Specmark ratings. Establish presence in commercial open systems market.</td>
<td>Use operating system, developer tools and networking subsidiaries to spread Sparc architecture among clones and compatibles. Keep lock on low-cost workstation market while moving into commercial sites.</td>
<td>Fully functioning Sparc multiprocessor. Low-cost ($5,000 to $10,000) Sparcstation in 50- to 80-MIPS range. More common peripherals and software for 1100/2200 mainframes. Expected: new item and check image processing products for banks.</td>
<td>“They’ve got to rejuvenate the Sparc close market. — it’s just not taking off the way they want.” — Dave Smith, analyst, International Data Corp., Framingham, Mass.</td>
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<td>Scott McNealy</td>
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<td>Unisys Corp.</td>
<td>Continue successful programs to sell assets and slash $3 billion debt. Expand sales to existing base by focusing on financial services, communications, airlines and government.</td>
<td>Further consolidate product line. Continue to improve manufacturing infrastructure, reduce production costs. Push new high-end 2500/9900 mainframe as hub processor for co-line transaction processing. Introduce migration strategies and tools for “de-emphasized” V series and System/80 mainframes.</td>
<td>More common peripherals and software for 1100/2200 mainframes. Expected: new item and check image processing products for banks.</td>
<td>“At this point, I think they’ve done all the reductions they dare do.” — George Lindamood, Gartner Group, Inc., Stamford, Conn.</td>
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Mergers: Not a big deal in 1992?

BY NELL MARGOLIS

Mergers, an ongoing drama in the computer industry of late, will play on in 1992. But as the mergers click in, the mania is largely missing.

"Deals that used to grow out of a sense of shared optimism now seem to be motivated by a sense of shared desperation," says Richard A. Shaffer, who is editor of the "Computerletter" newsletter.

Desperate times are making for a more mature approach to mergers, notes Harvey Popell, a principal at investment banking and consulting firm Broadview Associates in Fort Lee, N.J.

Popell says focus has shifted from snapping up weaker or willing firms to shopping for good technological and cultural "synergy." Shaffer adds: "One of the things we've all come to realize over the past several years is that, more often than not, these dazzling mergers don't work."

A good example is the vaunted merger of super-workstation vendors Stellar Computer, Inc. and Ardent Computer Corp. into Stardent Computer, Inc. Billed as an ultimate "merger of equals," the deal degenerated into a costly lawsuit.

So as the new year dawns, the question is this: Will '91's most stunning buyouts — AT&T/NCR Corp. and Borland International, Inc./Ashton-Tate Corp. — bolster confidence or promote more conservatism?

AT&T: Hands on or off?

"NCR had already turned itself around" by the time it was acquired, Shaffer says. "The question now is, will AT&T leave it alone to take its strategy forward?"

It will if it's smart, says Norman Weiner, a computer industry analyst at Cambridge, Mass.-based management consulting firm Arthur D. Little, Inc.

Weiner sees the NCR deal as AT&T's last stand in the computer industry. "The synergy is there; NCR has taken some bold risks, and AT&T's deep pockets should help fund them," he says, adding that the communications giant made the right investment.

"The challenge is, can they leverage it?"

Either way, analysts say users could benefit from the technological innovation and pressures on competitors that the pairing will bring.

The coming months will also show the fate of the Borland/Ashton-Tate merger. Some have upbeat expectations. "If Ashton-Tate didn't destroy itself — after years of trying awfully hard," he reasons, "I don't see what Borland is going to do."

The major question, says Nancy McSharry, an analyst at International Data Corp. in San Jose, Calif., is how soon — and how well — Borland can digest its catch.

While the merger gives users a simplified personal computer database market and an alternative to Oracle Corp., McSharry says, it also catapults Borland from a $190 million company to one of about $500 million overnight. "Managing that won't be easy," she says.


Will CA buy its way through 1992? "How else are they going to grow?" Broadview principal Alec Ellison asks.

Novell, Inc.'s purchase of DR DOS-maker Digital Research, Inc. positions it to give Microsoft Corp. a serious run for its money, McSharry says. "Novell is pitching its battle on Microsoft's turf — the PC operating system," Ellison says. "That's a gutsy move."
Court cases that will change your job

BY MITCH BETTS
AND KIM S. NASH

It will be more important than ever for computing professionals to keep an eye on the courtroom this year. Some cases will have a big effect on the business relationship between user and vendor, such as Eastman Kodak Co.'s antitrust case and IBM v. Comdisco, Inc. Users may also want to stay abreast of developments involving intellectual property issues.

Some long-standing copyright infringement cases between vendors will continue in 1992. These include Lotus Development Corp. v. Borland International, Inc. and Apple Computer, Inc. v. Hewlett-Packard Co. and Microsoft Corp.

Here are some details about the important cases to follow:

Case: Eastman Kodak Co. v. Image Technical Services, Inc.; U.S. Supreme Court.

At issue: Kodak refuses to provide copies gratis to independent service providers, claiming it needs to protect its trade secrets and by writing confidentiality clauses into contracts.

Status: Pending.

Impact: Kodak's supporters - including many large computer manufacturers - argue that customers (and vendor reputations) will be hurt if they get poor service from unauthorized providers. Independent service firms contend users will get lower prices if such competition is allowed.


At issue: Feist recompiled Rural Telephone's white-pages directory without permission. Can the compilation of raw facts be copyrighted?

Status: Decided in Feist's favor.

Impact: The ruling jeopardizes the ability of an information services company to protect its factual databases from being duplicated. However, users can continue to protect their own corporate databases (such as customer lists) by treating them as trade secrets and by writing confidentiality clauses into contracts.

Case: First Nationwide Bank v. Florida Software Services, Inc.; U.S. District Court for the Middle District of Florida.

At issue: The bank refused to pay sharply higher re-licensing fees for software obtained when it absorbed two failed savings and loans. The vendor said continued use of the software violated an "antiassignment" clause in the original software license, which prohibited transferring the software to a successor company.

Status: Decided in the bank's favor.

Impact: The ruling sets a precedent limiting antiassignment clauses in every state except Louisiana.

Case: Retail Systems, Inc. v. CNA Insurance Cos.; Minnesota Court of Appeals.

At issue: Retail Systems, a service bureau, lost a computer tape from the Independent Republican Party of Minnesota and tried to shift the liability to CNA, its insurance company. Is the insurance company liable for damaged tapes?

Status: Decided in Retail Systems' favor. Judge ruled that computer tapes storing valuable data are covered under the bureau's insurance policy for property damage.

Impact: Electronic data is property covered under common business insurance. Users should make sure there is insurance coverage wherever computer data is kept.


At issue: AMD filed a suit in September claiming Intel breached a contract allowing it to license Intel's chip technologies. AMD also says Intel coerced PC makers to use Intel chips instead of AMD chips.

Did Intel try to establish a monopoly in the chip peripheral and chip market for IBM-compatible PCs?

Status: Pending.

Impact: If AMD wins, more lessors would be inclined to do the same, probably driving down lease equipment prices.

Wish list: Partnerships they'd love to see

Which vendors would you like to see become partners in 1992? Computerworld staff members Jim Nash and Stefanie McCann asked several users and industry analysts for their dream teams.

Borland International, Inc. and Macromind, Inc.

Mike Butler, airport automation manager, Palm Beach International Airport, Palm Beach, Fla. What? Pair these once-bitter rivals! 3Com dropped out of the LAN fight to tackle wide-area networking. But Butler has a pretty convincing argument to bring them back into the ring. "You get the people that do connectivity well at 3Com with the people that have a great network operating system (Novell)," he says.

Lotus Development Corp. and Borland

Voughn Marilyn, partner at Ernst and Young's Center for Information Technology and Strategy, Boston.

"They are two real big powerhouses in the software industry," Marilyn notes. "Together they could be a big force against Microsoft and Computer Associates by marketing both of their software products."

Microsoft Corp. and Novell, Inc.

Frank and Catherine Dzubeck, president and executive vice president, Communications Network Architects, Inc., consulting firm, Washington, D.C.

Both Dzubecks agree this pairing would forever explode the myth that local-area networks are toylike tools suited only for departments or divisions. "Together they would literally become the IBM of networking," Frank Dzubeck says.

IBM and Banyan Systems, Inc.

David Ferris, president, Ferris Networks, Inc., market analysis firm, San Francisco.

A fantasy marriage of brain and brawn. Ferris says the world would be a better place if IBM mended its ways, bought Vines, Banyan's network operating system, with Big Blue hardware. "IBM would bring great [marketing] wealth to Banyan's technology."

Novell and Digital Equipment Corp.

Kris Gronert, senior telecommunications analyst, Quaker Oats Corp., Chicago.

A case of symbiotic simplicity. "Novell has the best network operating system but poor connectivity," he reasons. "DEC has some of the best connectivity but a poor network operating system." Simple.

DECEMBER 23, 1991/JANUARY 2, 1992
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INDUSTRY OUTLOOK
Computers and related equipment
(Worldwide revenue of U.S. companies in billions)

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<td><strong>Professional services</strong></td>
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<td>$566.9</td>
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<tr>
<td><strong>Software products</strong></td>
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<td><strong>Mainframes (units)</strong></td>
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<td><strong>Micros (units)</strong></td>
<td>4.3</td>
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Software and services
(U.S. revenue in billions)

More tax regulation
On another front, software vendors will mount an all-out assault to defeat an administration-backed tax bill that would impose a 14-year amortization period on purchased intangible assets, including software. Practically speaking, that would mean that buyers who are writing off software in five years or less would be forced to defer tax deductions, effectively raising the cost of the software. The bill would also require companies to account for software long after it has been put to pasture.

No picnic on Capitol Hill
Computer industry will face battles over tax laws, export regulation

BY GARY H. ANTHES
There's a plenty of fuel for debate on Capitol Hill this election year for users and vendors of information technology. That's the easy part.

The tougher call is whether the computer industry will be able to advance its multifaceted Washington agenda, especially on matters such as tax laws, export rules and intellectual property protections.

In 1992, "there may be so much political posturing that there will be political gridlock," says Kenneth Kay, executive director of the Computer Systems Policy Project (CSPP), a coalition of chief executives from 12 large U.S. computer companies.

Such pessimistic forecasts won't stop Kay and the rest of the industry from trying. He says a top goal for CSPP will be to get a tax break for companies doing high-tech research and experimentation. While a tax credit is currently available, it is simply an extension of a temporary measure implemented in 1981. High-technology firms say long-term research is being inhibited by the nonpermanent measure.

Rep. Dan Rostenkowski (D-I11.), chairman of the House Ways and Means Committee, says he will try to end the perennial suspense surrounding the credit, making the credit permanent or scraping it for good.

More tax regulation
On another front, software vendors will mount an all-out assault to defeat an administration-backed tax bill that would impose a 14-year amortization period on purchased intangible assets, including software. Practically speaking, that would mean that buyers who are writing off software in five years or less would be forced to defer tax deductions, effectively raising the cost of the software. The bill would also require companies to account for software long after it has been put to pasture.

An administration official says he favors exempting mass-market software from the bill. But it's an even bet as to whether custom-developed software or software obtained as part of a corporate acquisition will escape the mandatory write-off.

Beyond the Beltway, states scrambling for new sources of revenue are targeting the multi-billion-dollar computer services industry, most of which has traditionally been off-limits to the sales tax collector.

Pennsylvania levied a 6% sales tax last year on computer services, a measure the industry is still trying to roll back.

Nevertheless, the Information Technology Association of America (ITAA), formerly Adapso, says legislatures in Florida, New York and Maryland are likely to take up service-tax legislation early in the year. California, Kansas, Nebraska and Nevada are presumably considering measures in the spring. In Maryland and Florida, bills have already been filed that would nullify sales tax exemptions for computer services.

Export woes
In the global market, considerable progress was made in 1991 in easing restrictions on computer hardware exports. But two contentious issues are likely to keep computer industry lobbyists busy in 1992.

For one, an export regulation requires exporters to gain government approval before distributing software with encryption capabilities. Vendors will push Congress to reauthorize the Export Administration Act, the House version of which would free all mass-market software from export controls.

The second concern stems from a U.S. Department of Defense proposal. It would require exporters of powerful reduced instruction set computer (RISC) entry into the information services. More court tests are likely, but activity will move from the courts and the Federal Communications Commission (FCC) to Congress, which may impede the RBOCs by insisting on "safeguards" against anticompetitive behavior.

Computer security. Legislation is likely to modernize the 1984 Computer Fraud and Abuse Act to address mischief such as viruses.

Wireless networks. The FCC and the industry will work to define radio-based personal communications services for data and voice.

Other icy action

c. Government/industry collaboration. The industry will propose a model for greater collaboration with national laboratories whose nuclear weapons mission is fading.

Regional Bell operating companies' (RBOC) entry into the information services. More court tests are likely, but activity will move from the courts and the Federal Communications Commission (FCC) to Congress, which may impede the RBOCs by insisting on "safeguards" against anticompetitive behavior.

Computer security. Legislation is likely to modernize the 1984 Computer Fraud and Abuse Act to address mischief such as viruses.

Wireless networks. The FCC and the industry will work to define radio-based personal communications services for data and voice.
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Prepaid in U.S. dollars.
Bright lights, hot companies: News in industry not all bad

BY ALAN J. RYAN

When John Morgridge became the 34th employee and chief executive officer at Cisco Systems, Inc. three years ago, the U.S. economy was already showing signs of troubled times ahead. But today, while many of the nation's largest computer vendors are choking in the current slump, the employee roster at Menlo Park, Calif.-based Cisco has climbed to 600, making the networking vendor one of the nation's fastest growing companies.

Cisco, and dozens of other smaller companies like it, is proving that just because IBM, Digital Equipment Corp. and other biggies are staggering, it doesn't mean the entire computer industry has the blues.

In fact, Fortune magazine's recent "Fortune Fast 100," a listing of the nation's fastest growing companies, includes more than 40 computer-related companies, including the Top 4 spots. Similarly, Inc. magazine's recent "Fortune Fast 100," a listing of the nation's fastest growing companies, including the Top 4 spots. Similarly, Inc. magazine's growing companies in the U.S. for 1991 counts no fewer than 135 computer-related businesses.

Some of these little dynamos whose revenues are typically in the $5 million to $50 million range — boast stratospheric growth rates of 200% or more.
**The Amazing Outsourcing Game**

**A game played with absolutely no rules!**

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**Perot Systems**
Solid portfolio, hot new contract with super-regional banking giant NCB Corp. and Ross Perot at the helm

**WILD CARD!**

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**WILD CARD!**

**IBM**
We are the world
It’s getting easier to tally which firms aren’t offering outsourcing services these days.

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**New Blue**
Wild card in spades; no one knows exactly what the new IBM will be — except coming on strong.

**WILD CARD!**

**Electronic Data Systems Corp.**
Deal $3.1 billion deal with Continental Airlines Holdings, Inc. First again for another term. Quantum leap forward.

**GAIN GROUND!**

**Acropolis Management**
Biggest systems integrator in 60-Somethings. Advance further into software licensing services.

**DEAL!**

**Dealers**
Make hostile takeover bid for US-based systems integrator 60-Somethings. Advance further into fertile European outsourcing market.

**GOOD NEWS**

**Collect $145 million as third-quarter profits climb 13% on sales of $1.7 billion.**

**TIME OUT**

**Pause to count more than 30 major deals signed and renewed this year, plus more than dozen big alliances and acquisitions.**

**BONUS!**

**Andersen Consulting**
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**HOW TO PLAY**

**COMPUTER INDUSTRY VERSION**

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Winners are determined by research firm based in Westport, Conn. Long-term winners are judged on the basis of profitability and longevity.

Disqualifications. Companies that are out of business and/or have not yet been created are barred from play. A self-proclaimed outsourcing vendor that has never actually had a customer may be disqualified.

Tips on strategy:
- A good basic tactic is to win a large government contract, then branch into the commercial market.
- Consider expanding geographically or into a specific vertical market.
- Sudden changes in buzzwords or strategic direction can be an effective tactic.
Bridge by bridge by bridge

As standards groups grind along, IS looks for real products to build open systems

pen systems. The words conjure up vistas of thousands and thousands of diverse computers interconnecting across continental — or even global — networks.

Information systems managers, however, have become too savvy to be seduced by such utopian visions. Instead of waiting for various standards from on high, smart buyers are also looking at individual products to promote interoperability.

"I've detected a major shift in the meaning of open systems," says Bert Hartman, director of product marketing at Sybase, Inc. "Open systems used to be synonymous with Unix. Now, it's coming to mean interoperability between systems."

Indeed, others share the belief that open systems in 1992 will be propelled less by industrywide standardization than with bridges between individual products. From networks to databases, operating systems, user interfaces and applications development, vendors are scrambling to add open systems features in hopes of knocking down troublesome barriers between proprietary communications, software and hardware.

At the same time, analysts say, companies will quicken the pace of joint-development deals and strike new partnerships. "Vendors really can't afford to go it alone anymore," says Rikki Kirzner, a senior software analyst at Dataquest, Inc. in San Jose, Calif. "The software is getting more complex, and development cycles are getting longer and longer. The result is that it's going to take a lot of money to get those products out there."

In network management, electronic mail and high-speed networking, for example, various de facto vendor groups are cooperating to come up with quicker and dirtier versions of interoperability products, rather than wait for standards bodies to come out with the "official" versions. As open systems materialize, an exact definition is still up for debate. Kirzner suggests that qualifying systems must have multiple sources, widespread third-party support, a large base of trained users and developers and standards — official or de facto.

However, the rush of bottom-up activity doesn't mean that major standards-setting bodies, including the International Organization for Standardization, CCITT, SQL Access Group, the Network Management Forum and others, have become irrelevant.

If anything, decentralization, downsizing to personal computers and client/server architecture have also quickened the acceptance of standards like Transmission Control Protocol/Internet Protocol and X.400 for networking.

Even the most closed systems are being adapted for widespread networking that lets users send and receive electronic mail across departmental, site, regional and even national lines.

Continued on page 36

Client/server moving beyond 'hopeware'

BY MICHAEL FITZGERALD

Yes, Virginia, client/server architecture is real. And it might even grow up a little in 1992.

Any advance would be positive in the minds of some users, who for the last two years have seen the "Year of Client/Server Computing" come and go with little in the way of needed products.

"The [client/server] software world has made zero improvement in the last year, in my opinion," says Michael Purcell, manager of technology planning at Baxter Health Care Corp. in McGaw Park, Ill. What Purcell says he would like to see is "functionality along the lines of what you have in mainframes and minis, in terms of system management, diagnostics and monitoring."

Despite such disappointment, Baxter and many others will pursue client/server projects in the coming year. Analysts, such as Frank Dunbeck, president of Communications Network Architects, Inc. a consulting firm in Washington, D.C., caution firms to start slowly. He recommends "upgrading" applications from a personal computer local-area network environment to a work group or departmental level, then using these as test cases. That's very similar to the strategy Baxter will be following.

"The pieces are not in place, so we'll look at what we can really live with," Purcell explains. "We'll be doing research and prototypes."

Observers generally agree with Purcell that for client/server to really catch on, better management and development tools are needed. Until the client/server development environment begins to stabilize and more products emerge, the technology will be a spectator sport for most information systems shops.

"Your average user is just studying and watching," says Frank Michnoff, program director at Meta Group, Inc. in Westport, Conn. Michnoff says "bleeding-edge" users are implementing the technology, while leading-edge types are probably running pilot projects. "It won't be mainstream for another two to three years," he predicts.

At Bank of Boston, for instance, a team of IS workers is pushing toward a first-quarter 1993 delivery date for a

Continued on page 36
mail, query corporate databases or share applications software, for example. As a result, more U.S. companies will adopt formal standards in 1992.

Some links and formal guidelines will keep open systems advancing in 1992, following an overview of major "open systems" products due.

Operating systems

Some excitement will continue in the operating systems arena, but the "kernel wars" that characterized the 1980s are finished. "Most of the fighting is over, and now the fun begins," says Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass.

No longer among other things, means users will have to continue porting applications between different Unix variants, new OSF/1 products and newly opened proprietary operating systems such as VMS. All will use basically the same standards, notably Posix and XPG from X/Open Consortium Ltd.

One sign of the cease-fire will be growing cooperation by the two major Unix standards competitors, the Open Software Foundation (OSF) and Unix System Laboratories, Inc. (USL). The signs "will have a very close relationship, possibly including joint marketing and development agreements," predicts Julie Rodwin, program director at Computer Intelligence/Informatics Corp.'s Unix systems service in Acton, Mass.

Still, the biggest force in "open" operating systems for 1992 will continue to be USL's Unix System V Release 4. The only threat to this dominance, Unix V Release 4 dominates the market. But don't count out OSF/1, which Digital Equipment Corp. and Hewlett-Packard Co. will be shipping by the year. IBM will be shipping shipments of its high-end OS/2 version in the second quarter.

Products that will deliver on promises to open proprietary operating systems via Posix will also appear in 1992, including DEC's VMS and HP's MPE.

Nowhere is the term "open systems" taken more in vain than in local networking. Despite widespread lip service, vendors are likely to continue bucking the trend to openness in 1992.

Network vendors "don't want to share technology," says analyst Frank Michaeloff at Meta Group, Inc., in Westport, Conn. "They want to go out and own the corporate environment." Few cooperative projects between vendors are imminent.

One exception: Novell, Inc. and IBM. IBM's companion, a giant in its own world, has expressed willingness to make Novell's popular Netware and IBM's LAN Server work together.

There are other small signs of progress. Microsoft Corp., Banyan Systems, Inc. and Novell are building links by adopting similar server protocols. (Ironically, the trio is incorporating proprietary Apple Computer, Inc. standards). Despite such cooperation, each vendor has made clear its intentions to keep its products proprietary — for now.

GUIs

Graphical user interfaces (GUI) are playing an important role as the pretty face masking the ugly world of interoperability. But some blunders remain.

Differences between the major GUIs — the OSF's Motif for Unix, Microsoft's Windows for DOS, Microsoft's Presentation Manager for OS/2, and Apple's Macintosh interface — are just enough to drive developers crazy, especially in enterprise plans that want to deliver the same application using different platforms.

Fortunately, new tools are on the way that will let developers build an application once, then reconfigure it for different environments. New products are due in 1992 from Open, Inc. (Aspect GUI) and Guiderow Corp. in Mountain View, Calif. (Wintrant), joining various Easel Corp. (Easel) and JYACC, Inc. in New York (JAM).

Also in 1992, USL will ship its Motif/OpenGL/Intrinsics Toolkit, which lets users choose a Motif or OpenGL screen. But products should do give interoperability a cleaner face.

Analysts say openness will also get a boost in 1992 from a new generation of tools that will let developers more easily create software to run on different vendors' computers.

"We are really at a market turn, as a whole new generation of tools start to come out," says Peter Kastner, vice president at Aberdeen Group in Boston.

Put simply, these packages use numerous database management systems and permit developers to write an application on one machine, then port it to another. Analysts say the products are ideal for developers building applications for distributed, client/server environments.

No single tool can do everything. Kastner and others note, so several vendors plan to tackle the problem during 1992 by offering "infrastructure" software — schemes designed to help users work in complex environments by providing an organized way of connecting and integrating tools from different vendors. HP and IBM will promote HP's Softbench, DEC will push its own standard, as will the CAD Framework Initiative in Santa Clara, Calif.

Other open products are expected from a wide range of both traditional computer-aided software engineering vendors and from suppliers of PC, mainframe and expert systems software.

Basecases

There will be no rest for the weary; relational database vendors that worked hard last year in interoperability in 1991 have a new set of challenges in '92.

Best known multi processor; but very few of the shops that have it use more than one processor. What's missing are multi-processing operating systems such as Novell, Inc.'s Netware SFT, which is expected to debut in 1992.

We are greatly anticipating the release of OSF's Motif. Products offering multi-processing systems, including Computer Group Corp., Tri- cord Systems, Inc., AT&T's NCR division and Wyse Technology, Inc. Next year, they will start to sell boxes with up to eight processors.

However, this class of products is not quite ready for prime time. "You can [build client/server applications on multiprocessors], but they're almost enough to be distributed very well," Deubbeck says, citing monitoring and security issues.

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**TECHNOLOGY FORECAST 1992**

**NETWORKS**

**MANAGEMENT**

**Kitchen-sink approach out — for now**

**BY ELISABETH HORWITT**

The network supermanager — that expensive, unwieldy, kitchen-sink system — is losing its high-priority status on many 1992 budgets.

Not that companies don't need a reliable multivendor network management system for their corporate networks. It's just that many organizations have gotten tired of waiting for the ultimate "manager of managers" to arrive.

As a result, many firms are looking at simpler, less far-ranging alternatives.

The Yankee Group in Boston. The lower厨房-sink approach out — for now

1. **interoperability top concerns**

**BY JIM NASH**

The pell-mell pace of change in local-area networking is unlikely to slow down or become more orderly in 1992. Despite the proliferation of alliances in this arena, competition has abated only slightly.

In the coming year, Novell, Inc. is expected to boost its already huge market share from 67% to 72%, according to Forrester Research, Inc. The survey, which polled 126 users on buying plans, forecast that Banyan Systems, Inc. will shrink from 7% to 2% of the market.

- Interoperability inches ahead. Novell says Netware Version 3.2, set for year-end release, will mean users no longer need to buy special versions for different operating systems. Netware 3.2 will initially run on servers next to AIX and OS/2, industry insiders say. What users are wondering is how Novell will become fully interoperable with Microsoft Corp.'s LAN Manager or Banyan's Vines.

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INTERCONNECTION

A good year for linking LANs

BY JOANIE M. WEXLER

User zeal to exchange ever-larger electronic files with remote colleagues will spiral in 1992, lighting a boom in high-speed interconnecting technologies.

Analysts say high interest by buyers will spark the introduction of new high-speed routers — and accompanying high-speed wide-area technologies and services (see story below).

Many companies plan to trade up bridges for more efficient, secure routers connected on their growing local-area networks.

“We’re in the process of router shopping,” says Robin Layland, engineering consultant at The Technology Group, Norwalk, Conn. The insuror now runs 200 bridged LANs connecting 5,000 devices.

Bridging schemes for such a large network have become unwieldy, Layland explains, in part because of the seven-LAN limit of source-route bridging, required to bridge Token Rings.

Greater interest in routers will mean that prices for bridges will start to drop to commodity levels in 1992, according to Marty Palka, senior networking analyst at Dataquest, Inc., a consultancy in San Jose, Calif.

Now, improved offerings

To handle the exploding demand for LAN traffic, several vendors will upgrade their multiprotocol routers or enter the market for the first time.

Wellfleet Communications, Inc. in Bedford, Mass., plans to ship its industrial-strength Backbone Node router in March. Priced between $94,000 and $290,000, the device will feature a 1G-bit backplane that can reportedly forward 500,000 data packets/second.

Interconnect income

Router revenue will nearly catch up to those of less expensive bridges in 1992.

$325

$346

Projected 1992 U.S. LAN interconnect revenue (in millions)

Source: CMG Corp.

High-speed links to flood bandwidth-hungry firms

BY JOANIE M. WEXLER

Avalanche! Wide-area networking technologies of many types will tumble forth this year, as public telecommunications carriers and private equipment vendors deliver on 1991 announcements.

Suppliers are targeting companies that need to link high-speed local-area networks across geographic boundaries, those implementing bandwidth-hungry applications such as imaging and those investing in videoconferencing as corporate travel budgets shrink.

By midyear, frame relay — a fast form of packet switching — will be widely available in both private and public networks. Private equipment vendors are expected to deliver on frame-relay interfaces announced in 1991. On the public side, services will kick in at AT&T and MCI Communications Corp. midyear, about six months after U.S.

Look, no wires

Wireless computing will become a prettier standard option for portable users by the end of ‘92, observers say. The success of AT&T’s Safari notebook and Hewlett-Packard Co.’s 95LX are expected to drive the technology, as will continued commitment by IBM, Motorola, Inc., AT&T’s NCR division and others. Observers say wireless standards will also evolve in 1992.

The check is in the E-mail

Electronic mail isn’t just for messaging anymore. More than ever this year, “companies will start to use E-mail as part of production systems,” says David Ferris, president of Ferris Networks, a research firm in Concord, Calif. For example, users will increasingly use E-mail to process verify and track customer orders and sales information.

This shift will make it more important to merge E-mail with existing applications, he says. So standardizing on an application programming interface (API) will probably become a very hot issue. So far, vendors including Lotus Development Corp., Microsoft Corp. and Novell, Inc. all offer nonstandard APIs.

An equally big headache will arise in the form of managing multivendor E-mail systems; namely, making sure a message that necessitates use of different E-mail systems actually arrives at its destination.

Soft-Switch, Inc. is in the forefront with a very sophisticated — and expensive — management system.

Vendors will also continue to enhance their directories, which should help users integrate different systems, Ferris says.

X.500 directory services should begin to appear in public E-mail carriers, promising automatic routing of user messages between different vendors. However, Ferris says it will take several years before the major implementations of private X.500 systems hit the market.
PORTABLES

Smaller, cheaper units coming

BY MICHAEL FITZGERALD and JAMES DAILY

The future has never looked so small, as portable computer vendors labor to deliver on the big promises they made in '91 — namely, to squeeze more into less space.

Notebooks, which displaced laptops as the hot technology last year, will continue to grow in 1992, as the great shrinking computer saga will continue as "subnotebooks" — computers sized between note books and palmtops — appear on the market.

Dell Computer Corp., for example, is readying a $1,500 subnotebook that will weigh less than 4 pounds. Apple Computer, Inc. is expected to release a smaller version of its Powerbook portable weighing less than 5 pounds. P. Based systems of subnotebook size will also appear.

Whether they choose to compete in the subnotebook category or not, portable and pen-based manufacturers will be striving to reduce weights and prices this year, while increasing battery life and adding features.

• Lighten up. Besides shrinking cases, vendors will look for other ways to shed pounds. Toshiba America Information Systems, Inc., for example, says it uses carbon-reinforced plastics to reduce casing weight without compromising durability.

• Lower prices. Buyers can look forward to better deals on Intel Corp., 80386SX-based notebooks, which should reach near-commodity status by year's end, expect to see an SX notebook with 2MB of random-access memory, a 60-MHz hard drive, an IBM Video Graphics Array-compatible screen and a 2-hour battery for under $1,500. Price cuts will be driven by ferocious competition with Far Eastern clone makers, as well as by steady drops in component pricing.

Get ready

During the next 12 months, portable buyers can expect the following:

• Subnotebooks: Dell, Apple
• Color screens: Dell, AST Research, Epson America, Sharp Electronics
• Power Supplies: Nickel hydride batteries from Epson, power management chips from Intel, Advanced Micro Devices
• Longer battery life. Improved cell technology, aided by power-management software and hardware, will help vendors stretch the time between recharges of both notebook and pen-based computers. Battery life now stands between two and three hours.

Power management chips, such as Intel's 80386SL family and Advanced Micro Devices, Inc.'s AM386SLX, will be near universal by the end of 1992. Intel officials claim new versions of the company's SL microprocessor will boost battery life to as long as 11 hours.

WORKSTATIONS

Commercial desktops eyed

BY MARYFRAN JOHNSON

Like race car drivers finally noticing the passing scenery, workstation vendors are zigzagging into 1992 alert to the growing acceptance of Unix on commercial desktops.

Growing demand for reduced instruction set computing (RISC) Unix products will boost workstation sales over the next year, predicts Laura Conigliaro, an analyst at Prudential Securities, Inc. in New York.

Buyers will have more choices than ever in the below-$10,000 price category — now dominated by Sun Microsystems, Inc. — as companies such as Digital Equipment Corp., IBM and Hewlett-Packard Co. unveil their "personal workstations" as bridge machines to lure PC users into workstations.

DEC recently introduced a pair of diskless Personal Decstations at PC-style prices ($3,995 and $4,995), and IBM is expected to unveil its own personal RISC System/6000 workstations in January 1992. HP will also brave into the low end before mid-February with its "Bushmaster" 9000 workstation, priced under $10,000.

"We are arriving at the cutting edge between PCs and workstations," says Robert Herwick, an analyst at Hambrrecht & Quist, Inc. in San Francisco. "Workstations are capturing market share for two reasons: their full multitasking support with good performance and their integrated networking."

There is one caveat: available software. "The RISC world wants to take over the desktop, but the question is still applications availability," says Jack Karp, an analyst at Meta Group, Inc. in Westport, Conn.

High-end Unix-based servers will be coming key offerings for vendors such as Sun, HP, DEC and IBM.

Increasingly, analysts say, high-powered workstations and servers are encroaching on territory once reserved for large systems. HP officials say they've snatched at least 50 new accounts off mainframes and proprietary minicomputers in recent months with their top-end HP 9000 servers. And IBM's RS/6000 line — expected to sap $1 billion in revenue in 1992 — is scoring more than half its sales in commercial accounts.

Sun revenue comes up

Sun's Galaxy 600MP server began shipping in volume just a few weeks ago and is already boosting the vendor's quarterly revenue. In several months, Sun will announce workstations and servers with the superscalar Scalable Processor Architecture chip, based on Texas Instruments, Inc.'s 'Viking chip. Also expected mid-year is Sun's Solara 2.0 operating system, equipped with symmetric multiprocessing capabilities.

Another interesting scenario will unfold at Novell, Inc., which is moving into the RISC market at a brisker pace. In December, Novell announced that Netware will run native on HP's RISC chip. Similar introductions will likely follow for native Netware on DEC, IBM and Sun platforms, Karp says.

Unix should cause less consternation for users in 1992, analysts say, despite more than 200 variants on the market. Those variants will begin looking more alike as the two major Unix camps — Unix System Laboratories (USL) and the Open Software Foundation — work together behind the scenes, adopting bits and pieces of each other's work (see story page 35).

OSF/1 will finally begin volume shipping in 1992, and the Santa Cruz Operation will also roll out Open Desktop for the Advanced Computing Environment (ACE). Now that USL has joined the ACE initiative, and Sun is expected to act as a unifying influence there.

The year will also see the debut of Microsoft Corp.'s Windows New Technology operating system, a high-end, advanced implementation of Windows for servers and advanced workstations on both RISC and Intel platforms.
**MIDRANGE**

*Alive and quite liable to kick*

BY MARYFRAN JOHNSON

The coming year should prove that the much-maligned midrange is not dead, but just going through a midlife crisis.

True, the competition from cheaper machines and mainframes has been enough, vendors such as Digital Equipment Corp. will continue to thrash through the painful transition from proprietary to open systems, while others, such as Prime Computer, Inc., may fade from view altogether.

Overall, however, the forecast calls for a steady stream of applications moving off mainframes. These will be distributed to increasingly powerful, less-expensive midrange systems and servers.

"The ability of the midrange in the corporate world, with a sharper focus on the server end of the equation, will be the rich functionality and the cost effectiveness" needed for an enterprise system," says Wes Melling, an analyst at Gartner Group, Inc.

Gartner Group expects DEC's upcoming Alpha/RISC systems, when linked together in clusters, to satisfy the requirements of 90% of commercial processing by 1993. That could mean midrange systems capable of replacing powerhouse mainframes such as IBM's Enterprise System/9000 line.

Mainframes

Low growth, discounts continue

**MAINFRAMES**

BY ROSEMARY HAMILTON

The poor economy and industry trends, such as downsizing and outsourcing, will continue to peck away at an already sluggish mainframe market.

Not surprisingly, analysts predict continued low growth for mainframes in 1992. "With recessionary pressures and companies still continuing to explore client/server-style alternatives, growth will be well within single digits," says Will Capello, a vice president at New Science Associates, Inc. in Southport, Conn.

The only thing that won't be sluggish is the competition level among IBM and DEC, its two chief rivals, Hitachi Data Systems Corp. (HDS) and Amdahl Corp. Discounting has been on the rise since the late 1980s, and analysts expect this practice to continue.

Price breaks in the 30% to 50% range won't be uncommon next year, says Susan Gannon, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

At least the year will begin on an upbeat note, with moderate mainframe sales in the first half as IBM, Amdahl and Hitachi fill 1991 backlogs and introduce newer generation systems.

All three vendors are expected to ship systems announced in 1990 and 1991. Amdahl and HDS are expected to deliver their top-of-the-line models. Amdahl's eight-way processor should clock in at more than 300 million instructions per second, while HDS should be shipping its five- and six-way models.

IBM will be filling out its so-called Summit line, or newer generation Enterprise System/9000s, by shipping several lower end, water-cooled models next year.

By the later part of 1992, the companies will introduce better pricing and new software that provides services above and beyond processing. "There is also an increasing trend to multivendor networks, which IBM, DEC and HP's agreement to follow OSF's Distributed Computing Environment model. Another checkpoint: compliance with POSIX for application portability in multivendor networks, which IBM, DEC and HP have sworn to do now."

**Systematic shift**

Platforms of all sizes are expected to continue migrating to Unix during the next 5 years

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<th>Percent of hardware</th>
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<tr>
<td>Unix</td>
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</tr>
<tr>
<td>DOS and OS/2</td>
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<tr>
<td>370</td>
<td>$35.42M</td>
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<tr>
<td>VMS</td>
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<tr>
<td>AS/400 and S/3X</td>
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<tr>
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<tr>
<td>Other</td>
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<td>Total</td>
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Source: International Data Corp.

*Projected

**Supercomputers hot**

The waning months of 1991 saw a flurry of supercomputer announcements. In the new year, the competition centers on application development tools. Analysts say a more standard approach to supercomputing would help speed application development.

"Because supercomputers are based on proprietary CPUs, some companies, such as Cray Research, Inc., will be reevaluating their architectures in light of open systems and massive parallelism."

**PC price cuts slowing**

"Competition will remain vicious, but personal computer price drops won't be anything like those of the last year. Just the same, this time next year, advances in chip technology will take users to a new level of computing for the same price as to-day's high-level machines. Machines based on the Intel Corp. 1486 chip drop in price to make room for Intel's P5 below on the 486 chip. And for the same cost of an 80286-based machine today, you'll be able to get PCs based on the 80386DX chip."

**Speaking of chips...**

Intel Corp.'s P5, due in midyear, is expected to offer the first peek at 64-bit computing, have addressable cache and compete with reduced instruction set computing chips. Don't be surprised if it comes in a variety of sizes, just like its 1486 forebear.

**ACE's last stand**

1993 will probably make or break the Advanced Computer Environment (ACE), a jumbled alliance led by Digital Equipment Corp., Microsoft Corp. and Compaq Computer Corp. The group is struggling to establish a third desktop alternative to Sun Microsystems, Inc. and whatever rolls out of IBM/Apple Computer, Inc. Some analysts say ACE is a hopeless tangle of mismatched partners bickering over different agendas. Yet others are just as certain it will provide a broad array of tightly wrapped Unix software to run on both Intel and RISC platforms.

A critical component of ACE will be Windows New Technology, Microsoft's new high-end implementation for servers and high-end workstations.

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December 23, 1991/January 2, 1992

Computeworld
APPLICATION DEVELOPMENT

LARGE SYSTEMS

IS finds client/server is way to go

BY ROSEMARY HAMILTON

With more people developing applications on smaller platforms, information systems managers can look forward to a whole new set of issues and technologies in 1992 — those surrounding client/server development. Many companies are replacing large-scale design with enterprise development strategies that involve smaller systems or platforms with both a desktop and a host component. For most, it’s a new world.

"Managers don’t know how far to go with security and backup issues," says Shaku Atre, president of Atre/In-tec, Inc. in Rye, N.Y. "Some people aren’t sure how to move programmers into client/server. Some don’t have a [high level] of LAN expertise," she says.

As development shifts to smaller platforms, software companies are ramping up product efforts. Initial rollouts of computer-aided-Software engineering (CASE) for local-area network-based design appeared last year. Other CASE vendors will move onto the client/server bandwagon in 1992.

"In 1992, client/server will get even more attention, and your mainline CASE vendors will be delivering it," says Ed Acly, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

Aaron Werman, president of the consulting firm Database Definitions, Inc. in New York, says he already sees users building "an enormous amount of intelligent workstation-type applications in this mold."

"We will start seeing tools that allow [users] to specify applications by intelligently putting pieces of it where the most sense," Werman continues. He says he foresees a big fight between Knowledgeware, Inc., Texas Instruments, Inc. and Software AG of North America, Inc.

For its part, large-scale development will continue to be confined largely to maintenance and overhauls. Last year’s flurry of re-engineering and maintenance marketing campaigns, such as IBM’s expansion of ADV/Cycle to address maintenance, testify to this trend. Little of substance is expected in 1992 from IBM, which has documented the applications development market since introducing its AD/Cycle strategy in 1989 but has hedged as much as it has delivered.

Analysts are expecting another wait-and-see year as many users maintain lukewarm commitments to IBM’s repository-based strategy. "IBM still needs to deliver a real repository, and I don’t believe we’ll see that" in 1992, Acly says. "So in the meantime, it will continue to put out brushes."

Still, Werman says he expects IBM to eventually succeed with its repository.

Source: Forrester Research, Inc.

Where development dollars go

During the next decade, major corporations will increasingly focus on creating client/server applications

PC DBMS

Windows, client/server versions ahead

BY CHRISTOPHER LINDQUIST


"The edict has been mandated that IS organizations must build client/server applications," says Jeff Tash, president of Database Decisions, a Newton, Mass.-based consultancy. "That’s going to drive that part of the market."

The shift to client/server systems is slower than anyone expected — largely because the transition is difficult, both for vendors and users.

VMS-based server product.

Windows-based products will show signs of life as well. Both Borland and Fox Software, Inc. are expected to release Windows versions of their popular products aimed at existing current Windows favorites, Software Publishing Corp.’s Superbase. Entries from Apple Computer, Inc. Macintosh database makers such as Claris Corp. could further heat things up.

While newer technologies are garnering the most attention, older DBMSs could hardly be considered dead. The new powerhouse created by Borland’s purchase of Ashton-Tate Corp. is expected to dominate the still-viable market for character-based DOS products. Drive and Paradigm hold a combined market share estimated at more than 70%, and Tash calls the power of the new firm "awesome."
DECEMBER 23, 1991/JANUARY 2, 1992

TECHNOLOGY

TAPE, DISK, OPTICAL

New media could RAID 
storage market in '92

BY J. A. SAVAGE

D ata storage technology is usually about as interest-
ing as a chest of drawers. But 1992 should see some real action — and the emergence of some big technology winners and losers. Redundant arrays of inexpensive disks (RAID) are rising, digital audio tape (DAT) is dy-
ing, and tape storage may benefit from new media.

• RAID on high. Iceberg, the long-
expected RAID system from Storage Technology Corp. in Louisville, Colo., will finally ship this year. Billed as the industry's first RAID system for mainframes, Iceberg will give IBM

and plug-compatible makers some se-
rious price/performance competition for mainframe storage.

A RAID device can store as much data as direct-access storage devices, but they cost much less because they use off-the-shelf disks. Software controls data integrity and speed.

RAID devices have been intro-
duced mostly by smaller vendors, al-
though Compaq Computer Corp., Hewlett-Packard Co. and a few others have already moved in. Larger ven-
dors will continue to announce RAID products, says Jim Porter, president of Disk/Trend, Inc., a market re-
search firm in Mountain View, Calif.

• Done in by rock 'n' roll. While Sony Corp. and other owners of DAT technology dithered over trying to protect the medium from home copy-
ing of records and compact discs, oth-
er tape technologies, such as 8mm casettes, got a head start.

As a result, the coming year will see vendors of 8mm, ¼-in. tape and DAT trying to one-up one another with a flurry of products at lower prices, says Bob Abraham, an analyst at Freeman Asso-
ciates, Inc. in Santa Barbara, Calif.

The cost of DAT cannot drop as low as the competition because production vol-
umes never hit predict-
ed peaks, according to Peripheral Strategies, Inc., a market research firm also in Santa Barbara.

• New media for tape. Quarter-
inch tape will adopt magnetic material — specifically, barium ferrite — which will permit higher density, ac-
ccording to Abraham. Four and 8mm tapes will not change media, he adds, although consumers will begin to see them in a thinner, film-like form that permits higher density recording.

• Smaller and denser drives. Ex-
pect to see 1G-byte, 3½-in. disks made possible by fine-tuning record-
ing density, Porter says. Also, expect to see 2½-in. disks, now used in lap-
top computers, drop in price and become competitive with 3½-in. disks.

Porter calls 5¼-in. disks "dinosaur" ex-
cept for high-end drives that are in the 1.7G-
to 3G-byte range.

• Multifunction jukeboxes. A host of optical jukeboxes with re- 
write-once or write-once — or multifunction — drives will appear this year. "Multifunction jukeboxes have not only the write op-
tion but also newer robotics and bet-
ter media," Abraham says. A com-
plete conversion of write-once jukeboxes to multifunction will even-
ually take place, he adds.

BUNDLED OFFICE PACKAGES

How suite it was — and is again

BY DEREK SLATER

T hey're billed as "Everything you'll need for the office PC," and buyers will be hearing a lot more about them in 1992. Sound like deja vu?

They're hardly a new idea (remember Symphony and Freeware?), but so-called "software suites" — packages that combine word processing, database, electronic mail, communica-
tions, spreadsheets and other func-
tions — are getting a big new push from PC software vendors.

The vendors are hoping to con-
vince users anew that today's soft-
ware suites make economic and user-
friendly sense. The promise is that you can easily move from application to application, transfer information among applications and use one inter-
face for all.

Industry heavyweights are busy developing, updating and especially acquiring applications (see chart). Microsoft, for example, has acquired 10 companies in the past year, while Lotus has announced 20 new products.

Opinions differ, however, on the worth and impact of software suites. Rich Bader, contributing editor to Office Computing Report in Boston, says a mixed-vendor set of Windows applications should provide the hooks for transfer-
ing data between applications just as well as a single-vendor collection.

Others warn that vendors can man-
age the integration of different appli-
cations while still maintaining their individual strengths.

At the same time, some users may value integration above all else. "They may not offer the best of breed in every category, but the integration is pretty smooth," says Ronnie Marshak, editor of the "Office Computing Report" in Boston. Marshak points out another advantage: one-stop ser-
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Something to watch: Industry leaders will continue acquiring com-
petitors. "Technologically, the small companies can compete," Bader says. "Marketing is another matter."

DECEMBER 23, 1991/JANUARY 2, 1992

STORAGE

COMPUTERWORLD

Winners' position intact

This year catapulted Microsoft Corp.'s Windows from OS/2 competitor to undisputed new hotshot in the PC operating system arena.

It's not likely to lose that status in 1992. Stewart Alasp, editor of "PC Letter," predicts that Windows will be dominant for the next three to five years, either in its current form or in its New Technology (NT) iter-
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The most IBM can hope for with its expected new release of OS/2 in March is to buy about six months of time while Microsoft plays catch-up. But it first has to deliver all the promised functionality, includ-
ing built-in network support.

Windows' NT is supposed to offer the same functionality in a package intended more for high-performance servers.

And don't forget about DOS. A robust new release has sparked significant sales, proving that plenty of companies aren't planning to open a new Window any time soon.

CAROL HILDEBRAND

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Fill in the blanks

More acquisitions likely as vendors move to applications suites

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*Products obtained via company acquisitions

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<td>14360 S.E. Eastgate Way Bellevue, WA 98007</td>
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<td>Anixter Bros., Inc.</td>
<td>4711 Golf Road One Concourse Plaza Skokie, IL 60076</td>
<td>800-232-0190 x693</td>
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<td>Avnet Computer</td>
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EN ADVANTAGE.
EMERGING TECHNOLOGY

ELECTRONIC DOCUMENT IMAGING

No image problem sales set to take off

BY ELLIS Bocker

It's nearly everyone's darling technology. So while other products might be feeling a pinch, investments in electronic document imaging systems will skyrocket in 1992.

Even as the economy sagged in 1991, companies continued to lay out precious dollars on imaging pilots and feasibility studies — preparing for what analysts say could turn into a multiyear, multi-billion-dollar adoption and deployment of the technology (see chart).

Users "are putting imaging in place when business is slow, so they will be able to do more with fewer resources when business picks up," says Walter Novinger, a senior partner at Shaw, Novinger and Odell.

In fact, imaging revenue is forecast to double in 1992, surging to $1.9 billion, according to IDC/Avante Technology, a market research and consulting firm in Framingham, Mass.

More green lights

Bruce Lechner, a senior vice president at Technology Solutions Co. (TSC), a Chicago-based consultancy, says imaging projects that were delayed or deferred in 1991 will get a green light in the coming year. These will include some major projects among Fortune 100 companies, he adds.

Lechner, who runs TSC's imaging practice in Walnut Creek, Calif., says these installations will be bigger and more strategic than many in 1991.

With its promise of 20% savings and productivity gains, imaging will seduce even the biggest skeptics, IDC/Avante predicts. The firm says many users will be attracted by the promise of smaller staffs, quicker customer service, reduced transcription errors, fewer lost documents and reduced paper storage. Imaging lets companies redesign procedures for handling paper, analysts note.

Imaging will also get a big boost from the frenzy of vendor activity, analysts say. "1992 will be the first year that all major systems companies will be competing," says Scott McCready, director of image management systems at IDC/Avante.

Established players such as Wang Laboratories, Inc., IBM and Unisys Corp. will be joined by the likes of Digital Equipment Corp. and NCR Corp., which announced imaging products in 1991.

Watch for DEC to release a second version of its Imageexpress, a VAX 4000-based system introduced in January 1991. Wang, the granddaddy of imaging vendors, plans to release an IBM RISC System/6000 implementation in the spring. NCR is expected to announce important products about the same time.

Unisys, with its Informage products for banking, engineering and commercial settings, says it will introduce a work-flow product — either its own or one from a third party — sometime in 1992.

The heavier competition will put pressure on industry-leading pioneers such as Filenet Corp., as well as a crush of smaller companies and systems integrators. To stave off the systems companies, these firms will try to attract customers with marketing relationships with third-party vendors and innovative software.

Hotter competition could also result in consolidations among small vendors, Novinger and McCready agree. "Vendors are discovering it's no longer sufficient to sell a client hardware," Novinger says. "They have to write applications ... and the number of companies that can do that is not large."

Indeed, analysts agree that software — not hardware — will increasingly be a prime differentiator between products and vendors.

Probably the hottest category is "work-flow automation systems," which let IS departments or users create rules for routing digitized documents and files among individuals, departments and applications.

The ability to let users customize imaging software will be another much-desired feature. While imaging systems are far easier to deploy now than they were a couple of years ago, analysts caution that the software still needs much postinstallation tweaking. For this reason, buyers should expect little in the way of shrink-wrapped imaging systems in 1992.

Firms in the Open Software Foundation area that users and vendors alike will grapple with in 1992 and beyond include some major projects that are being moved into a new area: office automation. Most imaging installations to date have targeted production functions such as processing bank checks, insurance forms and birth certificates, McCready says.

The newer imaging systems will be geared toward smaller groups of users and will feature ad hoc queries and reporting into multiple image databases. Basi- cally, the systems treat images as just another data type and can be integrated by the office automation system.

Yet, while more single-user or small work group (under 10 workstations) imaging products will appear in 1992, McCready says major players will continue to focus on larger, production-oriented applications.
Opinions vary on the market growth of multimedia, a technology that combines text, graphics, animation, audio and video on personal computers. But even the most conservative observers, including Market Intelligence Research Co. (MIRC) in Mountain View, Calif., say sales of related hardware and software will grow dramatically during this decade. MIRC predicts that sales of multimedia will soar from $790 million in 1991 to $1.3 billion in 1992.

Analysts predict two factors will aid acceptance of this technology in 1992: greater cooperation among vendors (such as the IBM/Apple Computer, Inc. alliance) and broader acceptance of international standards compressing and manipulating full-motion video on the desktop.

Several other industry leaders, including Intel Corp., Tandy Corp. and Microsoft Corp., will continue to tout multimedia loudly in 1992.

Look for massively parallel processing computers, which tackle a task with hundreds or even thousands of microprocessors, to make a small but forceful push into the commercial market in 1992. Vendors such as Thinking Machines Corp. and Intel have already sold machines to American Express Co. and Prudential Securities, Inc. Other companies are likely to follow the leaders, some analysts believe.

More importantly, the fear, uncertainty and doubt that surround the programming of parallel machines will continue to subside in 1992, as potential buyers begin to recognize that the task is not as daunting as they once believed. In 1992, compilers will continue to get better at automatically "parallelizing" code. In addition, much effort will go into developing software tools for porting, developing and debugging software for parallel machines.

Object-oriented programming systems, which allow programmers to assemble applications in modular, Tinker Toy fashion, will find greater appreciation in 1992 (see related story page 42).

Backers say object orientation promises to simplify systems development and maintenance because code can be reused for a variety of applications. More importantly, object-oriented technologies let businesses adapt quickly to critical business changes, according to Andersen Consulting.

Voice recognition and speech synthesis, as well as pen-based computing (see story page 40), will go a long way toward smoothing the human-to-computer interface starting this year. But it will be several years before applications using these interfaces are commonplace.

In the interim, graphical user interfaces (GUI), especially Microsoft's Windows 3.0, will continue to enjoy tremendous growth, many analysts agree. Sales of the Apple Macintosh interface will remain steady, and Next, Inc.'s Nextstep is expected to have only a small impact, according to analysts at International Data Corp. (IDC).

Of the GUIs based on the X Window System, the Open Software Foundation's Motif will fare best, thanks to its visual link both to Windows and IBM's Presentation Manager, IDC predicts.

IBM's Presentation Manager hangs on the success of its OS/2 operating system, which is slated to hit the market in 1992, after considerable delays. Some analysts are betting on Presentation Manager as a long-term success story.

As companies struggle for competitive advantage in an increasingly service-oriented market, AI will continue to join the mainstream, according to Gartner Group, Inc. So will technologies relating to expert and knowledge-based systems, neural networking and fuzzy logic. Object-oriented programming will also drive these technologies because it eases applications development.

Dynamic changes in the neural networking market will continue in 1992, says Cognizer Co., a market research firm. The company expects more neural networking chips and custom applications to debut this year.

Riding the coattails of multimedia, optical discs — specifically, the 4.75-in. format pioneered by Sony Corp. and Philips Telecommunications N.V. — will likely get a boost in 1992. Some analysts say any compact disc/read-only memory (CD-ROM), whose installed base is predicted to double in 1992, is approaching critical mass in commercial acceptance. The number of CD-ROM titles will total 10,860 in 1992, up from 5,916 in 1991, says Infotech, a market research company in Burlington, Vt.

The coming year will also see two alternate multimedia formats: Philip's compact disc-interactive and Commodore's CD-TV will come under close scrutiny, especially as educational and training vehicles.

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EDITORIAL

Home atone

In the year ahead, as in the one just finished, the dominant force shaping the IS professional’s environment will not be technology, as had been the case for decades, but the economy. The only difference between 1991 and 1992 is that our sputtering economic engine will affect your world more strongly — and in a negative way, for the most part.

This isn’t the way we like to greet the new year with our Forecast issue. But one quick look at the numbers will tell you that we’re still in deep snores: 20,000 at IBM; 75,000 at General Motors; 33,000 at Sears; and tens of thousands at hundreds of other companies.

These aren’t just numbers. They’re jobs that are being lost. Unlike in past recessions, economists believe they are being lost permanently.

These are workers, increasingly white-collar, whose incomes either will decrease dramatically as they slide into early retirement or will disappear entirely as they are laid off.

These are billions of dollars in wages that won’t be spent on your company’s products and services, unless you’re in the outsourcing or outsourcing business. These are part of a vicious cycle of recession and layoffs that seem immune to the most ardent government policies to stimulate the economy, such as fostering the lowest interest rates in a generation.

The reaction from our Washington politicians is oh so predictable and can be summed up in one word: protectionism. That’s just a great idea. Do it is oh so predictable and can be summed up in one word: protectionism. That’s just a great idea. Do it.

In my years in the IS world, I have learned one thing: When you have a problem, it is usually with the people, not the technology per se. As IS professionals learning to ask the right questions, see the big picture and remember that they are a service organization? Is IS management letting staff participate in technical decisions? Have businesses truly realized they must produce a quality product to compete?

Our world is complex now, and to solve problems, you must work as a team, involve and value all players, review your progress constantly to see what works and what doesn’t and embrace change and creative thinking from the highest to the lowest levels of the business.

IS has a big part in making this happen — but most businesses just won’t accept the changes that have to be made in management styles.

Sound advice

Thank my good fortune I read your recent Fast Track column [CW, Oct. 28] regarding possible layoffs.

My co-workers, or should I say former co-workers, disregarded the writing on the wall. I must admit that I too was fat, dumb and happy after nine years with my ex-employer.

I started looking for a new position, as advised by the article, figuring, “What could it hurt?” They were right!

Now I’m in a better job, got a significant raise and actually feel challenged growth-wise for the first time in years.

My former co-workers are going through changes, too . . . unfortunately, they are dealing with the Texas Unemployment Commission.

Hats off to your authors.

K. J. Eichtenlaub

Houston

People the problem

In regard to “Cash drain, no gain” [CW, Nov. 25], who died and made information systems departments responsible for “enhancing U.S. economic performance?”

The idea that technology is the total answer to the complex issue of producing and trading globally is absurd.

In my years in the IS world, I have learned one thing: When you have a problem, it is usually with the people, not the technology per se. As IS professionals learning to ask the right questions, see the big picture and remember that they are a service organization? Is IS management letting staff participate in technical decisions? Have businesses truly realized they must produce a quality product to compete?

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IS has a big part in making this happen — but most businesses just won’t accept the changes that have to be made in management styles.

Linda K. Preston
Project Manager
Computer Management Services, Inc.

Ubiah, Calif.

Poor stereotype

With much grief, I read “Computers crack down on child support” [CW, Dec. 2].

The technical issues of the article were correct. What I disagree with is the sexism that was rampant throughout the article. Since I personally know five fathers who have custody of their children, and four of those mothers either do not pay their court-ordered support or have fallen behind, I feel the blanket use of men as the noncustodial parent is unfair.

A more correct manner of handling this article would have been to have discussed custodial and noncustodial parents. An example would be, “The system manages 300,000 child-support cases, from the moment a custodial parent applies for child support to the distribution of money that has been collected.” That would not have changed the content of the article, but it does not paint anyone in a bad light.

Please stick to the technical aspects of information systems that Computerworld is known for. This kind of sexism is as bad as “dumb blonde” jokes.

Thomas Barrow
Columbia Consulting Corp.

Dallas

Clarifying NT

There are a couple points I would like to clarify in regard to “Ace in the hole? Not!” [CW, Oct. 28].

• We are doing a lot to build connectivity into the Windows NT environment. We are implementing Netbeui and TCP/IP protocols into LAN Manager for Windows NT.

• Yes, Windows NT looks like Windows — that’s the whole point. With 7 million users and 4,900 native applications, we want one robust, industrial-strength operating system to be as familiar and easy to use as Windows and to support a broad range of applications.

Carl Stork
Director, Windows NT Business Development
Microsoft Corp.

Redmond, Wash.

Letters to the Editor

COMPUTERWORLD
Ready! Set! Go! The year 2000 is almost here

MICHAEL COHN

This is the time of year for reminiscences and predictions. Reporters are busy retracing the '80s, while book authors exposed on the '90s. I say we should forget all that and just jump ahead to 2000. The big story of 2000 is probably the pace at which we are mastering the computer. The next eight years are going to fly by, except for maybe one week next summer when I have to watch my sister's kids. So my advice is to start planning now if you want to stay in step and possibly improve your odds of snagging a bigger cube.

Computing 2000

• Personal computing. Voice recognition will have replaced the keyboard, and everyone will have flat, high-resolution crystal screens. All of this will be great, except that we'll all be talking to these little magazine-size computers and you'll never know if the guy next to you on the subway is building a complex spreadsheet or if he's just another weirdo.

• If you want to buy a computer, it will be out of a catalog, unless you go to the next megacompany and will get out of control as they design their own applications, generate their own databases and try to act like real programmers. Worst case: This will cause catastrophic shortages of cigarettes, soft drinks and other crucial IS staples.

End users and system owners will have to call us "data processors" and nobody will notice. But we'll still be bored with outsourcing, where little outsource to each other. The name game. They used to call us "data processors" and everybody toed the line. But now we're just "IS." The old "IS" has long given way to laptops. Sub-atomic-bit machines will have long given way to lap-chains. PCs will be minuscule. PCs will come wristtops. Sub-atomic-bit memory will drive tapes and disks down to the size of a tea bag.

Want to take advantage of downsizing in the year 2000? Start selling ideas like you would like at the beach for locating spare change. You'll need them just to find half the equipment in the computer room.

Buzzwords 2000

• New measures. By the year 2000, mega and giga will be considered puny. We'll probably have "megabytes" or "giga-bytes" or some other number, which will equate to the amount of storage you have to buy for the salesmen to make his quota.

• The name game. They used to call us "data processors" and everybody toed the line. But now we're just "IS." The old "IS" has long given way to laptops. Sub-atomic-bit machines will have long given way to lap-chains. Sub-atomic-bit

The siren song of new machines

RICHARD A. KATZMAN

After reading Gary Loveman's recent article "Cash drain, no gain" (CW, Nov. 25), I cheered loud and long. That article was one of the few attempts I've ever seen to explain a situation that people have been complaining about for more than 25 years — the act that U.S. companies have spent billions on powerful technology to do things faster and better yet realize few, if any, productivity gains.

We all hear a lot about success stories. But most of the articles written about successful information service efforts reflect nothing but propaganda concealed to hide wasted, unproductive efforts. To guard against any negative reactions from stockholders and corporate officers, companies push out positive press releases by the ton.

The major problem, which is usually ignored or rationalized, is that technology is far ahead of the human capability to think and analyze in real-world situations and real-world organizations. The result is that people wanting to appear "leading edge" rush to try to sell products they do not understand and will not need for many years.

I currently use an Intel 80286 PC. It is the type that would allow me to enjoy the alleged benefits of an 80386 computer by simply purchasing a new motherboard. People who hear that I have a 286, however, always ask, "What are you waiting for?" When I say that my 286 is more than sufficient, their shocked response is usually something like, "But you are already a general; aren't you?

When I was at IBM years ago as a systems engineer, I was taught to press the answer machine. Strange as it seemed to my managers, most of my clients did not need new computers. They were not even making optimum use of their old ones. The major problem, which is usually ignored or rationalized, is that technology is far ahead of the human capability to think and analyze in real-world situations and real-world organizations. The result is that people wanting to appear "leading edge" rush to try to sell products they do not understand and will not need for many years.

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*NET, test conducted against the PS/2 Model 57 SX without SLC processor. This option is only available for the PS/2 Model 57 SX.

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An ounce of prevention for performance cure

BY GARY H. ANTHES
CW STAFF

NASHVILLE — Products for analyzing systems performance are proliferating and improving, but some users say they have a better idea: Why not find performance and capacity bottlenecks and remove them before application updates go into production?

"We have all the tools," said H. Pat Artis at the Computer Measurement Group (CMG) '91 conference here recently. "But it's like the military — we're always prepared to fight the last war. It's the new applications that do you in." Artis, who is president of Performance Associates, Inc. in Palm Desert, Calif., added, "You need to look at capacity planning as part of application design."

Predictive products

A growing family of tools, some shown here for the first time, allow users to do just that. Chicago-based Windtunnel Software, Inc. showed a product, Performance Architect, that creates predictive models from design specifications imported from computer-aided software engineering (CASE) tools.

Technology Solutions Co. used the product to help design two 600-user local-area networks for a major appliance manufacturer. Bill Pierson, principal at Chicago-based Technology Solutions, used the tool to evaluate options for Unisys-, DOS- and OS/2-based workstations, for sizing servers and for locating application bottlenecks. Input to Performance Architect came from benchmarks for hardware components and from application designs via two standard CASE tools.

Bank enlists neural net to fight fraud

BY KIM S. NASH
CW STAFF

PITTSBURGH — The holiday rush will soon be a fond memory for shoppers, but Mellon Bank Corp. will be dealing with the repercussions well into 1992. The bank's Mastercard and Visa cardholders rang up about 3 million transactions in November and December.

Those may be the two busiest months of the year for cardholders, but credit-card crime knows no season.

To fight back, Mellon Bank is testing a mainframe-based neural network designed to flash warning signs when it finds potentially fraudulent transactions. This year, the bank expects to swallow a billion $3 million fraud-related pill when it closes the books on 1991 financials, according to Philip Samson, vice president and portfolio performance manager. The 18th biggest bank in the U.S., based here, wants to curtail fraud losses in the coming years.

"We want to better protect our cardholders and ourselves," Samson said.

System too simplistic

Right now, credit purchases are monitored with an in-house-developed, rules-based system. The system triggers a request for positive customer identification if activity on the card is unusually high or if a purchase exceeds a preset dollar amount.

However, this method is too simplistic, according to Samson: "Fraud changes all the time. Criminals constantly try to outdo the banks," he said.

As Mellon Bank's resident expert on neural networks, Samson is overseeing a pilot of the Fraud Detection System (FDS), an application from Providence, R.I.-based Nestor Corp. FDS will "learn" to recognize irregularities.

Crime stopper

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COMPUTERWORLD
Prevention for performance cure
CONTINUED FROM PAGE 53

computers. "It let us hedge our bets on the budgeting side," Pierson said.

BGS Systems, Inc. in Waltham, Mass., showed its Crystal Performance Analyzer, which predicts DB2 performance and requirements. The tool allowed Southern California Edison to avoid computational gridlock in its new, mission-critical Customer Support System (CSS).

According to Bill Hargrove, senior research planning analyst at the utility, the old system for order processing, billing and accounts receivable — the one being replaced now by CSS and "the application that constantly drives us to the latest and greatest IBM machine" — takes up two-thirds of an IBM 3090/600J; it also uses 100G bytes of on-line storage and accounts for more than 1 million transactions per day.

Crystal found flaws
When Hargrove used Crystal to evaluate test code for a key CSS subsystem, some resource-gobbling flaws were discovered. "We found cases where we were executing sections of code many, many more times than necessary — like thousands of times," he said.

According to Hargrove, the modeling gave the utility company confidence in its resource planning early in the development cycle. "Without it, capacity planning would have been more of a crapshoot," he said.

BGS's Crystal Performance Analyzer is not a new product, but the company did introduce an adjunct product at CMG '91. Called Crystal DB2 Extractor, it automates the building of a model of a DB2 application by reading the DB2 Catalog and Plan Table for table, index and SQL access information.

Metron Systems, Inc. in Rockville, Md., made its U.S. debut of Athene at the CMG show. Athene is a capacity planning tool for performance forecasting in a variety of environments, including MVS, VMS and Unix.
Omegamon for DB2 tracks source of problems

BY JEAN S. BOZMAN CW STAFF

LOS ANGELES — Candle Corp. has found a way for users to watch how IBM DB2 relational databases use up their disk drive resources. An enhanced version of Candle's Omegamon for DB2 monitor, introduced in early December, allows users to observe the impact of individual SQL statements on mainframe disk drives.

The new Omegamon II for DB2 contains an Object Analysis module that shows I/O activity generated by specific DB2 tables and assigns that I/O activity to specific disk drives. "We're doing control block sampling of DB2 and MVS," explained Buff Jones, director of Candle's database solutions group in Houston. Users can use DB2 tools from Candle and other vendors to correct performance problems by moving DB2 tables and indexes around in the disk drive memory spaces, she said.

"This is a more granular look within DB2 itself," said Fred Joy, a senior research analyst at Meta Group, Inc. in Westport, Conn. "It gives database administrators the ability to look into a disk pack on which DB2 resides and also the ability to look into pools of memory." Performance problems can be identified down to the level of DB2 logical "threads," or individual requests, he said.

One beta-test site, Southern California Edison in Rosemead, Calif., has been using the enhanced Omegamon monitor for several months. The site has six copies of DB2, said John Gryharn, a senior systems programmer. "We stressed the product pretty well," Graham said. "This product helps you decide whether there is a problem — and which DB2 object is causing that problem."

At The Williams Cos. Information Services Division in Tulsa, Okla., the repair tool is another Candle product called Omegamon II for DB2, which is being shipped to customers, is priced from $35,000 to $61,500, depending on the size of the computer that hosts it. The package runs on IBM mainframes under MVS/XA or MVS/ESA operating systems and supports DB2 Version 2.2 and later releases.

Bank fights fraud with neural net

CONTINUED FROM PAGE 53

lar charge-card patterns, then rate the situation on a fraud possibility scale.

For example, the fictitious Joe Charger typically uses his Visa card twice a month, once at a restaurant and once at a local department store. Suddenly, Joe apparently starts running up four or five purchases over a week's time.

The next time Joe's card is passed over a shopkeeper's counter or his number is presented to an order taker over the phone, FDS will match current buying patterns against Joe's charging history and spic back either a flat denial or a prompt to ask for positive identification.

"The neural network can see patterns of activity a busy human can't," Samson explained.

Putting FDS to work

Plans call for the finished FDS to be set up on an IBM 3090 Model 600J mainframe at Mellon Bank's Pittsburgh data center. FDS will be tied into Visa's and Mastercard's authorization centers.

When a shopper presents, for example, his Mastercard to a merchant, the merchant transmits pertinent data to Mastercard, which sends it to the card issuer, Mellon Bank. FDS will then calculate the chances that this purchase is fraudulent and issue one of three instructions: accept, deny or refer. A referral means the salesperson must ask the customer for proof of identity.

"Cardholders aren't always cardowners," Samson said.

Although he would not say what the application cost, Samson claimed it did not break the bank's bank. The information systems budget for Mellon this year was $194 million, according to information supplied for the 1991 Computerworld Premier 100.

The pilot, which will be run stand-alone — unconnected to Visa or Mastercard — will be ready to roll in three months, according to Samson. He and two other IS people must first finish gathering actual credit-card records to feed into FDS. A month or six months' worth of real credit transactions by the bank's 1 million active customers will be the history on which FDS will draw to discern and predict criminal scams recorded in the subsequent two months. By the spring, the team should know whether FDS is worth installing wide-scale, Samson said.
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IBM’s reorganization could breathe new life into OS/2

BY ROSEMARY HAMILTON
CW STAFF

In the wake of IBM’s announced reorganization, some industry analysts and users said its restructured personal computer business could actually help the long-troubled OS/2 operating system.

“What I’ve heard is the stated direction of OS/2 will remain strong,” said Jack Blanchard, a senior consultant at Continental Bank in Chicago, an OS/2 user site. “OS/2 is still going strong in their minds, so we are relieved.”

Earlier this month, an IBM spokesman said the reorganization would have “absolutely no impact on OS/2” when asked if the operating system might be de-emphasized in the new unit.

He said the current OS/2 organization, which reports to Joseph Guglielmi, general manager of marketing and business development for IBM’s personal systems, will remain in place.

The spokesman said the OS/2 shipment schedule remains firm. A limited availability version was scheduled for release by Dec. 31; general availability is planned for March 1992.

“If it can only help” OS/2, said Scott Stein, an analyst at Technology Investment Strategies Corp. in Framingham, Mass., of the reorganization. Stein said the restructured unit will look to distribution channels such as mail order that could help promote OS/2 in new ways that were not pursued before.

Frank Michnoff, program director of desktop computing strategies at Meta Group, Inc. in Westport, Conn., said he also expects to see more flexibility in the way IBM markets OS/2.

“This could actually give them some more flexibility in pushing it forward in terms of pricing and bundling with hardware and alternative distribution channels,” Michnoff said.

One user said he still has faith in a message delivered directly by IBM’s James Cannavino several months ago. Cannavino is an IBM vice president and general manager of the Personal Systems line of business.

“We had a one-on-one with Cannavino, and I was very impressed that the man has the business under control,” said Carey Serf, manager of applied technology at Huntington National Bank. “He confirmed that IBM believes OS/2 is very important . . . and very high priority.”

Looking strong

At least some industry analysts feel that OS/2 will show respectable growth after IBM’s reorganization settles down.

OS/2 shipments:

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<th>Year</th>
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<tr>
<td>1990</td>
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<td>1991</td>
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<td>800,000 to 1 million</td>
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*Projected

Source: Meta Group, Inc.
CW Chart: Jerald Gossen

Aldus products arrive in seasonal time

BY CAROL HILDEBRAND
CW STAFF

Aldus Corp. bucked the holiday product announcement dearth with a spate of shipping products, plunking a trio of offerings down by the information systems chimney with care.

The Seattle-based company announced that Aldus Freehand 3.1 for Windows, Freehand 3.1 for the Apple Computer, Inc. Macintosh and PageMaker Database Edition have all hit the shelves.

Freehand 3.0 for Windows features a pasteboard-style work environment that lets users access tools, colors and layers via use of floating palettes. Becky Barlow, a prepress specialist at Image 4 Prepress in Baton Rouge, La., said the Windows version was a help in converting data brought in by clients from non-Macintosh environments.

"It’s very friendly to Macintosh Freehand," she said. "As an output service, people come to us needing PC output, and we sometimes have a problem converting the software. Having Freehand [for Windows] is very compatible."

Freehand 3.1 for the Macintosh shipped simultaneously with its Windows-based cousin. It includes full support for Apple’s System 7.0 operating system, as well as a pressure-sensitive capability for the drawing tool that lets a user specify line widths without going to the line style window.

Bob Bohnannon, a geologist with the U.S. Geological Survey in Menlo Park, Calif., said that he has encountered some printing problems in the pt. "I use rather big files," he said, "so any-thing they do is going to help." Barlow said the new printing capabilities allow her to print from preprint mode documents with any links in them. "That’s a pretty major accomplishment," she said, "because we try to print from preprint as much as possible."

PageMaker Database Edition. PageMaker 4.0 for Windows can now be linked to database management systems via PagePrint, a spreadsheet-like interface developed by Pagemaker Software Corp. Users can query, retrieve and format data from database files and move the data into Pagemaker files by means of Database Edition.

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* Includes ads placed within Executive Report or Product Spotlight sections and premium positions.

Please Note: Executive Report topics will be announced one month prior to ad closing. Your sales representative will provide you with specific information on each topic.
Avis cruising with Wizard IV into airports, training centers

BY ELLIS BOCKER
CPW STAFF

GARDEN CITY, N.Y. — Wizard IV, the fourth iteration of the Avis, Inc., car reservation system and the first to use distributed, intelligent workstations, is on track despite expected delays, according to a company spokesman.

"There have been slight, anticipated delays with cutovers but no major problems," the spokesman said. He added that Wizard IV is already in production at Avis counters at John F. Kennedy International Airport in New York.

Normal cutovers are scheduled for Avis' New York training center, Newark and LaGuardia airports and Avis locations in Manhattan.

Earlier this year, Avis began a replacement program for the 2,200 dumb terminals now in use at its domestic retail counters. Avis tapped Unisys Corp. to replace the CTOS workstation for the first 100 systems in the $10 million U.S. portion of the project, which is expected to be completed by late 1992.

CTOS, an integrated systems and management-based network operating system, was created by Convergent Technologies, Inc., which Unisys acquired in 1988. Using the extensive Systems Network Architecture capabilities of the CTOS operating system, Avis' agents will be able to connect to Avis' IBM 3090 mainframe in Garden City or function independently if this network is disrupted.

Progress Software Corp. in Bedford, Mass., is under contract to Unisys to develop applications for Wizard IV using Progress' fourth-generation language, which is compatible with software industries.

Agents on Wizard IV will be able to access multiple databases, including micros, sold WTB III system required agents to use separate terminals for each 2527 and, a slow and expensive process.

Alpha moves Four-ward
Firm introduces text OS/2 version, upgradable

BY CHRISTOPHER LINQUIST
CPW STAFF

BURLINGTON, Mass. — Alpha Software Corp. has announced the release of the latest version of its Alpha Four relational database as well as a text-based OS/2 version of the same product. Sales of Alpha Four have grown from 8,000 copies two years ago to 175,000 copies last year, according to the company.

Alpha Four Version 2 is billed as a relational database for non-programmers. New features include network support and a Powerscript scripting language that allows more complex applications to be developed than were possible with the previous version.

Users develop applications by developing an "outline" of the required application and then recording macros and customizing menus and screens. Programming is not required because macros can be recorded as the user walks through various menus. Lists of available commands can be called up with a mouse click.

Alpha Four also includes a report writer that lets the user "paint" a report and then it will appear when printed.

No conversion needed
The product supports a Nethos-based network. It has the capability to read Borland International, Inc., Delphi III and IV and compatible files directly without any conversion.

Pricing for both the DOS and OS/2 versions is $549 for a single-user version.

Local-area network packs are available in units of three, five and 30, priced at $749, $1,249 and $4,995, respectively.

The product is scheduled to be available this month.

Daly
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vendors are making the nascent pen-based computer market, where the time does come to make a choice, it's a good bet you won't buy a domestic model, but a Japanese one.

Why? While U.S. companies yammer on, Japanese giants have already launched four handheld, pen-based machines that have gained a fair measure of success. Just as Sony hit the weight and price points with the Walkman, they have done the same with the Palmtop.

The tidiest little machine is already shipped 5,000 to 7,000 units per month, according to "Asia Pacific Update," a newsletter based in Menlo Park, Calif.

Conversely, domestic sales of pen-based systems are slow. Grid Systems sold only 10,000 machines in 1990, company President Alan Lefkof says. When the Japanese companies are content with the success in their own countries, they will launch international versions. Sony, for instance, is expected to introduce its Palm in the U.S. next year, and the others will follow suit.

U.S. companies aren't lagging. They may not be as successful as the Walkman, but they have them on the market. For example, Computervision, which released CADDS-5 in June, was late off the mark.
Alternative local telecommunications carrier Metropolitan Fiber Systems, Inc. (MFS) recently announced an E1 access service it is making available to companies located in MFS' 12 U.S. service areas. The service targets international companies requiring E1 delivery service locally in the U.S., according to the company. E1 is the European version of the U.S. T1 standard.

Northern Telecom, Inc. is expanding further into Asia with a Tokyo laboratory that will develop telecommunications products tailored to Asian needs. The lab will be part of Bell-Northern Research, a Northern Telecom subsidiary. It will work with Asian firms to incorporate and take advantage of technologies used in the region.

Electronic mail from both public and private networks will be brought to portable personal computers over wireless links as part of an alliance between Ericsson GE Mobile Data, Inc., Research in Motion and Anterior Technology, Inc. Anterior, based in Menlo Park, Calif., will provide its Radiomail gateway between Paramus, N.J.-based Ericsson's Mobitex public mobile data network and other E-mail systems.

Pathworks beats out Netware—barely

BY ELISABETH HoriWITTt OF STAFF

MALVERN, Pa. — Faced with the choice between Digital Equipment Corp.'s Pathworks and Novell, Inc.'s Netware as its companywide network operating system, Smith Industries Corp. chose Pathworks.

However, the aerospace company still has some reservations about DEC's VAX-based local-area network server strategy, according to Steve Ruger, information systems manager at the company's Smith Industries Ltd. division.

In particular, Smith Industries would like to implement a distributed departmental LAN server strategy without having to implement "a Microvax in each office," Ruger said.

Two years ago, the firm had eight personal computers and 10 Apple Computer, Inc. Macintoshes on its Netware LAN. Six months later, that number had grown to about 65 PCs, 25 Macintoshes and a few DEC Ultrix workstations, Ruger said.

Users were already accessing corporate files and applications on a DEC VAX, so the company came to see its Netware server as "yet one more system to maintain," Ruger said.

The firm began looking for a network operating system to turn that VAX into a combination corporate host, LAN server and gateway to Smith's X.25 packet-switched network. One major reason the company rejected Novell's Netware-for-VMS product was that it grew tired of waiting for Novell to introduce Macintosh support, Ruger said. "I've come to the conclusion that Novell's commitment to Netware on VMS is tepid at best," he added.

Smith Industries beta-tested Pathworks' predecessor, DEC's Personal Computing Systems Architecture, and found it "terrible on the first pass," Ruger said, although he added that it "the new one was fine."

After testing Pathworks' Macintosh support for over a year, the firm went on to implement the product across its 200-person organization.

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U.S. WERE ACCESSING corporate files and applications on a DEC VAX, so the company saw its Netware server as just another system to maintain.

Netware — barely

BY MICHAEL FITZGERALD OF STAFF

ANN ARBOR, Mich. — When the University of Michigan's 322-pound All-American tackle Greg Skrepenak heads to the weight room, his first stop is the strength and conditioning program that calculates how well they met their goals. The program gives treatment schedules. Godick says the athletic department's business office just replaced an AT server file system required Macintosh support, but most coaches don't use it," Godick said. "They're into handwriting. It's their loss."

Given Michigan's 2-8 record in the Rose Bowl since 1970, Godick could be more right than he knows.

Continued on page 62

In the strength and conditioning room, each athlete is assigned a Diagnostics, which is carefully tracked by graduate assistants, who plug the information into a program that calculates how well they met their goals. The training room tracks the progress of injured athletes and gives treatment schedules.

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Token Ring product ready

Cabletron's management module to allow traffic analysis, port control

BY JOANIE M. WEISE CW STAFF

ROCHESTER, N.H. — Cabletron Systems, Inc. last week started shipping a Token Ring management module for its smart wiring hub that gives users extra layers of insight into their Token Ring networks.

The move could affect the 35,000 Token Ring hub ports the vendor said it has shipped since it announced Token Ring support in September 1990.

The object-oriented Token Ring Management Module operates with Simple Network Management Protocol-based management packages, including Cabletron's own Remote Lanview and Spectrum offerings. It provides more network information to help users better analyze traffic patterns, manage bandwidth and control each individual Token Ring port wired through Cabletron's intelligent hub.

For example, users can calculate the percentage of bandwidth use on any given local-area network or individual workstation, said Tedd Frechette, Cabletron's Token Ring product manager. Also, he said the module maps a workstation hardware address to the hub module port, so that a network manager seeing errors on a given node knows which port to shut down.

This "helps us narrow problems down very quickly," said Graham Morrison, project leader of LAN services at Blue Cross/Blue Shield of North Haven. The insurance company has been beta-testing the enhanced management module since August.

Morrison said the package allows the firm to look into blueprints of its 1 million-sq-ft facility — which he expects to double in size — so that "granularity down to the node. When we do have to send someone out on the floor, we're able to show them exactly where to go and which closet the device terminates into."

Morrison said he would like to see more features added, including analyses of which nodes communicate with each other "to aid in building bridging tables." He added that while Cabletron's hub supports the management of both Ethernet and Token Ring networks, the management is not yet integrated.

Cabletron's $4,995 hub module kicks off a series of expected Cabletron management product announcements to leverage the power of reduced instruction set computing (RISC). The Intel Corp. 6800 RISC chip is "faster than what competing hub vendors are using on their products," observed Charlie Robbins, director of communications research at the Aberdeen Group, a Boston consultancy.

According to Frechette, there is untapped potential in the 32-bit, 25-MHz processor that he said "will allow us to add future enhancements."

Unisys adds SNA capabilities to CTOS workstations

BY ELLIS BOOKER CW STAFF

BLUE BELL, Pa. — Continuing its strategy of being "bluer than blue" when it comes to support for IBM's Systems Network Architecture (SNA), Unisys Corp. earlier this month introduced the first of a suite of new SNA products for its CTOS-based commercial workstations.

CTOS, an integrated, multi-tasking message-based operating system, was created by Convergent Technologies, Inc., which Unisys acquired in 1988.

Among the dozen new elements in the CTOS Client/Server SNA product suite are facilities for exchanging electronic mail with IBM's host-based office automation systems, as well as a service for managing remote workstations with IBM's own host-based Netview network management system.

According to Unisys, well over half of the 1 million-plus CTOS workstations shipped by all vendors to date are connected to IBM mainframes. For its own CTOS sales, Unisys claims the proportion of IBM accounts is even higher — about 80%.

The products introduced earlier this month include the following:

- CTOS OFIS Access Professional 1.0 links CTOS OFIS mail and IBM's host-based Professional Office System/400 systems run-ning Officevision/DM.

Other software products enable CTOS systems to exchange mail with IBM's Cross/Blue Shield of Connecticut

Mail Transfer Protocol and X.400.

- CTOS SNA/NM Entry Point Services 1.0 allows CTOS LANs to be managed from an IBM host under Netview. CTOS SNA/NM Distribution Manager 1.0 uses Netview's own Distribution Manager (Net-view/DM).

A third element, CTOS SNA/NM Distribution Services (SNADS) 1.0, implements IBM's own SNA architecture, extending SNA network store-and-forward capability to a CTOS network.

As a statement of direction, Unisys stated its intent to support IBM's Systems Application Architecture Common Programming Interface-Communications and to extend support for IBM's Advanced Peer-to-Peer Networking architecture. All the products, with the exception of CTOS SNA/NM Distribution Manager, are available immediately. The Distribution Manager will be available in June 1992.

Pathworks beats out Netware — barely

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The VAX host running Path-works acts as a file server for all PCs and Macintoshes and backs up all LAN files overnight. The VMS built-in security system provides better control of file access than the Novell system, according to Ruger.

However, one problem is that Pathworks takes up a lot of PC memory, which leaves insufficient room for some applications — particularly on PCs that are also running Microsoft Corp.'s Windows, Ruger said.

Another glitch is that printer services continue to stall "at least once a day" because of print queue problems, he added.

One of Ruger's biggest gripes about Pathworks is that DEC still does not have adequate third-party support in place.

"Consultants we talk to flash their Novell certification but don't even know what Path-works is," he said. A DEC spokesman said the firm is expanding its third-party value-added reseller network.

Ruger is also impatient for a DEC Ultrix version of VAX/ Hostmail services — particularly those that allow electronic mail and file-sharing among users on distributed LANs. DEC's current Ultrix Pathworks product supports only local LANs, a DEC spokesman said.

Ruger also balked at DEC's suggestion that he buy either its VAX-based All-In-1 office-automation system or a separate X.400 E-mail system to support E-mail exchange across PC LANs. Both products are too expensive.

Ruger is now evaluating PC LAN-based E-mail systems such as Lotus Development Corp.'s CC:Mail or Microsoft Corp.'s Exchange Mail.

"We can probably use PCs as E-mail servers for $3,000 or $4,000," Ruger said.

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MANAGER'S JOURNAL

It all adds up for Young & Rubicam

By Sally Cusack

Sometimes it's better to have nothing than something. At least that was the case for Young & Rubicam, Inc., one of the world's largest advertising agencies. While many state-of-the-art information systems shops are struggling with standards implementation and downsizing dilemmas, New York-based Young & Rubicam says it may have a head start on computing in the 1990s because it held back on major technology initiatives until the mid-1980s.

"Transaction processing doesn't handle what our businesses are really about," says Nicholas Rudd, senior vice president and chief information officer. "We are about combining the various products we make with very personal client relationships."

Young & Rubicam was actually a high-tech pioneer in the back office, installing a Burroughs Corp. mainframe some 30 years ago to handle number-crunching, bills, invoicing and the like. But it wasn't until the mid-1980s that systems could really be applied to the true nature of Young & Rubicam's business. The introduction of personal computers and front-office architecture was the company's water shed for implementing truly meaningful work enhancement techniques via computers.

Given the global nature of the organization, it was imperative that any IS undertaking be shaped with an eye toward international needs. Young & Rubicam employs 12,000 people worldwide, and billings are split evenly between the U.S. and overseas operations.

So in 1985, Howard Maynard, a 23-year IS veteran and former director of information services at Coors Corp., short-lived office systems business, joined Young & Rubicam as director of MIS.

"I was brought in to give an international perspective," Maynard says. "We were spending a lot of money to run a data center, and people weren't happy."

Maynard and his staff made a decision that turned out to be ahead of its time. They outsourced both the development and processing of their back-office mainframe applications to Donovan Data Systems, a New York-based vendor specializing in outsourcing for the advertising industry. Outsourcing helped clear the way for Young & Rubicam to concentrate solely on ways to leverage technology specific to its five business divisions: advertising, public relations, direct marketing.

New user group ponders outsourcing question

By Clinton Wilder

Whatever a new technology or management trend going, the birth of a user group will surely follow. So it is no surprise that the first multi-industry user group has been formed for companies that have outsourced part of their information systems function — or are thinking about it.

The Vendor Partnership and Outsourcing Interests Group, based in Sherman Oaks, Calif., is the brainchild of two veteran Southern California IS consultants, Gene Sheiniuk and Barry Wiegler. Sheiniuk and Wiegler, founders of Key Consulting Group, Inc., also in Sherman Oaks, have teamed up with IS management heavy- weight DuWayne Peterson to co-sponsor the user group. Peterson, the recently retired chief information officer at Merrill Lynch & Co., is now an independent consultant in Pasadena, Calif.

The group has four corporate members so far. Membership is $15,000 per year, which buys two conferences per year, research studies and networking opportunities with other companies that have undergone the outsourcing experience.

In the same room

"We will get people who haven't outsourced in the same room with those who have, and they can at least find out what they shouldn't do," Sheiniuk said.

Among the possible outsourcing issues to be covered are the areas of greatest potential payoff by outsourcing, potential obstacles and trouble spots, experiences with specific vendors and all-important contract issues. "We want the group to be the catalyst that helps members help each other," Wiegler said.

Outsourcing vendors are not eligible for membership but will be invited to give presentations. The group's sponsors do not want members deluged with vendor sales pitches; however, members' names are kept confidential because "they don't need more vendors beating down their doors," Wiegler said.

Wiegler and Sheiniuk formed Key Consulting in 1983 after long careers in consulting and IS management. Wiegler managed systems development at Security Pacific Corp. in the 1960s; Sheiniuk is a former IS chief at Imperial Bank.

The $15,000 membership fee is "not insignificant," Wiegler said, "but companies can spend many times that with a consulting firm deciding whether or not to outsource."

Member companies can designate two representatives. In most cases, that would be the CIO or equivalent and another manager in IS, although the group encourages participation by chief financial officers and business executives. The group's first meeting is tentatively scheduled for March 1992.
It all adds up for Young & Rubicam

CONTINUED FROM PAGE 63

sales promotion, sales advertising and design and corporate identity management. "The other half of my assignment was to focus on front-office applications that would be viable to our business," Maynard says.

Rudd and Maynard have worked closely together to integrate strategic planning for the firm, articulating strategies for both technology and management of information as applied to the business.

As an example, Young & Rubicam’s Direct Marketing Division can do the equivalent of point-of-sale data collection in television advertising, along with preparing commercials.

With a magazine client, the agency prepares a television commercial — with an 800 number for subscriptions — to run on various channels at specified times. Phone calls start coming into the telemarketing agency, which operates 24 hours a day to accommodate different time zones.

Young & Rubicam has now implement ecology that allows tracking data to show up on the account executive’s desk the next day. This would include information such as when the greatest number of calls were placed and the demographics and number of orders placed.

Using this type of information, an account executive can fine-tune the process if necessary and immediately correct any situation.

Given the highly flexible and fluid nature of the business, Rudd stresses the importance of providing each business unit with technology that meets its individual needs.

For example, Young & Rubicam’s design company relies heavily on Apple Computer, Inc. Macintoshes, while the public relations end of the business — Burson Marsteller — has been functioning as a worldwide network using Digital Equipment Corp.,’s Decnet architecture. There is a wide variety of desktop equipment used by the advertising division.

And while diversity and freethinking is encouraged, it is important that the units work together as partners when it is in a client’s benefit to do so, Rudd says, pointing out that major clients often use more than one of Young & Rubicam’s services.

Hence the company’s mission to establish a single worldwide network link among all of its desktop systems. At present, the divisions rely primarily on fax machines to transmit messages and material across boundaries and oceans.

The company uses multiprotocol routers for linkups in the U.S., and Integrated Services Digital Network dial-up digital technology in Europe.

Global frame relay

"We will be experimenting with frame relay here in the U.S. next, and we will eventually offer it on a global basis," Maynard says. The goal of the new environment is to allow people to perform loosely structured, very flexible tasks.

Maynard says that since the company has not been "bottled" by an installed base of older technology, it can go directly to the new computing paradigm of versatile desktop environments and open network architecture.

The biggest change, however, is going to be in how people will work when free to use computing, Rudd says. In 1985, only 10% of the company was exposed to computers. Today, that has grown to between 30% and 40%, and by 1995, all employees are expected to be computer-literate.

"We are designing and engineering cultural changes that will allow our professional services people to take advantage of technology," Rudd says. "We have to help Young & Rubicam become a learning company."

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Global frame relay

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Company snapshot

Founded in 1923 and based in New York, Young & Rubicam employs 12,000 people in 299 offices in 52 countries.

In 1990, worldwide billings were $7.5 billion, and gross income topped the $1 billion mark for the privately held company.

The firm has five main operating divisions:

- Young & Rubicam Advertising.
- Burson-Marsteller (public relations).
- Wunderman Worldwide (direct marketing).
- Burson-Marsteller (public relations).
- Landor Associates (design and corporate identity management).

Chairman and CEO: Alexander Kroll
President: Peter A. Georgescu
Chief information officer: Nicholas Rudd

DECEMBER 23, 1991/JANUARY 2, 1992
**Firms take tips from high-tech testing**

**How am I doing?**

**Top execs can benefit by asking questions like these, says the National High Tech Group — starting with the man (or woman) in the mirror.**

**Stage (average age of company)**

- **Concept** (1 day - 12 months)
- **Seed** (3 months - 12 months)
- **Product development** (12 months - 48 months)
- **Market development** (24 months - 48 months)

**Questions to ask**

- **Have we sketched out a simple product development plan, with resources and a loose timetable?**
- **Have we mapped out a detailed schedule, listing milestones and resources for money and technology support?**
- **Does the product development plan address each part of the design, with focused plans for software, hardware, physical appearance design, diagnostics, documentation, quality control and IP customer support?**
- **Is the formal plan, stating priorities for subsequent enhancements, new releases and the next product, developed and approved by all departments?**

**Source**: National High Tech Group

**It’s not hard to fix, but it can be hard to recognize,** she said. Since 1990, Suchors' group has evaluated 30 ventures in the U.S.

**Taking measures**

The process it uses is based on the Bell/Mason Diagnostic, a 700-question method for measuring risk and predicting growth of emerging technology companies. Coopers licensed the diagnostic last year from its inventors — Gordon Bell, an industry notable with 30-plus years in the technology business, and Hedi Mason, a former marketing strategist at Digital Equipment Corp.

Bell also sold the method to his alma mater, DUC, where he worked for 23 years. DEC is using it to assess potential firms in which to invest.

The diagnostic evaluates 12 dimensions of a start-up, such as cash situation, management team and viability of product (see chart page 66). Depending on the wealth of these dozen areas, a young company can be in one of the four following stages:

- **Concept**: Founders lay down the logic of their idea and sketch a business plan.
- **Seed**: With detailed product specifications and a fleshed-out business plan.
- **Product development**: An original equipment manufacturer (OEM) has begun selling its product.
- **Market development**: The firm is busying itself with sales and marketing.

**Continued on page 66**

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**Welcome to New Blue: Execs address restructuring**

**By Kim S. Nash CW Staff**

**NEW YORK** — IBM's executive committee took to the podium at an analyst's briefing earlier this month to practice what may be its stock in trade for a long time to come: imparting information and answering questions about the reorganization.

In fact, their morning-long presentation performed two functions, serving not only as a briefing but also as a trial run for IBM's annual shareholders meeting.

"I was surprised and impressed by their candor," said Ulric Weil, president of Well & Associates, a consulting firm based in Washington, D.C. However, he noted, reaction following the conference focused—unsurprisingly — on the grim economic realities imparted by the top IBM executives, rather than on the unprecedented amount of frankness on their parts that allowed analysts to walk away with a barrage of disconcerting information.

During the conference, several members of the executive committee had the following to say on several of the key issues concerning industry observers:

- **On entering new business arenas:**
  - "We're moving aggressively into the original equipment manufacturer's marketplace..." — President Jack Kuebler
  - "Yes, we're considering it — and aggressively." — Akers

- **On whether IBM will look beyond its own borders for talent to fill top positions at new units:**
  - "Yes, we're considering it — and aggressively." — Akers

- **On how long the ambitious change in business opportu-**
  - "If we're going to..." — Senior Vice President Frank Metz

- **On the coming change in large systems pricing:**
  - "In the past, IBM hardware prices included many support services because customers wanted them. Well, the market has changed..." — Senior Vice President Frank Metz

- **On financial disclosure by the newly autonomous IBM units:**
  - "We will report [the units'] respective financial results..." — Senior Vice President C. Michael Armstrong

- **On the traditional "no-lay-**
  - "Employment security, over time, will become the responsibility of our new business general managers." — Akers

- **On on role of alliances:**
  - "Simply stated, alliances are fundamental to delivering solutions to our customers and growing our revenue." — Senior Vice President C. Michael Armstrong

- **On the traditional "no-lay-**

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**COMPUTER INDUSTRY**

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**INTERNATIONAL BRIEFS**

**Pacific overtures**

- Knowing how to do business in the Pacific regions may be a must in years to come, and Apple Computer, Inc. is not leaving anything to chance. In mid-January, the firm will host its third annual forum aimed at teaching Macintosh developers how to enter the critical strategic market. Anticipatory, distribution issues and local partnering will be discussed as Apple focuses on five regions: Japan, the Far East, Canada, Australia and Latin America.

**Subscriber drive**

- Spain's state-controlled Telefónica de España SA will invest $285 million next year to develop its mobile telephone systems, which account for an estimated 80% of the country's mobile phone market, the firm said. The carrier expects to see its year-end subscriber tally at 110,000 — up from 100,000 at the year's start. Projections are for 210,000 users by the end of 1992.

**Heading south**

- Bachman Information Systems, Inc. is off and running in a new direction: south of the border. Choosing as its new allies three companies with proven clout in selling and supporting IBM products that complements Bachman's software offerings, the Burlington, Mass.-based firm signed distributorship agreements in Argentina, Mexico and Venezuela.

**West meets west**

- Munich, Germany-based Siemens/Nixdorf Informationsysteme AG last week chose Santa Clara, Calif.-based Tandem Computers, Inc. subsidiary Ungermann-Bass, Inc. as its major local-area networking OEM partner. Officials at both firms said Ungermann-Bass rode to victory over some 30 companies contending for the contract on the technological strength of its switching-based hub architecture.

**On the rise**

- According to market forecasts by several experts in China, the mainland computer market is expected to grow steadily during the Eighth Five-Year Plan (1991 to 1995). Total demand for computers during this period is expected to exceed 10,000 units.
Firms take tips from high-tech testing

CONTINUED FROM PAGE 66

business plan in hand, founders seek capital from outside investors.

* Product development: Development team is hired; members test specifications and build alpha- and beta-test product versions.

* Market development: Firm ships product to primary target markets and focuses on breaking into secondary sectors.

In a daylong question and answer session, executives identify the strong areas and the areas where the company may be falling down. "You get a view of where your company is right now, measured against an ideal," Sachors said. That's a good idea, considering how an angry recession is ripping into U.S. business. High-tech companies could be particularly vulnerable to economic slowdowns. Business failures in California and New England, traditional technology hot spots, have climbed sharply. The New England region posted the biggest regional increase in business failures for the period — up 82% from about 1,700 in 1990 to 3,100 in 1991, while the Golden State shot up 71% from 4,800 to 8,200, according to The Dun & Bradstreet Corp. Other companies can't decide whether they're researchers or product makers, he added — which is a fate...
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High achievers retrace their steps

BY JILL VITIELLO
SPECIAL TO CW

When Bill Osl reluctantly took a promotion into the pioneer Consumer Product Business Unit at AT&T in 1983, he had no idea that this "frustrating, painful experience" would turn into a pivotal career move for him. Yet in hindsight, Osl, who is now vice president and division executive of information management services at AT&T, says the skills he acquired in the course of performing a job he neither wanted nor enjoyed were key to his success at the company.

Osl and eight other top information systems executives agreed to talk about some of the significant turning points in their careers and lessons they have picked up along the way, in the hope that their experiences may provide some helpful insights for others in the field.

Personal stats:
- Richard Koeller
  - Vice president, information technology
  - Whirlpool Corp.
  - 29 years in IS field; 2½ years at company
  - Bachelor’s degree in finance

Turning point: Back in the dark ages of computers in 1961, I was working in a steel mill. Out of intellectual curiosity, I wrote a math model that would provide full process control of an $80 million steel-rolling mill. I figured I knew more about rolling steel than the programming consultants, and as it turned out, I was right. The company used my program, not the consultants. That became a turning point in my career. A high-level manager took an interest in my programming work and before I knew it, I was in the information technology field, where I’ve stayed ever since.

Difficult passages: Making the transitions from individual to manager to officer is not easy. I compare CIOs to 19th-century sheriffs. Society let us do our own thing while the frontier was new. Now they’re asking us to put down our guns and run for mayor. It’s a difficult step, yet it’s necessary if information technology is to grow as it should and re-engineer business.

Personal stats:
- Elaine Bond
  - Senior vice president and senior consultant, IS area
  - The Chase Manhattan Bank NA
  - 35 years in IS; 11 years at company
  - Bachelor’s degree in mathematics

Turning point: Two back-to-back assignments at IBM were instrumental in my career. First, I ran a research and development group in which I had the opportunity to run my operation as if it were my own company. Then, I was asked to become the head of executive resources, reporting to the chairman. In this role, I had the chance to learn the company from the very top of the organization.

Difficult passages: The worst time in my career is what I call a “dead spot.” I was doing a job I enjoyed with a fun group of people, but I was not in the heartbeat of the company. When I realized I was comfortable but not growing, I left that job. Sure enough, the area was phased out because the work no longer fit corporate needs.

Personal stats:
- Garret Morris
  - Corporate information systems

Turning point: Garret Morris, an actor who was on the show “Saturday Night Live,” used to imitate a baseball player whose trademark slogan was: “Baseball’s been very, very good to me.”

Well, computers have been very, very good to me.

The first computer I programmed was a vacuum tube computer back in 1959 at the University of Michigan. Now, the technology that took up an entire room exists on the corner of one small chip.

Without a doubt, the best move I made was in coming to Kmart. I joined at a time when the company was launching the largest retail automation program in the world with a commitment of more than $1 billion. It was a revolutionary technological change in support of customer service, and I was lucky enough to be one of the architects of that change.

Lessons learned: I’ve learned the value of liberal arts education. While I was a graduate student in engineering, I taught undergraduate psychology, having been prepared by many semesters of undergraduate work in that field.

This background has provided models for the behavior of individuals, groups and organizations that have helped me learn to manage people and departments and contribute to the management of corporations.
Turning point: My most pivotal career move was when I decided to leave the education field and go into data processing. I loved my work as a high school biology teacher, but I wanted a career with more competition and the chance to earn more money. So I left teaching, took a cut in pay and went to work for a data processing company.

Lessons learned: The worst mistake anyone can make is to chase titles and rainbows. I don’t believe you can plan your career; you’ve got to be open to opportunities as they arise. Three of the jobs I held didn’t exist 90 days before I accepted them. And I’ve taken jobs at less pay and lower status when I saw that they would offer a chance to increase my technical knowledge.

Turning point: When I graduated from college, I had three offers for entry-level reporting jobs; I took the one that paid the least but was with the most exciting company — Dow Jones. Eventually, I worked my way up to become New York City bureau chief, a job I held for seven years.

Then one Friday afternoon around 4:00, the managing editor came in and asked me if I’d like to take over the wire operation on Monday morning. Dow Jones was just beginning to get into electronic information retrieval at that time.

If I’d had more than a weekend to consider the job offer, I probably would have turned it down. It turned out to be a hell of a move. The business just exploded, and my career grew with it.

Lessons learned: If I’ve made any mistakes along the way, it would have to be in not learning a foreign language. I never dreamed I’d be involved in international work, but now I am.

Turning point: Each career move I’ve made has helped me build a cross-functional perspective that’s been valuable in all my assignments. I have a marketing and international background, but Xerox was my first job in the information systems field. Here, I’ve learned the importance of managing information, a fact other managers without IS experience have yet to comprehend.

Difficult passages: I began my career in consulting straight out of Harvard’s MBA program. Looking back, I can see that I went into consulting far too early in my career. At that stage, one has no grasp of the nuances of business or the intangible factors that successfully create and manage change.

Lessons learned: I’ve learned the worst thing anyone can do is stay in one place too long. About 12 or 15 years ago, I was having almost too much fun. I had settled into a comfortable job and was managing a good staff which bore a full project load. I looked forward to 20 years there with no change and hoped to retire from that position. But I found out the world won’t hold still for you.

Things began to change around me, and I decided to make a major move. I became a member of the University of Michigan business school faculty and revitalized myself professionally. It was an exciting change, and I loved the place. I regained my perspective and went back into industry.
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Minimum requirements include:
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DECEMBER 23, 1991/JANUARY 2, 1992

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This position will analyze, develop and coordinate activities related to ensuring the reliability, availability and serviceability of VAX® and its related products. Installation or upgrade of new and existing products, development of procedures and documentation to enhance the usability of software products is additional responsibilities.

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Resumes can be faxed to (609) 378-9699, or sent to: Craig Parker, Battelle, Pacific Northwest Laboratory, P.O. Box 1505, Richland, WA 99352. We are an equal opportunity employer, U.S. citizenship and college degree required.
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A consistent volume of high-quality leads is why we advertise only in Computerworld’s Marketplace Pages.

A distributor specializing in new and reconditioned DEC equipment, Compurex Systems offers end users a complete product line of systems, disk drives, and peripherals. Since everyone with something to sell or looking to buy is a potential customer, President Mark “Rocky” Ostroff and Partner Christopher Pernock need to reach a broad base of prospects in virtually every industry. To gain the greatest exposure every week, they advertise in Computerworld’s Marketplace Pages.

“While we’re located just south of Boston in Easton, MA, we service end users both nationally and internationally. So getting the Compurex name out requires the most broad-based classified advertising vehicle available. We know the classified section is what people looking to buy or sell read first, and Computerworld, with its large subscriber base and distribution to a wide variety of professionals, lets us broaden our horizons throughout the world.

“Specifically, we need to tell every potential customer, particularly the Fortune 500, about all the options open to them. About our programs for buying, selling, trading, leasing, and cosignments. About substantial cost savings available with fully warranted reconditioned DEC equipment. About our competitive pricing structure. And about how we stand behind everything we sell to ensure customer satisfaction. Looking at the steady stream of quality calls we receive every week, we know our advertisements in Computerworld’s Marketplace Pages reach all the right people. It’s definitely where our classified message gets delivered to the largest and most diverse audience of potential customers.

With company sales having increased 35 percent annually over the past five years, it’s critical that we build on that momentum by continuing to generate serious leads from our very best prospects. A consistent volume of high-quality leads is why we advertise only in Computerworld’s Marketplace Pages. And, based on results, our classified advertising in Computerworld’s Marketplace Pages more than pays for itself. So that’s where our classified message will stay to keep the calls coming in - week after week.”

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The right ways to cut costs

BY JOEL B. GILMAN

If you are like many information systems professionals, you are probably lawyer-averse. Chances are, you prefer to steer clear of all members of that over-paid profession, unless a deal goes sour and you need a brief-slinger to fight things out for you in court. That’s a good way to save yourself into the poorhouse. A

Regardless of where you seek help, there are things you can do to keep a lid on legal costs.

First of all, bear in mind that anything you can do to save the attorney time will save you money. For example, whenever you have a meeting with your attorney, make a list of specific questions you want to have addressed. This way, all of your concerns can be covered more quickly, but with full attention given to them.

Cost control

Another way to keep costs under control is to simply accept the fact that the attorney does not know your situation as well as you do and will need to ask you a lot of questions. The questions may seem obvious, irrelevant or pointless, but let the attorney direct the conversation and answer each question asked — no more and no less.

The most efficient way for cause attorneys learn by a process of collecting and filtering information. For example, if you don’t understand the answer to the first question, you should ask additional questions to clarify the specific points you don’t understand. Many clients will attempt to “clarify” things that don’t need to be clarified, responding with an encyclopedic answer that is impossible to assimilate and may or may not address the specific question asked. While this may seem like a more helpful response, you are probably just making the process longer and running up your costs.

Gilmans an attorney and mediator, practicing computer law in Seattle.
A distributor specializing in new and reconditioned DEC equipment, Compurex Systems offers end users a complete product line of systems, disk drives, and peripherals. Since everyone with something to sell or looking to buy is a potential customer, President Mark "Rocky" Ostroff and Partner Christopher Perron need to reach a broad base of prospects in virtually every industry. So they advertise in Computerworld's Marketplace Pages every week.

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"Specifically, we need to tell every potential customer, particularly the Fortune 500, about all the options open to them. Looking at the steady stream of quality calls we receive every week, we know our advertisements in Computerworld's Marketplace Pages reach all the right people. And, based on results, our classified advertising in Computerworld's Marketplace Pages more than pays for itself. So that's where our classified message will stay to keep the calls coming in - week after week."

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Return this form and advertising material to:

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**Involvement in the Purchase of Computer Systems by Computerworld Subscribers in User Organizations***

<table>
<thead>
<tr>
<th>Category</th>
<th>Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Computers</td>
<td>69%</td>
</tr>
<tr>
<td>MiniComputers</td>
<td>61%</td>
</tr>
<tr>
<td>SuperMiniComputers</td>
<td>58%</td>
</tr>
<tr>
<td>Mainframes</td>
<td>42%</td>
</tr>
</tbody>
</table>

*Source: STAT Resources Profile of Computerworld Subscribers, November 1987

To place your ad, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).
News flash: Xmas spirit missing, Grinch on lam

As the new year dawns, away in the data center sits a threadbare Christmas tree by a darkened menorah. After a season in which the Grinch may have succeeded in heisting the holiday spirit, there was not much in the way of high-tech booty waiting for many about a little more honesty about products in general?

Rick Christjansen, manager of administrative and technical support at Manville Corp. in Denver, suggested, "Apple should deliver products in general?"

"Open" open systems, products tailored to real needs, technology that will help them do more with less and better communications across the board. Here is a sampling of users' aspirations for 1992:

Quality is job No. 1
Tom Loane, vice president of IS at Alamo Rent A Car, Inc.: "To everyone that sells software, please get it right before you ship it. This has not been easy, and therefore I was impressed with quality.

Evan Wright, director of the IS Division at Nissan Motor Corp.: "We've got to reduce the time it takes to complete systems development, from the current two to four years down to six to 12 months. If we don't, we won't be able to keep up."

"Really" open systems, a major vice president of Management Information The Gap Stores, Inc.: "Getting to open systems quicker is our No. 1 priority . . . but there's not a common user interface. That poses big problems for our developers."

Tom Fermazin, staff planning coordinator at Ampex Corp.: "We're hoping for open systems — that is, greater participation by vendors in a mix-and-match, open world."

Standardization
Roger Jamboor, vice president of The Dun and Bradstreet Corp.: "A truly robust environment for building truly transportable applications. From DOS to Windows to OS/2 to Unix. One that really works. No ball."

Charles Darnell, chief information officer at Lithuania Lighting: "I'd like for Microsoft, IBM and the rest to quit arguing and settle down on operating systems that make business sense. A lot of times, they go off and do things half-baked."

Arthur Beckman, manager of information technology services at Pacific Gas & Electric Co.: "Peace on earth among networking standards — particularly in naming services, electronic mail and E-mail-enabled applications."

Talk to me
Joseph J. Leo, deputy administrator at the Food and Nutrition Service of the U.S. Department of Agriculture: "Vendors are not as forthcoming as users need them to be for strategic planning. I don't know what we're going to set down. I don't have the warm and fuzzies."

Jon Tankersley, research scientist, senior grade, Amoco Production Research: "It would be nice if companies, hard-party vendors would get together and figure out the right way to implement things. A lot of them are just going off and doing things half-baked."

Less has been more
Julian Horwich, executive director at the Corporate Association for Microcomputer Professionals: "The biggest wish is for things that would make support tasks easier and would help users get more done in less time. It's the same old story. Getting enough support people in these times of budgetary crunch is even more difficult."

DEC to post first loss from operations
MAYNARD, Mass. — Unrelenting economic and competitive pressures, combined with a declining demand for large systems, will cause Digital Equipment Corp. to post its first-ever quarterly operating loss.

DEC customers have held back purchases of big-ticket systems, opting to wait for recently unveiled — and aggressively priced — workstations, servers and large-scale systems, analysts said. The company, however, has gained customer confidence through its new products and by restructuring software licensing, analysts said.

Given DEC's fiscal conservatism, staff for months has hoped the 10,000 that the company announced earlier this year will probably not delay product rollouts, said Neal Hill, a senior analyst at Forrester Research, Inc.

Intel gets break
U.S. District Judge James Ware granted Intel a partial summary judgment in Advanced Micro Devices, Inc.'s antitrust suit. The judge granted Intel's motion on the grounds that the four-year statute of limitations had passed prior to AMD's filing of the complaint. AMD said the ruling was a 'legal technicality.'

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Paul predicts...

January: Borland announces it has made a breakthrough in object-oriented software development that will enable it to improve programmer productivity dramatically. From now on, the company says, all Borland product development will be done in Minneapolis by a guy named Phil.

February: AT&T sells off its NCR computer division, claiming its $7.4 billion bailout was "a big joke," and the telecom giant was "never that big on computers anyway." NCR is snapped up by a well-known New York real-estate baron who renames it Computer. Com.

March: IBM finally ships OS/2 2.0, claiming that every feature that customers have requested is incorporated into the code. Reviewers agree the product is complete but express concern that an Enterprise System/9000 mainframe is required to run it. A chagrined Bill Gates admits that OS/2 "really does do better Windows than Windows" and acknowledges that "we were really wrong about OS/2. It's a great product."

April: Boeing stubs the industry when its IS department unilaterally outsources the rest of the company. Researchers announce they have isolated the shortest event in the universe — the career expectancy of a CIO at a Fortune 500 company.

May: Bell and Siemens announce plans to merge but call it off because the combined company's new name is judged as too embarrassing.

June: Computerworld celebrates its 25th anniversary with a special issue profiling the only 25 people in the world who care anymore about the Cobol standards debate.

In a dramatic move to improve on its image as arrogant and remote, IBM changes its name to "Big Blue Buddy."

July: Apple and IBM announce that nearly a year after their historic alliance, they have finally agreed on a design for their letterhead stationery.

August: Lotus says it has finally fixed all the bugs in 1-2-3 for Windows but chafes at criticism that it has released too many bug fixes. Free upgrades are being mailed for Release 3.141597B/42V.

September: Apple wins its copyright infringement suit against Microsoft over the look and feel of Windows. As punishment, the judge forces every Microsoft employee to spend a month on the road with nothing to work on but a Macintosh Portable.

October: Compaq reports its first profitable quarter in nearly a year, attributing the rebound to a renewed focus on its roots. From now on, the company says, all future products will be designed on a place mat in a Houston diner.

November: Big Blue Buddy (formerly IBM) introduces OS/2 Pen, its operating system for the pen computer. The product runs on a sleek, black, 12-ounce handheld computer hatched to a disk drive that the user must carry around in the trunk of a Buick.

December: The end of 1992 arrives with all the vendors that had promised to deliver products by now vowing that they really, really will deliver by mid-1993.

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In fact, Paradox and database journalism were key figures in USA TODAY's groundbreaking series of reports on the Savings & Loan crisis. Early in 1989, USA TODAY's Special Projects Unit used Paradox to investigate and analyze the health of more than 3,000 S&Ls across the country. As a result, USA TODAY readers were among the first to know about the national ramifications of this important story.

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USA TODAY has 29 bureaus and regional offices nationwide. The paper's production depends on all these offices sharing messages and vital information. To handle this information flow, a system called AMANDDA (for Automated Messaging AND Directory Assistance) was created using Paradox to work with the corporate electronic mail system. This remarkable partnership links every USA TODAY office, and provides instant access to a variety of information sources, the lifeblood of a daily newspaper. And with Paradox, AMANDDA was up and running in less than two months.

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