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Interview with Cary Prague

Director of Software Productivity The Travelers Insurance Company

Cary Prague is Director of Software Productivity at The Travelers Insurance Company, Hartford, Connecticut. He manages PC software evaluation, selection, support, and training for 35,000 end-users. Since he is also a well-known consultant in the dBASE field, *SDJ* had some questions for him about the recent acquisition frenzy in the dBASE market.

Overall, do you believe that Microsoft's acquisition of Fox Software will be good or bad for the xBASE/dBASE market?

The Microsoft/Fox acquisition is unquestionably beneficial for the xBASE/dBASE market, just as Borland's acquisition of

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Novell's NetWare: Emerging Superstar of Enterprise Computing

At the end of April, I had a chance to visit Novell in Provo, and experience first hand what is driving this company towards being a giant in the 1990s. What I saw corroborated my feeling that Novell will be one of the few, dominant companies shaping computing over the next few years.

Novell's NetWare server operating system is absolutely the most prevalent PC multi-user software platform. I emphasize "software" here because only a few years ago, hardware was an important component of Novell's

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Novell's NetWare...

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business. With a stroke of intelligent analysis, the company decided (about five years ago) to sell off its hardware business (the majority went to Samsung) and concentrate on software for the Intel x86 architecture. In this way (and others, as I found out later) Novell is similar to Microsoft. Years ago, Microsoft management decided to pursue enterprise computing and leave the hardware vending to others like IBM, Compaq and the Asian tigers. Novell also came to the conclusion that hardware is likely to be a difficult, low margin business easily penetrable by off shore competition, while software can add unique value and afford greater ongoing business opportunities.

Novell and NetWare

According to most estimates, Novell holds approximately 65% of the market for LAN operating systems — in LAN environments, NetWare is "*THE STANDARD*." This marketshare has been earned by a product set which offers fast, reliable execution of LAN functions. File and printer services on NetWare are unbeatable. By publishing APIs and working with industry partners, Novell has developed an extensive array of third party products for NetWare.

NetWare was written primarily in x86 assembler (with some C) and is highly optimized for the Intel x86 architecture. This allows Intel-based machines running NetWare to deliver performance equal to superservers running variants of UNIX or substantial mini-computers. On DBMS benchmarks, the same DBMS usually delivers two to four times the throughput when running on NetWare than it does running on OS/2 or UNIX (when tested on the same Intel-based machine).

...This ability to place either all or parts of applications on the server with NetWare gives developers the desired "client/server" architecture...

Underlying NetWare 3.11's LAN services is an operating system written to optimize the full 32 bit operation of the 386/486. Because of this, NetWare can directly address very large memories (however, it does not support virtual memory).

One principal advantage of the NetWare environment is that there exists an "Army" of systems integrators capable of support. Novell has been very savvy in building a support network through the retail channel, and in training its dealers on installation and support procedures.

The initial concept behind NetWare was that applications would run on client PCs while NetWare itself ran on a separate machine, the server. With the advent of NetWare for the 386, however, Novell provided the capability for writing server-based applications for NetWare called NLMs (NetWare Loadable Modules). NLMs are extensions of NetWare that share the security and services of the basic operating system. Developers normally write these applications in C.

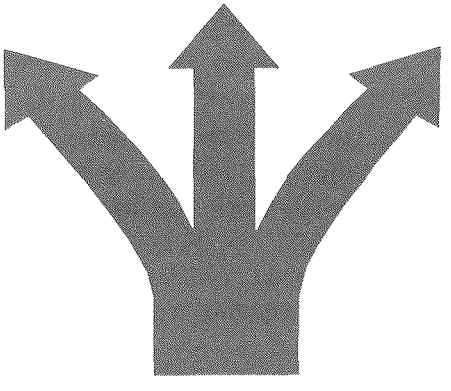
This ability to place either all or parts of applications on the server with NetWare gives developers the desired "client/server" architecture which allows application tailoring where it's logically needed. When developers of DBMSs and tools, however, look at the NetWare environment there are certain design issues that should be understood:

- NetWare isn't pre-emptible, meaning that

NLM extensions to the operating system must be well-behaved or they can cause the entire system to crash. This subject will be covered in some more detail later in this article.

- Versions of NetWare have been developed to run elsewhere, for example under UNIX. However, when NetWare runs as a process under another operating system, it won't offer the performance of native NetWare. Many versions of NetWare will soon be coming from vendors. Expect NetWare Core Protocols in Univel, NT, and Solaris.

- The availability of shared access DBMSs such as Gupta, Progress, and Oracle is only a recent development. In order to help prime this market, Novell's Austin, Texas-based development lab has developed an SQL DBMS -- NetWare SQL. This system is a shell around Btrieve. It isn't as capable as the general purpose DBMS server-based products now starting to appear, but it is a reasonable choice for a NetWare shop that is using Btrieve and wants to leverage existing experience.



NetWare -- the problems and issues

Few Application Development Aids -- It is more difficult to develop NLM applications than it is to develop applications for OS/2. NLMs are typically written in C without a GUI interface. The availability of tools (CASE, 4GLs, etc.) is much less than for OS/2 or UNIX. To a significant extent this is because NetWare 3.x is a young (2 years old) environment compared to OS/2 (5 years old) or UNIX (over 15).

No Protection -- The major weakness of NetWare is its architecture. It's built similar to Windows 3.x; it has no protection, it is not pre-emptible or re-entrant, and it has no virtual memory. NLMs run at ring level 0 along side the operating system. In contrast, applications created for OS/2 and UNIX run at ring level 3 which includes protection.

A NLM developer must be very careful in ruling out the possibility that a NLM won't overwrite a portion of NetWare's memory. For NLM DBMSs delivered to date, such overwrite possibilities have ruled out server multi-tasking and other nice DBMS server features including triggers and server-based batch reports. Running multiple NLMs on one machine is something that should be **very** carefully investigated because applications overwriting the memory of other applications sometimes happens.

Novell is very aware of the potential memory overwrite problem and is taking steps to provide its customers with options that either totally or partially solve the problem:

- Novell has announced a "Novell-approved NLM" status for which software developers can apply. So far, no DBMS has passed the test to earn this status. However Oracle, Progress, Gupta, and XDB have confirmed that their products are in this testing process and we can expect to hear more about them in the near future.

- Around the end of 1992, perhaps as part of the upcoming release 3.2, Novell will announce an optional "protected mode" for applications running on a Novell server. This will give users the options of application security and recoverability, but, presumably, at the cost of performance. That's why Novell personnel talk about the protection "option."

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Novell's NetWare...

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Local, not wide area flavor — NetWare was developed as a support environment for local work groups on PC LANs. The developers didn't envision the product's being used for client/server applications with a mission critical flavor (in their defense, neither did most people envision such usage). Because of this product's heritage, NetWare has been limited in its support for WANs, especially since its directory service doesn't recognize locations outside of the server LAN. Company spokesmen stated to me that Novell's new Burst Mode protocol (reducing echoing overhead) should make NetWare a much more desirable WAN environment.

Go back to School! — Most people will tell you that the installation of NetWare is not a job for the faint of heart. The documentation for version 2.15 runs 2,000 pages and should be completely understood before installation. Although 3.11 is much easier to install than its predecessor, many companies have been pleased with the idea of hiring either consultants or Novell VARs to install NetWare.

Exposed underside — Because the new NetWare products (3.x versus the older 2.x) are targeted towards corporate applications, competitors such as Artisoft have moved into the low end of the market to provide LAN support for companies wanting simple file and printer sharing services. To compete with new products such as Artisoft's LANtastic, Novell has developed NetWare Lite for peer-to-peer networks; so far, this product has not been well reviewed in the technical literature.

...Because of its speed and wide availability, users are beginning to try NetWare as a platform for serious, enterprise-wide, client/server applications...

While in Provo, I didn't get the opportunity to examine NetWare Lite, but we did discuss Novell's future in network and multi-tasking operating systems. Novell believes that basic networking services such as file sharing are migrating toward desktop operating systems such as the client Windows products from Microsoft. Novell continues to invest in peer-to-peer networks. The new Desktop System Group is chartered with the development and marketing of client operating system support and peer-to-peer networking. This includes developing DR DOS and NetWare Lite, as well as supporting MS DOS, OS/2, NT, and Macintosh operating systems in a NetWare network.

NetWare's future

Because of its speed and wide availability, users are beginning to try NetWare as a platform for serious, enterprise-wide, client/server styles of applications. If you've already got NetWare installed as a work group OPERATING SYSTEM, the additional training and investment in bringing in an enterprise application based on NetWare is probably much less than going to a whole new environment. Novell, in reacting to this need, is developing NetWare in a direction that will bring it into direct competition with DOS, OS/2, UNIX, and Windows NT. In other words, NetWare is going to evolve into more of a distributed, network/server-based operating system. In keeping with Novell's attitude about industry participation, however, NetWare will inter-operate with and

support various types of client operating systems. These will include DOS, OS/2, Windows 3.x, Windows NT, Macintosh, and various desktop versions (including Univel's) of UNIX. Novell's view is that users should choose NetWare as their server operating system, and then be free to choose any client operating system. Users will also be able to choose any popular microprocessor as the server engine. NetWare then, is the "friendly, open" server environment.

Of course, the most important application in the big leagues of corporate computing is a database management system. And for NetWare customers, the news here is very good. Either currently, or in the very near future, you'll be able to get the following server DBMS products on NetWare: Gupta, Oracle, NetWare SQL, Informix, XDB, Progress, and Sybase. Also, in the future, it's likely that most of the currently available DBMS products on OS/2 and UNIX will be running on NetWare.

The great thing about a NetWare DBMS is that approximately 50 TPS on the TPC-B benchmark is available from a 486/33 server. That is a serious amount of work. Many OS/2 DBMS benchmarks on comparable equipment have returned in the vicinity of 20 TPS, so the NetWare option looks VERY interesting to those wanting performance (and isn't that everyone?) NetWare 3.2 is going to evolve better support for that enterprise type of function and connectivity. Around the end of 1992, NetWare 3.2 and other related Novell software will provide additional functionality over what's available from NetWare 3.11:

Global directory service – Directory services that are currently available under NetWare support only those nodes on the LAN. In contrast, Banyan's VINES supports directory services for any nodes connected across multiple LANs to the managing server. With global directory services, Novell promises to be competitive, feature-wise, in its support for wide area networks.

Internationalization – Better multi-language support in version 3.2 will be offered. This will probably include support for the double-wide byte standard that is required in Japan and other countries dependent on ideographic alphabets.

Utility package with GUI interface – After using Windows, Macintosh, or Presentation Manager, the standard DOS-type prompt just doesn't compare to the Window's-style interfaces for entertainment value. Novell understands this situation and will provide a utility package for operation under Windows or OS/2 PM on a client workstation.

More and better application development package – One of the easiest aspects about developing for the NetWare 3.11 NLM environment has been the choice of development tools. With earlier versions, developers had only one choice – C. Since many existing programmers and their management aren't interested in spending the year or so that development of C expertise requires, widespread use of NetWare requires the availability of more friendly NLM development tools. Novell management promised me that a much wider selection of such products can be expected by the year's end.

NetWare on RISC – So far, NetWare has been tied to the Intel x86 architecture as the server. Novell management talked to me about their plans for native ports of NetWare to Hewlett Packard's Precision Architecture (PA), possibly IBM's RS/6000, Sun's SPARC, and (possibly) DEC's Alpha. This strategy would certainly make Novell

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Winners and Losers
June Edition

👍👍 dBASE/xBASE

👍👍 Easel

👍👍 Hewlett Packard

👍👍👍 Best...

👎👎👎 ...Worst

Current Computer Wisdom

Dr. George Schussel

dBASE/xBASE

The dBASE/xBASE field has remained in the news over the past month as Computer Associates acquired Nantucket and its flagship Clipper product. What a difference a year can make. Exactly one year ago, the top three competitors in this field were Ashton-Tate, a financially ailing giant; Fox Software, an aggressive challenger facing a threatening copyright infringement lawsuit from Ashton-Tate; and Nantucket, a vendor going its own way by adding "C" style capabilities to dBASE compiler technology. Now, while the same three products are still the leaders, their ownership has changed hands, and they are just parts of the computing stables at Borland, Microsoft, and Computer Associates.

There appears to be no downside to these changes in ownership. The new parent companies are all far more financially stable and adept at marketing than their predecessors. The only question mark in this group is Computer Associates: CA is not known as major player in the PC software market despite its significant group of PC products. CA's PC fame is slight because their sales are not through the normal, PC-oriented distribution channels. Instead, their software is direct-marketed by a large sales force that focuses on corporate accounts. Also, of the three products (dBASE, FoxPro, and Clipper), Clipper has, by far, been the most distressed over the last year. However, I wouldn't count CA out of the game quite yet. Charles Wang isn't a fool. He has previously managed to revitalize other products that seemed dead (IDMS, DATACOM) and prolonged their lives through judicious application of new technology and by pampering the installed base. CA also knows how to sell to corporate accounts, while Microsoft is just learning and Borland doesn't yet have the first clue.

In any case, the heightened competition in the dBASE market means more exposure for the language, commitment from the vendor community, and confidence in building client-side applications for the future. Almost everyone within this environment appears to be a potential winner.

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Periscope

Downsizing: What's Really Going On...

Ron Peri, President
Computer Support of
North America

"The times, they are a changin' ." -Bob Dylan.

"If you would know the future, study history." My ninth grade history teacher, probably quoting somebody else.

Machine makes monkey out of man

Today, there is a processing revolution of tremendous historic perspectives occurring. J. Presper Eckert and John Mauchly were the prime participants in the first phase of this revolution. Creators of ENIAC at the University of Pennsylvania, they left in 1946 to start the Electronic Control Company in Philadelphia. Their first machine was built for the US Census bureau. The Census Bureau was in a desperate situation since they had been mandated by Congress to complete the coming 1950 census within ten years. They negotiated a contract with the Electronic Control Company to produce a machine dubbed the Universal Automatic Computer (UNIVAC).

In 1950, Remington Rand was one of the largest business machine companies in the United States. Realizing that their business in punched card tabulating machines was threatened by UNIVAC, they purchased the Electronic Computing Company for $200,000 and gave employment contracts to Eckert and Mauchly.

At that time, many argued against the commercial viability of the promised UNIVAC. The questions and concerns that detractors had in 1950 are most interesting to the modern reader:

1. People questioned the supportability and reliability of such a computer. The vacuum tube was considered by many to be an exceedingly fragile component. It was so unreliable that it could not be soldered in place like other components; it had to be placed in a plug-in socket. ENIAC had 18,000 tubes and required teams of people just to replace vacuum tubes.

2. There was a major concern over the lack of available applications. Seeing the machine as an engine for computing complex scientific calculations quickly (such as mathematically modeling the H-bomb in 1945), it was argued that the number of such giant problems was very small. Therefore, in the entire world, only a handful of computers would ever be required.

3. A shortage of knowledgeable people existed. Programming the new machines required an ability to use binary machine language (not even hexadecimal back then!). Therefore, since 20 or more mathematicians were required to create and support the programs, mathematical

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Periscope...

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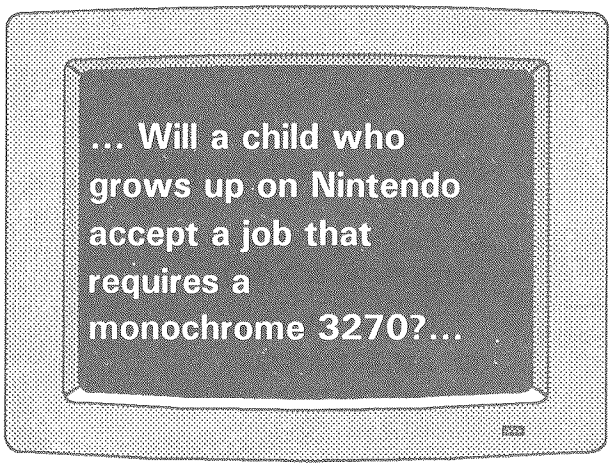
projections confirmed that the total market for the UNIVAC was very limited (American Mathematical Monthly, 1950).

Concern for the lack of support, applications, and knowledge – *these are exactly the arguments being made by skeptics trying to prove that downsizing is only a minor phenomenon.*

Remington Rand, in an uncharacteristically savvy move, introduced the new UNIVAC on CBS, November 4, 1952. With a small portion of the election results in, UNIVAC predicted a landslide victory for Dwight D. Eisenhower. At first, CBS commentators refused to believe the machine. They demanded that the UNIVAC be reprogrammed to yield a more reasonable estimate. However, headlines the next day read *"Machine Makes Monkey Out of Man."* The business world took notice of this event. Once people saw the potential of this new technology, there was no stopping it's progress.

To learn our future from history

Questions about support, applications, and knowledge have continually plagued major advances in this industry. In fact, I would suggest to you that these three items are the most fundamental indicators that a change or paradigm shift is occurring. But the magnitude of the revolution is directly proportional to the laymen's involvement. By this measure, a massive revolution is taking place within the computer industry today. I initially noticed this when it became obvious that my children preferred "Super Mario Brothers" to the PC-based games I had purchased to help them become computer literate. Simply put, "Will a child who grows up on Nintendo accept a job that requires a monochrome 3270?" This question/dilemma has been termed the *Nintendo Effect.*



When on-line computing with video displays was first introduced, users were thrilled to have something better than a teletype to use in communicating with the mainframe. Heck, I remember being mesmerized the first time I saw a Selectric typewriter talking back to me on behalf of a remote 32k System 360 model 30 at the amazing speed of 17.5 cps. That was heady stuff in 1968!

End-users of the future will drive the demand for sophisticated interfaces and applications that go as far beyond a VGA interface as Nintendo goes past teletype. Mainframes won't be a part of this picture. As soon as you acknowledge that processing power is needed on the desktop (or in the hand, or wherever else on your person future computers will reside), you are forced to dismantle the mainframe. If host architectures and operating systems are not designed to handle PC processing and video as it is being done now, how can they possibly handle our future requirements?

I recently attended a reunion of the folks who worked at my IBM branch office in the early 1970s. I heard from those who were still with the company phrases like "IBM is not what it used to be," "IBM is flailing,." or "It's not fun anymore."

I remember that once before, IBM was flailing. The president of IBM at the time, Thomas J. Watson, Sr., steadfastly refused to commit the company to the computer. It was only at the insistence of his son, in addition to the Korean war, that convinced

him to build the IBM 701 Defense Calculator. The 701 was replaced by the Model T of computers, the 650, and from that point, IBM took over the data processing marketplace.

Can they do it again? They must, or they will be passed by in the rush of history. Beyond the Nintendo Effect, there are seven other trends that I will discuss in this month's and next month's column that are signaling us that these times are "a changin'."

1. Traditional pricing algorithms are no longer appropriate.

Some large information processing users are reducing annual costs by 70% or more by replacing mainframes with microcomputer-based networks.

The first and most obvious place where the revolution can be seen is in the almost overnight drop in annual processing costs at some data centers. For the past several decades, corporations and government entities have seen gradually increasing data processing budgets. Increased expenditures have provided significantly increased computing power. Suddenly, advances in technology and the competitiveness of the PC marketplace have combined to completely rewrite all former price/performance equations.

Incredibly, after downsizing, users are getting *several times the computing power for much less money* with their new systems. Industry experience indicates that the average savings when downsizing from mainframes to LANs is 70%! Our experience at Computer Support of North America confirms such figures. In fact, one of our clients, Consolidated International Insurance Company, reduced their data processing costs from $3,000,000 per year to $300,000, *an annual savings of 90%!*

Forrester Research Group did a study of twenty-five large companies. Seventeen had done away with their mainframes entirely, while eight were moving some important jobs off the mainframes and onto the PC networks. According to Forrester, the savings ranged from $200,000 to $4.5 million, with *an average first year payback of $1.6 million.*

Examples of our future

Some industries are downsizing more rapidly than others. Insurance, a real bastion for IBM, is ahead of most other industries at this time. Companies like Consolidated Insurance, Keyport Insurance, FGIC, and others have completely eliminated their mainframes.

Generally speaking, the private sector is well ahead of the public sector in downsizing. A few companies that have replaced some or all of their mainframes include:

- CBS/Fox Video
- Kodak
- T.J. Lipton (Canada)
- Echlin, Inc.

CBS/Fox Video has reduced data processing costs from $10.5 million to $3.5 million annually. The mainframe that was replaced had been installed for a little over one year when it was given the boot. Applications replaced included the company's royalty and accounting systems.

Kodak and Lipton have both replaced multiple manufacturing plant computers with much less expensive LAN-based systems. The primary applications replaced were MRP II systems that ran the accounting, inventory, etc., for the plants in real time.

Echlin, a $1.5 billion distributor of auto parts, replaced its IBM 3481 mainframe in Bradford, Connecticut with a local area network. All of the business systems were transferred. Savings totaled $800,000 in the first year.

Other companies have declared that downsizing is the future direction for data processing. These companies include BASF, Pfizer, American Airlines, and UPS. Many companies have declared that

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Dr. George's Picks

Being held at the Hynes Convention Center in Boston, June 29 – July 1, 1992, are DCI's **DATABASE WORLD** and **CLIENT/SERVER WORLD** Expositions. In combination with these expositions, which together will have over 100 exhibiting vendors, will be two conferences featuring over 100 presentations by leading database and application development specialists. This is an excellent educational opportunity for professionals in the information technology field.

As always, out of the 100-plus presentations, there are a few speakers from whom I have been privileged to review early versions of their sessions. Even if you are not attending either show, this article can serve as a reference guide to various consultants and industry leaders. My comments on some of these exceptional speakers follow below:

Monday, June 29

Jim Davey – *Developing Client/Server Applications: An Event/Activity Information Model Approach*

Jim has been DCI's senior research associate for 10 years. In evaluating the new class of Windows 4GLs such as Revelation Technology's Open Insight and Powersoft's PowerBuilder, Jim has developed new approaches to information analysis that are helpful in the building of systems using implementation products such as Object Vision, Visual Basic, and Power Builder.

Allen Lacroix – *Bank on the Micro (A User Story)*

Allen will share the experience of Richmond Savings's migration from a mainframe to their new downsized system. A one billion dollar bank being run entirely on personal computers should be enough to convince everyone that transaction processing and mission critical systems do belong on personal computers.

Karen Watterson – *Database NLMs - Just Say "YES"*

I predict that Novell's NLM environment for databases, within the next couple of years, will outnumber those of any other software environment, such as OS/2 and UNIX. Karen, a consultant as well as the Founder of Watterson Database Group, will give her views, reasoning, and background information on why she agrees with this prediction.

Jeff Tash – *PC-Based SQL Front-End Application Development Products*

Jeff, President and Founder of Database Decisions, is the Chairman of DCI's **Client/Server Workshop Symposium**. At his symposium, Jeff uses and demonstrates tools through actual case studies so that the differences between individual products of the new genre can be seen. At **DATABASE WORLD**, Jeff will summarize his experience and knowledge of this area.

Tuesday, June 30

Rob Dickerson – *The PC Database Market: Where It Stands Today – Where It's Headed Tomorrow*

Rob heads Borland's Database Business Unit. As the chief architect responsible for developing both Paradox and dBASE, he wields tremendous power in the field (and in Borland's future). Many of Rob's plans center around the use of the Interbase's distributed database as a server technology. Rob will explain the future directions of both Borland and the PC database market.

Larry DeBoever – *Networks Are TOO Important to Leave to the Networking Types*

Larry, Managing Director of Tucker/DeBoever Technologies, knows networks, and databases. He will discuss the challenges that client/server and LAN-based applications can present. He is an advocate of application-driven network design, and will discuss two case studies of companies that used this approach.

10:30 a.m. **Cary Prague** – *Does Windows Make Sense for the PC Database Environment or Does DOS Continue to Rule?*

Cary, Director of PC Database Research at the Traveler's Corporation in Hartford, CT, is also a well-known and superb teacher of database related topics. Cary is in constant contact with most software developers that are creating products for the dBASE/xBASE market. He will give us a peek into the future tempered with some excellent projections on what might happen in this market. (For more on Cary, see "Interview with Cary Prague," starting on the front page.)

2:20 p.m. **Marilyn Bohl** – *Opening Up the Client/Server Model*

Marilyn honed her technical abilities at IBM, and now is at Ingres Corporation where she is Vice President of Engineering. Ingres is one of the technical leaders in this marketplace, and Marilyn will explain what open standards for client/server interoperability will mean for the future direction of their products.

2:20 p.m. **Howard Fosdick** – *Downsizing DB2 Applications*

Howard, Consultant and Founder of Fosdick Consulting, is also President of the R/AD Group and specializes in consulting on network-based implementations of DB2 technology. Since his session will cover what to expect when downsizing or cross developing DB2 applications, IBM lovers will not be able to miss this session.

Wednesday, July 1

8:30 a.m. **Herb Edelstein** – *Stored Procedures and Triggers*

Herb, Principal and Founder of Euclid Associates, is one of the most brilliant researchers and consultants on database subjects. I remember a conversation with him in 1974 when he predicted that relational databases would take over the database field. At the show, Herb will be focusing on two hot topics in the PC DBMS world: stored procedures and triggers.

8:30 a.m. **Adam Green** – *Future Directions for the xBASE World*

Adam is the best-known and most widely quoted consultant in the dBASE/xBASE market. His books and lectures on these subjects are highly regarded. When the ***Wall Street Journal*** wants to know what's happening in this market place, Adam is always their resource person.

2:00 p.m. **J. Aaron Zornes** – *Tools for Tables*

Aaron is one of those market analysts (Vice President of Application Development Strategy for the META Group) who has a top-notch technical background. In his session, Aaron will be focusing on strategies for selecting products, and guidelines for application development infrastructures.

4:00 p.m. **Robert McDowell** – *Implementing Technologies for Competitive Advantage*

Bob, Vice President of Education and Consulting Services for Microsoft, has deep and wide-ranging experience in how companies use network-based computing to achieve a competitive advantage. His presentation will largely focus on case histories and how companies have succeeded in this field.

Other outstanding researchers/lecturers in the fields of database and client/server that I haven't mentioned here include Richard Finkelstein, Ron Ross, Shaku Atre, Barbara von Halle, and Ron Zambonini. I have discussed the work of these people in previous ***SDJ*** articles. They will all be speaking at Boston's DATABASE WORLD as well as other DCI events. *GS*

Novell's NetWare...

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a major candidate, and NetWare the network operating system of choice for future open distributed computing. In this way, Novell and Microsoft (with Windows NT) are about to compete head on for ownership of network management in the mid-1990s.

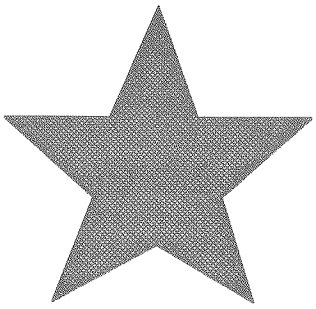
SFT III - system fault tolerance – As the LAN starts to be used for mission critical applications, it is no longer acceptable to have periodic downtime. Since the hardware that NetWare runs on is so inexpensive, it seems logical to design software that is capable of managing mirrored or duplexed disks and/or servers. Novell is designing such a capability under the name of SFT III. SFT III will be able to duplex and control hardware, but will stop short of the types of fault tolerance that Tandem provides. Tandem multi-processors check on each other after each computation. For example, if there are three machines, the processors can proceed on the basis of unanimous vote, or in the event of failure by one machine, majority vote. In the case of a majority vote, the systems operator is informed of a failure. Still, the type of operation that Novell is promising is superior to any other fault tolerance that I'm aware of on the PC LAN. Caution – Novell has been promising SFT II for over 2 years; it's been continually slipped because of higher priorities being assigned to their development resources. Don't count on SFT III until it is shipped! In addition, since SFT III is not directly tied to 3.2, we can not conclude that SFT III will be released at the same time as NetWare 3.2.

1000 user NetWare – When NetWare 3.11 was first delivered, the typical office machine was based on a 386SX processor running at 16 MHz. Now the typical new machine has a 486/33 chip and three times the processing power. NetWare 3.11 supports a limit of 250 users per server and Novell's customers have asked for a much larger limit to take advantage of the new hardware capacities.

SAA connectivity – In combination with IBM, which is now selling NetWare at a greater rate than its own LAN Server (according to the rumors I hear), Novell will have a version of 3.2 that runs on top of OS/2.

Software distribution – One of the most useful things you can do with a LAN is software distribution. In other words, when a new release comes out, you can install it on the client machines from the LAN server, rather than using sneaker net.

Network Management – Now that LANs are evolving into enterprise wide solution networks, there is a requirement for the LAN administrator to have tools that can really be used to manage the network from a distance. Such tools have to be able to pinpoint both potential problems (such as a 90% full hard disk) and real outages along with diagnostics about what must be done to fix the outage. Because the network spans a real, three-dimensional world, it's important that such tools be capable of graphical display. These tools should also permit game playing in a simulation mode. Novell is promising tools that are based on GUI software running from clients, and are capable of monitoring hardware, software, and cabling. *GS*



Interview with Cary Prague...

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Ashton-Tate was positive. Fox's acquisition will create more market awareness for dBASE both as a language and a standard. An additional benefit is that dBASE users now know that future product support is certain. Now that both Microsoft and Borland are marketing dBASE products, there are tremendous financial and personnel resources available to carry the dBASE message forward. As a result, I believe that the entire dBASE market will grow and flourish.

Fox's share of the PC database market is estimated at approximately 10%. Now backed by Microsoft, and with products being released over the next year, what share of the market do you think Fox will have one year from today?

Fox's share of the PC database market may grow to be 15%, but it won't expand much further than that – there are too many other dBASE and non-dBASE products grabbing chunks of marketshare. Microsoft is going to further inundate and confuse the market with both Cirrus and Visual Basic, which, in turn, will hurt their Fox offerings. Borland is also involved in a type of *"self-competition"* with both Paradox and dBASE. What I believe to be the most important aspect of Fox's share of this market is that the entire market is going to greatly expand. So, in the future, 10% or 15% of a market that's twice as large will be more significant to Fox than a 5% increase in marketshare at the current time.

Besides Microsoft and Borland, there are many other companies currently offering good PC products. Approach for Windows, by Approach Software, Redwood City, CA, a database especially optimized for pen computing, has been receiving much good press. Approach for Windows runs on any IBM compatible PC with Microsoft Windows installed. It is probably the slickest database I have seen in years. Other products also receiving favorable press coverage include SQL access tools such as Open Books, by Open Books, Inc., Cambridge, MA, and development tools such as PowerBuilder by Powersoft, Burlington, MA. All of these will take marketshare away from established dBASE products.

> ...In Borland's favor is their desktop (interactive) environment which is an end-users dream...

How do you think Borland will respond to the new competitive situation?

Borland's answer to all of their competitors will be their Windows products. dBASE for Windows is remaining true to the dBASE world while, for example, Nantucket's Clipper has moved away from dBASE and has entered the C language realm. dBASE for Windows allows a dBASE programmer to stay totally within the dBASE language and still have everything that is available to C programmers. The problem with Clipper is that I don't think a corporate developer who knows dBASE today will be able to use that product effectively – you would need a real, hard core developer to achieve great results. However, even a more novice developer could use dBASE for Windows and be successful.

Also in Borland's favor is their desktop (interactive) environment which is an end-users dream. It is the first end-user product I've seen

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Interview with Cary Prague...

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that can handle several relationships with the use of multiple linked cursors. I've been able to create some amazing systems without any programming. The dBASE language extensions give a dBASE programmer the ability to create Windows applications even if they only know dBASE. At this time, Fox products don't have that type of capability.

Finally, Fox does not have a user friendly front-end. I give the market edge to Borland for this reason, in addition to the fact that Borland's product is truly object oriented while Fox's products use event-driven approaches.

Some analysts are talking about the upcoming Borland vs. Microsoft war, claiming that it's Kahn against Gates wrestlemania. However, Borland has (in presentations, anyway) been very supportive of Microsoft's Windows campaign. Do you buy this battle of the titans scenario?

Analysts who talk about the upcoming war between Microsoft and Borland need more work. A wrestlemania between Gates and Kahn? A battle of the titans? No way. Borland has been supportive of both Windows and OS/2. They don't play favorites because it is not necessary. Borland is a software company that develops applications to run across all IBM compatible platforms. Therefore, for Kahn, there is nothing to gain by attacking Windows.

I'm sure this summer we will see a lot of rhetoric between Kahn and Gates. But, they've both mellowed as they've grown older, and each has his own problems. Overall, Borland's Windows products are still way ahead of the rest of the market despite the fact that delivery is late. I have yet to see a real demonstration of Microsoft's Cirrus.

...On a technological level, Interbase is far ahead of SQL Server...

Technology wise, Borland's Interbase server is a reasonable competitor to Microsoft/Sybase's SQL Server. In terms of marketshare, however, SQL Server on all platforms generates about 20 times the sales of Interbase. Do you see Borland being able to make Interbase a serious challenger?

On a technological level, Interbase is far ahead of SQL Server. However, I'm not sure if Borland currently has the resources to make Interbase a serious challenger. I do predict that soon we'll begin to see pieces of Interbase appearing in Borland database and spreadsheet products. Within two years, Kahn will get it moving fast enough so that SQL Server will no longer outsell Interbase 20-1. Just don't expect any short-term changes.

With two strong leaders (Fulton of Microsoft and Kahn of Borland), do you see the xBASE standard diverging?

With both Fulton and Gates in one company, what I see is them pulling themselves apart. I give Fulton one year at Microsoft, maximum. Concerning the xBASE standard, there is an ANSI committee currently starting to define the dBASE language. Marc Schnapp recently started the xBASE Institute which will be funded by Microsoft, Borland, Recital, Computer Associates, etc.

When do you expect xBASE Windows

products from Borland and Microsoft?

I don't like to predict ship dates. Products will ship when they are ready. However, one thing about ship dates that I will tell you is that *good* Windows products take more time to develop. Lotus 1-2-3 is an example of a poor Windows product that was rushed in order to hit the market quickly. Lotus 1-2-3 for Windows is nothing but a port, a shell sitting on top of Lotus 3.1 for DOS which means that all of the original DOS limitations still exist. This is the reason why it has been only marginally successful.

How long do you expect a strong DOS PC DBMS market to survive?

I expect DOS PC DBMSs to thrive for many years. It is much easier to develop on a non-graphical platform (you have less options). However, even though GUI is here to stay for the future, not everyone will move to GUIs *en masse*. There are many DOS-based 8088 and 286s out in the world that are doing just fine. But, Windows will pull ahead of DOS-based sales in the database arena late this year once products are released. By 1996, DOS will be dead, but with a GUI-based, multi-tasking DOS, who will know the difference?

Given your current, internal situation, with which of these companies' products would you be likely to align? What if you could start with a clean slate?

Travelers, ultimately, is a Paradox shop. We use dBASE, Clipper, and Fox, each of which serves various types of end-users and/or developers. Under Windows and OS/2, we will remain a Paradox shop, but will also use new products (which ones, we have yet to decide). Remember, many Fortune 1000 companies are planning on using OS/2 in the future rather than Windows.

In reference to your question about if we could start with a clean slate...we always have a clean slate. With 35,000 end-users, we have the freedom to use many different products within various groups.

In the future, will it be reasonable for a company to operate and support both FoxPro and dBASE as internal development standards?

Yes. The reason why companies might want both programs in-house is that while FoxPro has speed, dBASE is the standard whose Windows version enjoys incredible ease of use. Borland has an interoperability strategy (BOCA), and Fox has only one product.

Clearly the acquisition of Nantucket by someone was forecastable. What do you think about the acquisition and how will Computer Associates manage Nantucket?

Computer Associates will give Clipper a large amount of marketing resources, but I believe that they won't really get behind Clipper as either a database or a language. The biggest difference at Nantucket in the short run will be that they will continue to survive where they would not have without new funding.

As far as marketshare is concerned, I don't believe that Computer Associates will ever be a big player in the micro-computer database field. Even though they now have Clipper in addition to dB FAST, they also have Cullinet and about eight thousand other products. I believe that when you have that many products, you can not have a sales force dedicated to moving one particular product forward. Clipper is not an established MIS product and would need tremendous support to grab a larger share of the market. Computer Associates is just too large of a firm to effectively sell such a product. GS

Battle of the 1990s Part II

This is the second article of a two part series on the major players and upcoming forces in the PC market. In the May issue, George discussed DEC's and Microsoft's roles in the downsizing arena. This month, he is focusing on IBM, Apple, and Novell, and where they may be positioned at the end of this decade.

Big Blue's plan

I honestly can say that I'm not quite sure of IBM's plans concerning downsizing. Given the company's ongoing reorganization and internal downsizing, it appears that there will not be a single, master strategy for coping with the new realities of the 1990s. Rather, IBM seems to be following a variety of strategies for moving into the downsizing arena:

- IBM has been organizing partnerships with smaller, technologically innovative companies in order to gain access to new technologies through contracts and investments. Dozens of companies including Bachman, Rolm, Computer Task Group, NeXT, and Novell have signed with IBM at various levels of partnership. However, at this point, it doesn't appear that further imminent agreements will be forged between IBM and Microsoft.

- IBM is considering distributing inexpensive, low-end PCs. Such plans, as well as a myriad of other approaches, will be announced as IBM decentralizes decision making and finds ways to compete with downsizing leaders. The problem for IBM in using such tactics is that historically, they have only been successful when accomplished by entrepreneurially-driven companies that have fast decision making and very low overhead. These certainly aren't characteristics of IBM, and so the jury is still out on whether decentralized decision making can work for Big Blue in the future.

- IBM is leveraging their existing mainframe market dominance. By providing access to data on mainframes, and promoting their good reputation among existing mainframe customers, IBM can build a downsizing business as faithful customers migrate applications from their mainframes onto LAN networks. In anticipation of such changes, large corporate customers of IBM are anxiously awaiting the successful delivery of OS/2.

There is no reason to believe that IBM won't be capable of building a downsizing business as an extension to its hegemony in mainframe accounts. The Information Warehouse (a joint effort with Information Builders) appears to be a product initiative in this direction. The problem here is that Microsoft is starting to go after those same accounts, and will be successful in courting many of them away from IBM and towards a Windows-based strategy. This means that IBM is stuck in a defensive, hold-onto-your-existing-base position. Being on the defense is not a good way to make money.

Unfortunately for IBM, many people don't believe that OS/2 will be a "better Windows than Windows." Once the end-user population discovers that running multiple Windows, DOS, and OS/2 sessions requires at a minimum, an 8MB 486 with a 120 MB hard disk, and that they have to buy all new hardware, OS/2's market-share will grow too slowly to challenge the lock that Microsoft is now building on the desktop.

Using OS/2, IBM is trying to capture and control its existing base as it migrates onto the LAN. At one time, IBM and ex-partner Microsoft envisioned OS/2 as the universal replacement for DOS. Had that vision come to fruition, the world (and IBM's stock price) would be very different now. Using OS/2 as the PC platform for SAA, the universal IBM standard, may work and satisfy some of the existing customer base. How-

ever, I give this strategy a "B-" grade. The absence of compatibility between OS/2 2.0 and the new Windows 3.1, as well as other missing pieces, means that OS/2 is getting a "B" – pretty good, but not spectacular.

Is Apple prepared to take a big byte?

Apple seems ready to move out of the desktop publishing niche and into the world of general computing. They aspire to be the desktop ambassador to the mainframe. The vision of such a role was, most likely, the driving force behind their partnership with IBM in forging a new desktop computing standard (Pink and Power PC) for the mid-1990s.

Apple has been hiring extensively from the mainframe and mini-computer worlds, and has built a real capability in SNA network architecture. With managers at Apple such as Morris Taradalsky, they are showing a willingness to introduce mainstream computing concepts into the Apple culture. The principal beneficiary of the Apple/IBM agreement, so far, would appear to be Apple since Apple now has IBM's blessing as a viable desktop computing partner for SNA networks.

Apple's Data Access Language (DAL) is another example of the company's seriousness in joining with existing database environments that are mostly IBM-based. A large number of vendor companies including Computer Associates and Oracle, are signed up to support Macintoshes as corporate clients. However, to break the old, Macintosh climate, Apple needs to pursue a rigorous, low-cost hardware strategy to demonstrate it can (to some extent) compete with the clone industry in supplying desktop hardware. I don't know if Apple can, or is willing to lower prices in such a manner.

Low-priced hardware or not, I really believe that Apple is on the road to becoming mostly a software company. If they open their architecture, I am sure it will be cloned for wide availability to the point of rivaling the IBM PC clone. The Macintosh interface is more mature and robust than its chief rival, Windows 3.x. I absolutely see the next few years as being an all out war between Apple and Microsoft. Apple developers already believe that whatever technology Apple announces it will be cloned by Microsoft for the IBM PC. At the current time, Microsoft holds a major advantage – the hardware it is designed to run on is much cheaper than Apple's. By opening up, Apple can eliminate Microsoft's advantage and we could have a fun, all-out battle with users everywhere benefiting from the competition.

> ...Microsoft and Novell will represent the new leadership for architectural decisions...

Novell – Newcomer to the IT party

According to most estimates, Novell holds approximately 65% of the LAN operating systems market. For LAN environments, NetWare is "*THE STANDARD.*" This accolade has been justly earned by a product set which offers fast, reliable execution of LAN functions. Novell's file and printer services are unbeatable. By publishing its APIs and working with industry partners, Novell has allowed the development of an extensive array of third party products for NetWare. Highly optimized for the Intel x86 architecture, NetWare running on Intel-based machines delivers performances equal to superservers running variants of UNIX on substantial mini-computers.

Part of Novell's strategy for the 1990s is to port NetWare into the UNIX, Microsoft, and other environments where it isn't already a factor. However, when

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Battle of the...

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NetWare runs under other operating systems, such as UNIX, it uses the services of those facilities and, therefore, can't be expected to operate as efficiently as when running directly as the native operating system. But, accessibility from these ports continues to advance the company's influence and the usefulness of applications developed.

The partnerships Novell is striking with UNIX Systems Laboratories, IBM, DEC, and others continues their reputation as "Almost everybody's friend versus almost everybody's enemy" as the ***International Herald Tribune*** commented in a story dated April 2, 1992. When ***The Tribune*** went on to contrast Novell's corporate culture with that of Microsoft, they found that "Microsoft is brash and outspoken...and is... the company other companies...are united against. Novell is humble and reserved and shares with all."

One of the principal advantages of NetWare is that there exists an *Army* of systems integrators available for support. Novell has been very smart in building support through PC distribution channels and in training its dealers to install and support their products.

One problem that NetWare must overcome in order to gain a leadership sales position in the downsizing arena is that its architecture may not be suitable for replacing mainframe environments. NetWare is not protected, pre-emptible, or re-entrant, and has no virtual memory. Novell server applications (NLMs) are not normally multi-tasked. SQL databases under NetWare don't support desirable features such as triggers and server-based batch reports.

It is more difficult to develop NLM applications than it is to develop applications for OS/2. With NLM, there exists no GUI interface, and because of lack of protection, applications must perform spotlessly. Also, the available selection of tools (CASE, 4GLs, DBMS, etc.) is much smaller than those in OS/2 or UNIX environments.

As most corporate, American PCs become networked, Novell is competing directly with Microsoft, owner of two of the three desktop standards, DOS and Windows (the third is the Macintosh). Last year, Novell purchased Digital Research to gain access to DR DOS, an alternative to MS-DOS. Thus, NetWare and DR DOS are gearing up to compete against MS-DOS and LAN Manager.

Over the next year, many SQL database management packages and application development tools will become available as NLMs. Then, the installed base of NetWare will begin to really work for Novell.

In spite of these problems, the tremendous success that Novell has had in managing networks of Intel architecture machines means that it, along with IBM and Microsoft, will be one of the big three influencers in the future of downsizing.

Conclusion: strategies for the 1990s

Microsoft is likely to continue aggressively developing its Windows-based products along with Windows-style applications. It will bundle networking functions into its Windows operating systems in an attack on the Novell empire. And, by the end of 1992, Microsoft will emerge as a leading player in the DBMS business, and present a serious challenge to its competition.

Novell will continue to add functionality to NetWare while striking deals to establish support everywhere. As NetWare improves and incorporates features including memory protecting, global naming, and symmetric multiprocessing support, its market share will make life difficult for competitors who want to rule network-based computing of the downsized 1990s.

DEC over this decade is going to pursue a strategy of supporting the interfaces created by the leading

downsizing suppliers such as Microsoft and Novell. With its omnipresent offices and service personnel, it could emerge as a serious player in the systems integration and support business. The open licensing of the forthcoming Alpha chip and Open VMS should successfully complete the transformation of this company and insure survival in the 1990s.

IBM is going to be successful with its newly reincarnated OS/2 which will help it hold onto its Fortune 1000 customer base as those companies downsize and distribute applications. Beyond that, however, I think that IBM will find a hostile audience, turned off by IBM's lackluster performance in delivering products to the market over the last few years. For this large volume of customers, Microsoft and Novell will represent the new leadership for architectural decisions.

Apple, now out of its desktop niche and competing for a piece of the PC pie, is coming to the party with the advantage of superior software technology over Microsoft and IBM (for now). Apple increasingly is becoming a software company. If ACE falls apart (as now seems likely), and Taligent is successful in generating a new and improved operating system environment, Apple could have a spectacular decade and emerge to challenge DEC (or HP) as the number two computer company in the world. More plausible, however, is a reasonably successful decade with a continuing 15% annual growth. *GS*

For more information on Novell and NetWare, see *"Novell's NetWare: Emerging Superstar of Enterprise Computing"* on the front page of this issue.

Current Computer Wisdom...

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Easel

While at DCI's Downsizing Conference in Duesseldorf, Germany this past May, I had a chance to spend some time at the Easel booth (one of the co-sponsors of the conference). Prior to this hands-on experience, I was skeptical about painting GUI front-ends on mainframe systems. The demonstration I witnessed of Easel, however, seemed to indicate that it was a powerful windows and OS/2-oriented 4GL with serious capabilities for building client/server applications with access to DB2 data located on either a mainframe or several different servers. As much as consultants (and vendors) would like users to throw out the old and immediately buy into the new technologies, reality must intrude. That reality, in Germany as well as several other locations, means that managers want to be able to take advantage of new GUI and object technologies while concurrently moving from their older, installed base of systems. If I wanted to downsize but had a shop running legacy systems, I would certainly find an evaluation copy of Easel. It seems to be a real winner.

Hewlett Packard

In Duesseldorf, Hewlett Packard was a co-sponsor of the Downsizing Conference. More than any other mini-computer vendor, HP has successfully accomplished a transition into the 1990's world of open and downsized systems. I remember being at HP offices a few years ago and having an excellent day full of discussions with managers about the necessity of supporting UNIX, Windows, OS/2, as well as other burgeoning standards of downsized computing. Witness to the fact that HP heard that message well is that they have now grown to be approximately equal in size with DEC ($14 billion). Job well done, Hewlett Packard. *GS*

Periscope: Downsizing...

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no new development work should be done on the mainframe. Instead, all new systems will be developed to run on microcomputer networks.

One large publishing company is in the process of converting all of their software to a LAN that, when completed, will replace 12 mainframes. UPS is half way through a five year plan to eliminate almost all of their mainframes. Many of their applications have been ported to the new environment already.

Next month's column discusses the remaining six items indicating that we are part of a computer revolution. *RP*

Ron Peri is the President and Founder of Computer Support of North America, an industry leading firm providing downsizing services from initial consultations through software conversion, hardware installation, and outsourced support. Mr. Peri can be reached at Computer Support of North America, Basking Ridge, NJ, (908) 766-9200.

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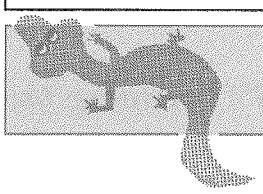
UPCOMING downsizing Events...

One of DCI's most popular conference/expositions is the **Downsizing EXPO**, being held in San Francisco, August 25-27, 1992. Downsizing EXPO can be thought of as the keystone to all of DCI's downsizing events. Three separate conferences are rolled into one, giant, three-day conference in combination with a two-day exposition offering 16 tracks which cover the complete downsizing spectrum: Downsizing Experiences, Windows Applications, Client/Server DBMSs, Client/Server Applications, Windows Technology, Security and Downsized Systems, Rightsizing, Executive Track, Re-seller/Systems Integrator, Business Process Re-Engineering, IS Re-Engineering, Leveraging "Next Generation" Technologies, Open Systems, Interoperable Networks, Middleware, E-Mail, and Enabled Technologies.

Finkelstein's Practical Guide to Client/Server DBMS Computing is a two-day seminar designed to be an in-depth study of the tools and techniques necessary when implementing a client/server application. At this seminar, being held in Washington DC, July 13-14, 1992, you will learn topology requirements and suggested approaches to use during the designing of a stable and flexible client/server environment.

Cheryl Currid: Managing Downsizing is another two-day seminar on downsizing and is being held in Chicago, July 13-14, 1992. This seminar goes beyond the basics of downsizing; using case studies, as well as a detailed product survey, Currid will give you the knowledge needed to assess your company's requirements to implement the best strategy for downsizing. Immediately following Currid's seminar in Chicago is **Implementing Client/Server Applications and Distributing Data**, a two-day seminar chaired by Herbert Edelstein, July 15-16, 1992. This seminar will show you how to use client/server technology to effectively distribute data throughout the organization by giving you pragmatic, "how-to" coverage of the different methodologies.

For more information on any of these classes, call DCI at (508) 470-3880.



For your enjoyment and ease of reference, like a chameleon, SDJ will be changing its colors monthly. Our changing color scheme will make it easier to spot each new issue at a glance, and quicker to reference past issues.