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# Diamond *in the* MAINSTREAM

## The MultiValue Data Model:

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*Facing Tough Deadlines on the Web?*

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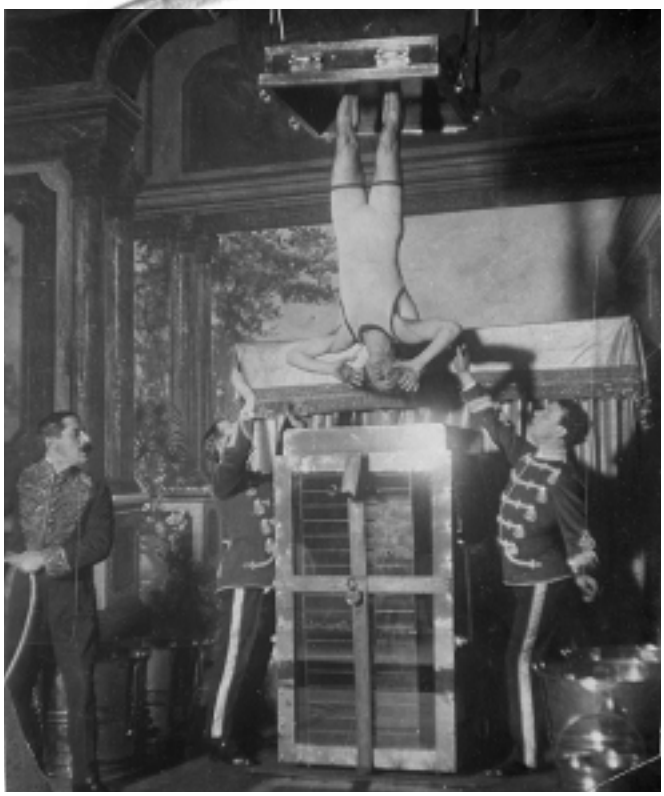

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# COVER STORY

## Diamond in the MAINSTREAM

28 Why and how MultiValue is a jewel of a data model when it comes to building data warehouses. A new series explores innovative uses for MultiValue in data marts, operational data stores, and data warehouses.

BY STEVE VANARSDALE

## FEATURES


26 **LIFE AFTER PICK: INTRODUCTION**
For 20 years, MultiValue has remained a mystery to the experts that design data warehouses in traditional two-dimensional tables. But, now it seems that a few authority voices in the data warehousing community are waking up to the fact that what's needed has been a part of the MultiValue data model all along. BY STEVE VANARSDALE

22 **DIARY OF A PDA PROJECT**
What are the right questions to answer when you're planning to integrate PDAs into a business operation? Learn from the experience of one consultant who did just that. BY NATHAN RECTOR

32 **SPECTRUM SPOTLIGHT: APPLICATION HOSTING GROUP TARGETS NEW BUSINESS PARADIGM**
Application Hosting Group hit on a winning proposition in its quest to help its clients realize substantial economical and technological benefits: a state-of-the-art data center built for hosting MultiValue applications coupled with extensive consulting services.

40 **XP AND .NET WILL MAKE A DIFFERENCE**
Do you need XP? Do you want .NET? Better to ask, can you avoid them. Let's gain some insight on how the arrival of these products will make a difference in the computer market overall, and specifically, the MultiValue industry. BY STEVEN BACKMAN

36 **SEVEN-YEAR ITCH: WEBONOMICS LOOKS BACK TO THE FUTURE**
Like most things in life, technology and economics change relentlessly. Looking back over the last several years, did what we expected "webonomically" really happen? BY MELVIN SORIANO

8 **RETHINKING GOVERNMENT FOR THE 21ST CENTURY**
The rising tide of e-government initiatives is reshaping the way government operates and helping government agencies deliver a growing range of internal and external services.

47 **DO YOUR PEOPLE GET THE BIG PICTURE?**
A key to success in today's selling climate is all departments working together to sell the product—"team selling." Do the employees at your company buy in to this concept? BY STEVE WATERHOUSE


## DEPARTMENTS


6 From the Inside
16 Newsmakers
46 Marketplace


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[FROM THE **INSIDE**]

# The History Of MULTIVALUE

## Chapter I - The Origin of the Word

"It's time!" I'm sitting here, staring at the blank screen in my home office, wondering if I should do it. From nowhere, I hear myself say out loud, "It's time!"

And then I knew I was going to begin writing the history of MultiValue from my own perspective. But where to start? More to the point, what's the purpose? I think I know the answer.

First, by looking at the past, one can understand why MultiValue has endured, and why it will endure in the future; and last, because it has such a colorful history, it would be a shame not to share it. It is the stuff of life for many people around the world.

I will begin this adventure by putting a face on the technology. At the core of MultiValue is a remarkable database concept that reflects information as it exists in the real world. It was way ahead of its time when it was introduced in the late '60s, and like many great inventions, was born out of necessity; in this case, the requirement to achieve more performance with scarce computing resources.

Conventional thinking at the time was built around the "flat file," inherited from the punched-card, batch-processing era. If you were going to have a customer file then, you decided what the fields (attributes) were going to be, estimated the maximum number of characters that you would allow in each field, and then you made a determination of the maximum number of customers (items) you would ever have in that file.

If you set the Last Name field of the customer file to be a maximum of 15 characters, for example, a customer with the last name of Steppanopoulisski was S.O.L. If you set the maximum number of customers to be 500, presumably, you had to turn away customer 501 from the door or trash customer number 299 to make room. Worse yet, if you made the number of characters for the First Name field to be 15, then a guy named Bob was squatting on 12 valuable characters that you wished you could use somewhere else.

Heaven forbid you forgot to include a Fax Number field and you needed to add it to your file later. You don't even want to know about that; and if you had a business where the number of line items on an invoice varied from one to 50, you were in deep peetooties.

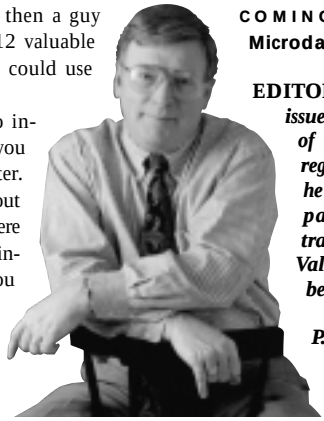
So the thinking of the inventors of MultiValue was that there ought to be a way where you could construct a file such that it mirrored data as it exists in real-life situations. Why should any piece of data (value) use more resources than it needed? Why should a company with no fax number use any resources at all for a fax number field? Why should an invoice with one line item use as much disk space as an invoice with 50 line items?

The answer they came up with was simplicity itself. They divided files into two sections — a dictionary (relational map) in one section; the actual data in the other section. In lay terms, the dictionary said, "When you go over to the data section of this file and you look at a customer record, you will find that the first bit of information you come to will be the person's last name, followed by a unique character that we are using as a field separator to separate it from the next bit of information, which incidentally I am guaranteeing will be the person's first name, then company name, and so on."

The beauty of this was that every piece of data in a file used the exact number of characters it needed plus one — the separator character.

But what about that troublesome invoice? The dictionary for the invoice file said that the first field you will come to will be the invoice number, the second field will be the part number of the first item on the invoice, then the item description, then the quantity ordered, the unit price, etc. But when we get to the end of the first line item, you will find a different unique character separator, which will indicate that we are moving to the second line item. This, they called a "multivalue" field (attribute) separator.

And so, the revolutionary concept was born that allowed you to have a file where a record could contain fields with a varying number of values, or "multiple-values."



**COMING NEXT ISSUE: Chapter II - Microdata, "Firmware" and "English"**

**EDITOR'S NOTE:** ***Starting in the next issue, Gus will move the continuation of this series from this column to a regular feature. As he goes forward, he will look at the people, the companies, the triumphs and the tragedies that have relegated MultiValue to be the computer industry's best kept secret for over 30 years.***

***P.S. He feels that this story belongs to many, many people, so feel free to jump in by sending your comments to gus@intl-spectrum.com.***

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# Rethinking Government for the 21st Century

**The rising tide of e-government initiatives nationwide is using proven IT technologies like document imaging and best practice business philosophies to reshape government systems and deliver a growing range of internal and external services.**

Imagine for a moment that upwards of two thousand documents pile into your office each week, averaging two pages each, with one attachment minimum and often several. Imagine entering every scrap of data contained in those six thousand plus documents manually, without typos, and disseminating the correct information to dozens of different locations quickly. Now, imagine that every department in your statewide organization has a similar story to tell — and just for good measure, none of your systems easily share data.

While this scenario is somewhere between horror novel and history text in the networked business world of the 21st century, according to Chris Mickens, director of External Information Services at the Indiana State Department of Health (ISDH) in Indianapolis, this is precisely the problem ISDH faced in the recent past. Like many IT managers at local, state and federal government agencies across the nation, Mickens was overseeing an infrastructure that was lagging several years behind on the fast-paced technology curve. "We reached the point where we could no longer even use the tools we had, due to the cumbersome nature of the old, proprietary systems and their inability to share data among departments," she says.

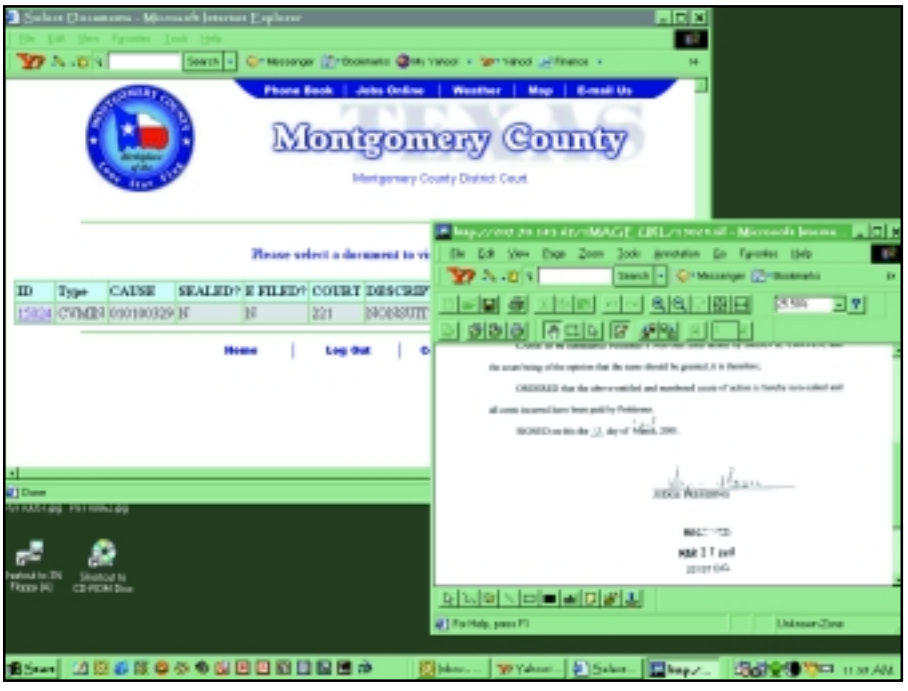
According to Tom Curran, the systems manager at ISDH's Children's Special Healthcare Services Program, his chapter of the story unfolded like a high-tech version of a Grimm fairy tale. "About three years ago, I was managing applications and support for an old Wang system that handled all the computing chores for the program, and one day it basically locked up and died," he explains.

Working with Curran, Mickens' staff helped restore the problematic application, started the process of extracting data, and also developed an interim system to support their high-volume claims processing throughput while the Wang was phased out. The stopgap system kept the program afloat, and bought them time to evaluate a long-term replacement that would mesh with existing plans for agency-wide system upgrades and the eventual development of agency and state-level e-government programs.

"Five or six years ago, every program at ISDH was developing their own applications — independent of any statewide architecture standards — on everything from Macs and PCs to mainframes," Mickens reveals. "Eventually, as a result of our preparations for Y2K, we received a budget to create a uniform client/server environment and develop new versions of existing applications for a modern platform."

Because a number of ISDH programs receive federal funding, they've had to work to develop a willingness at the federal level to accept data sharing between different programs within the agency. Addressing these legitimate security and confidentiality concerns, along with preparations for compliance with

*Continues on page 10*



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## Rethinking Government

*Continued from page 8*

the Health Insurance Portability and Accountability Act (HIPAA), gave shape and form to their new operational model.

"Security and confidentiality were major issues, but the support issue was really the biggest, since the level of resources available to maintain the applications and systems are a critical cost," she says.

Today, everyone at ISDH is up and running and Mickens is focusing on connectivity, having already built a central data warehouse and links between systems using a combination of LAN and WAN technology. She feels that an open systems philosophy is one key to holding down costs and maximizing her limited budget.

"I think open systems and open standards are the wise choice, especially since the support tends to be easier, which translates to less expensive," she says. "We're moving more data off the desktop and centralizing storage and applications at the server level. Since we have a high number of users external to the agency, we're also participating in a statewide Virtual Private Network ('VPN') pilot project that began in November 2000. We looked at general access to applications using the Net, but the security issues steered us toward VPNs."

As Mickens sees it, ISDH was basically forced to play catch-up, and she holds up the new application package implemented for Currans' Children's Program as an excellent illustration of how government systems are beginning to benefit from the experience of the Fortune 500 world over the last decade. "We didn't really consider document imaging and management until we were selecting an application package for the Children's Program, and discovered that the one we preferred had the technology embedded," she explains. "The issues that really sold us were how much it could positively affect operational overhead and improve our data quality, by eliminating the inherent errors of manual data entry."

Already a proven technology in the business world, Mickens realized that document imaging dovetailed perfectly with her future plans, especially facilitating better use of staff resources. "It's very hard to attract and retain skilled IT staff, especially in the government sector, and the resources required to support and maintain applications at the desktop level are far greater than at the server level," she says. "When we learned that the system would collect, manage and deliver images stored at a central location to every user logged into the system, the benefits were blatantly obvious."

Before document imaging was implemented, every claim to the Children's Program was submitted on paper to the Central Office, where a large group of data entry staff manually fed information into the old system. A contract with an outside data entry vendor helped reduce labor overhead to a degree. But even though the outsourcing did reduce internal labor costs, it also required them to package and ship thousands of pages across town each week, which created a whole new set of paper loss and process control issues.

All that changed for the better in December 1999, when their new Keane healthcare application went live. The bottom line effect was felt immediately. Using scanners to input exact digital replicas of original documents directly into the applications' embedded document imaging and management system, they let their contract with the data entry vendor lapse and were able to trim their internal staff by nearly half.

"When a user logs into the application, they not only have claims processing capability, now they can view every single original document associated with the claim right at their workstation, as part of the standard processing procedure," she says. "The level of integration between the imaging system and the application is the key."

Beyond obvious bottom line benefits, Mickens points out that the most remarkable achievement of the system is best measured in the unexpected level of improvement in turnaround time, as a result of using an image-enabled system. "The total processing time for a claim, based on all the steps and processes that had to take place, used to average about six weeks," Curran proclaims. "Now, we can process the most straightforward claims in a day."

The efficiency gains seen at ISDH as a result of document imaging and management technology aren't all that unusual, according to David DeYoung, president and CEO of Englewood, Colo.-based 1mage Software, the Keane technology partner whose 1MAGE system is streamlining operations at ISDH.

"During the economic boom in the '90s, businesses were focused mainly on acquiring new customers, but in the current economic climate we are beginning to see a significant shift toward reducing operational costs and improving efficiency, which are two of the key benefits of document imaging," DeYoung says. "Interestingly, e-government is exactly opposite, about efficiency and cost reduction first, since the customers are often footing the bill."

He adds that where prospects did a lot more tire-kicking just a few years ago, with imaging companies performing some serious education about benefits, nearly every business today has at least one ERP, CRM, or financials system that they know will benefit from being image-enabled. Since imaging is a component technology, the only way it can live up to this newfound reputation is when tightly integrated with a customer's core systems.

His company's 1MAGE technology is a core component in a wide variety of e-government programs large and small, running on UNIX, Linux, and Windows NT. Specializing in enterprise document imaging and management technology, from proven applications like Computer Output to Laser Disk (COLD/ERM) to high-volume image management and the latest in Net-ready workflow tools, DeYoung's company has nearly two decades of experience.

"Creating acceptance for document imaging among workers accustomed to old paper-based processes is one of the major hurdles confronting any organization in the process of installing the latest enterprise level document systems. However, once the system is in place and they realize what it's capable of, how much it simplifies their work, they become believers quite fast," he states.

DeYoung's experienced observation was borne out at ISDH, where Curran explains that imaging allowed them to retrain many employees and provide them with opportunities to gain knowledge in new areas. "Using the system actually created interest and excitement among staff at the Children's Program when they realized that they were being offered the chance to become knowledge workers and not just paper shufflers," Curran says.

Mickens' litmus test of document imaging and management technology in the Children's Program is also being monitored closely by other agencies and programs at the Department of Health, as well as by individuals in other areas of the Indiana state government, including the director of Finance.

"Keane chose 1MAGE as its embedded imaging application specifically because the system offers all of the technology and features of a FileNET or Documentum system you'll typically find at a Fortune 2000 company at a fraction of the cost," DeYoung points out. "Like the top tier vendors, our system uses a large library of APIs to easily

*Continues on page 12*

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## Rethinking Government

*Continued from page 10*

integrate with an organization's existing systems and software."

Boston, Mass.-based Keane Inc. offers solutions across the range of industry from a network of nationwide offices, as well as operating separate groups that specialize in serving the specific needs of the healthcare and local, state, and federal government markets.

Keane's experience at the federal level personifies their delivery of commercial best practice philosophies to the e-government market, culminating in a recent $54 million contract from U.S. General Services Administration (GSA) to provide IT services to the U.S. Department of State's Office of Foreign Building Operations.

"This project is an excellent example of how best practices from the private sector can be brought to a government agency to help it achieve its goals," says Glenn Giles, vice president of Keane Federal Systems. "Like any organization, government agencies are seeking to change the way they do business and how they use information technology to support the mission-critical operations."

These pioneering efforts extend across the entire spectrum of potential e-government applications. As a result of creating NCSiteSearch.com, a Web site specifically designed to serve the state's industrial real estate market, Keane was recently awarded top recognition by the National Association of State Information Resource Executives (NASIRE) for innovative use of technology.

"Every state is pursuing e-government to varying degrees, as witnessed by Indiana's internal system improvements at ISDH and their 'accessIndiana electronic gateway,' which provides information and online services to the entire state, 95 percent of which is available at no cost," DeYoung explains.

A self-supporting venture, the accessIndiana portal that he refers to is based on a public/private model that funded the building of the entire network and its operational maintenance without the appropriation of a single tax dollar.

Following a different course, California chose to invest heavily in upgrading a subpar public Web site in late 2000, vaulting to the front of the state e-government pack in January 2001 when 30-year-old state director of Internet programs Arun Baheti unveiled the new "MyCalifornia" portal.

"This Web site wasn't going to be only about organizing information. We had to offer services, online transactions," Baheti says of the portal, which provides state residents and businesses alike faster access to information and services using the latest search engine technology and personalization features.

Every state is pursuing e-government to varying degrees.

His strategy appears to be working. Before Governor Gray Davis hired him with a mandate to revamp a content-rich but otherwise "impenetrable" site in Baheti's words, California ranked 42nd among the 50 states in Internet services. By April 2001, My California was the only state-run site to crack the Top Ten list of government Web sites compiled by Jupiter Media Metrix, logging about 1.5 million visits a week.

With a population above 33 million and ranked as the sixth largest economy in the world, California spends over $2 billion a year on IT and e-government. The state's 2001-2002 budget earmarks $4.7 million for e-government, with $1.7 million for ongoing development of MyCalifornia and the remaining $3 million set aside to create new systems for its e-business center.

The e-business center resides at the core of its new business services model, and by moving routine government transactions like vehicle registration and drivers and business licensing online, California expects to save substantial revenue as a result of reduced administrative costs relative to archaic paper-based management.

1mage's DeYoung explains that component technologies like document imaging and management are a key enabler in the transition to e-government, allowing for automated management of the resulting electronic documents, regardless of their source, and secure retrieval of the images from almost anywhere using the Net.

"Providing online services to businesses and professionals is rapidly replacing online services for the public as the number one priority of state and local government officials, on top of improving dysfunctional internal systems that are hemorrhaging taxpayer funds," he remarks. "While it may not be the biggest or sport the largest profit margins, the state and local e-government market is definitely the fastest growing right now.

According to data from Gartner Dataquest, the biggest growth occurring across state agencies is in the areas of administration and finance, human services and transportation, followed by public safety, health and justice.

DeYoung explains that quite often there's also substantial crossover between the stovepipe market segments listed in major market studies, offering the State of Vermont Judicial Bureau's new installation of his 1MAGE system as evidence. The first stage of the ambitious project will scan, index, and cross-reference traffic tickets and associated case documents with the statewide TRAFFIC Case Management System.

The Judicial Bureau plans to capture, organize, distribute and archive millions of pages, creating an integrated repository of digitized images. Fully implemented, the system will offer judicial, administrative and public safety staff at all 14 counties the ability to share case documents using the existing state "GOVnet" browser network, granting pre-authorized personnel access to a secure statewide electronic case file — without the expense of adding additional network systems.

"While there is definitely a re-engineering push taking place in government computing to replace legacy systems now that Y2K has come and gone, the migration to integrated enterprise systems during the late '80s and '90s in the business world can offer some valuable lessons to every government organization contemplating ways to build cost effective e-government," DeYoung asserts.

Since most government agencies operate with significantly tighter fiscal controls than their brethren in e-business, increasing employee efficiency, and by inference, productivity, is a lynchpin of e-government strategy, as a result of declining staff levels and shrinking budgets nationwide.

Already caught between a proverbial rock and a hard place, they must also adhere to improvement policies manifested in laws like the National Performance Review, Government Performance and Results Act and the more recent Government Paperwork Elimination Act. The latter requires all federal executive agencies to provide the option of electronic maintenance, submission or disclosure of information, where practical, as a substitute for paper.

Vermont's approach, integrating core component technology with existing systems, is gaining popularity as an effective way to

leverage existing IT investments, an especially crucial element in government computing. Their plan to fully integrate document imaging with an established case management system is echoed at the county level, where another application of the 1MAGE system illustrates several areas where the technology supports innovative process improvement and development using commercial best practices.

"We originally implemented imaging about six years ago, and the biggest problem we had with the system was a lack of integration," says Scott Mykelbust, an experienced veteran of the IT wars and database administrator for the Communication and Information Services department of Montgomery County, Texas.

Situated less than an hour north of Houston in Conroe, Texas, Montgomery County, like Vermont, also chose the 1MAGE system out of a crowded field of competitors that included the document management industry's biggest names. Their final decision was based on three primary criterion: the substantial difference in cost relative to virtually identical system features and options; the system's ability to integrate transparently with his existing applications; and the fact that DeYoung's system was designed with MultiValue database technology in mind.

"1MAGE integrates directly into my screens, some of which are literally 20 years old," he says. "As a result, I have zero retraining issues and I can install imaging capability into any existing application package we have in just a few minutes. Those two items alone handed me some major cost savings."

Mykelbust explains that the first phase of implementation image-enabled the District Clerk's processes. Currently, all of the documents filed in the District Court for every case — civil, tax, and criminal — are scanned, while records retention is working back through old records. The county is also migrating old image files onto the new system using an automated routine that converts their proprietary format to standard TIFF files, with an attached index file that re-indexes them in the 1MAGE system.

"The benefits of integrating the system with the existing network in the District Clerk's office are pretty straightforward," he continues. "It will keep people from constantly taking files out of the Clerk's office, to the individual judges, prosecuting attorneys, defense attorneys, anyone connected with the case. Now they will be able to see it from their bench, their office, even their car, and we will still have that original piece of paper stored in a safe, and more economical, location."

The county is also right in the middle of writing an e-commerce application to serve as the transaction system between the image repository and users outside the Clerk's office. Attorneys will set up an account with the District Clerk's office, be issued a login and a password after their request passes through security measures designed to prevent fraud, and will immediately be able to retrieve documents via the Web.

Mykelbust adds that Montgomery is already capable of e-filing using their existing CourtLink software, a popular application among counties across Texas and the nation. CourtLink handles the entire process automatically, notifying every attorney involved in the case via the Web when items are filed.

"A Texas statute mandates that the District Clerk must at all times be able to present the original paper or a verifiable image of the paper on file, so we've created a protocol within CourtLink that automatically forwards the electronic documents that are filed via e-mail," he details. "Every evening an automated program we created collects

*Continues on page 14*

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## Rethinking Government

*Continued from page 13*

the images and indexes and files them in the imaging system."

The county's IT systems were already highly integrated, with linked MultiValue databases and much of their application software, which has facilitated previous automation of their workflow processes. For example, every day at 5:45 a.m., an automated program at the Sheriff's Office selects the files of everyone that's landed in the county jail since the previous cycle. It populates the District Clerk's database with the files, where another automated program sorts the files. Felonies go to the District Attorney, misdemeanors to the County Clerk, and all the appropriate databases are populated with the necessary information.

"Weaving the imaging system into the productivity mix at the Sheriff's Department is on the agenda, and they're preparing to scan all of their documents in the near future," he says. "Based on our experience with 1MAGE, we are confident that most of the departments in the county will jump on the bandwagon eventually. Right now, the county Tax Office and the Sheriff's Department are next in line."

Mykelbust points out that all of Montgomery County is running UniData database technology now owned by IBM, and that because 1MAGE is built atop the performance advantages of MultiValue, integration was as simple as injecting a few lines of code to call the imaging process into his applications.

"The concept of an imaging system that integrates using APIs isn't new," DeYoung declares. "Others have done it before, but what we've done with 1MAGE is make it extremely user friendly."

"It was almost too easy," Mykelbust recalls. "The first day 1mage was here, in about two hours the software was loaded, file systems were created, and at 6:00 p.m. we rebooted the system. At 6:15 p.m. we were running imaging. That kind of ease of installation is unheard of. I had a contract programmer that came in to help with the install and he was amazed. 'I've done several of these and this has been the most incredible installation I've seen,' he said. That made us pretty proud."

According to DeYoung, despite a fairly modest up front capital investment, Montgomery is among the leaders in e-government development at the county level nationwide, keeping pace with multi-million dollar ventures like King County's (Washington state) electronic court records system, built by its Department of Judicial Administration and integrator Sierra Systems using customized FileNET software.

"However, given the budget constraints that most local and regional government entities must adhere to, the bulk of e-government programs tend to be less expensive as a rule rather than an exception," he adds.

Another experienced user of document imaging making inroads into e-government is the Plymouth County (Mass.) Registry of Deeds. Also using a MultiValue database, when the agency outgrew the limited abilities of their original system they went looking for technology that would allow them to convert their entire database of historical records, some dating back as far as the county's establishment in 1685, according to systems administrator Cynthia Sykes.

"For most government agencies, simply throwing out systems is not cost-effective," she says. "When we decided to migrate off of the old imaging system, we knew we wanted to continue using our existing database, and I went so far as to price rescanning our records. One service would do the job for about $0.12 per page, but if you multiply that by 2.7 million records, that's just way too expensive."

Among their 2.7 million documents are a long list of property records including liens, oversized surveyor plans, mortgages, and deeds, all of which were eventually left right where they lay in their original location. The county was able to avoid the cost of migrating the images by installing 1MAGE on the same server, a feat few vendors could accomplish, and eliminating the need to purchase and maintain a second server. "We needed a system that integrated painlessly," Sykes adds. "We wanted as little disruption as possible."

The document management process at Plymouth County is deceptively simple: Scan every piece of paper filed on any piece of property in the county. Application developer and programmer/analyst Graham Reed explains that they simply used the 1MAGE APIs to call image files from the database. He was suitably impressed with the modular structure and scalability of the system, which allows features to be added as time and budget allow.

Scalability is another important aspect of any system purporting to serve the smaller county and municipal e-government projects. Plymouth County's imaging application is similar, as far as scale and budget, to what we've observed in a number of city e-government programs," DeYoung says.

Two such city programs under the 1MAGE banner are both in the area of public safety, in Yakima, Wash., and Aurora, Ill. Andrew Feuerborn, network administrator for the City of Aurora Police Department, went live in late 2000 with an imaging system purchased through Geac, another 1mage technology partner. Their goal was simply to improve internal department operations.

Feuerborn explains that the city has grown significantly since the last census, and that they were generating quite a volume of paperwork. Realizing a paper-based filing system was getting more expensive and wasn't working all that well any more — not to mention valuable office space being continually consumed by multiplying filing cabinets and bankers boxes — Aurora PD decided electronic document imaging and management was the most effective way to streamline access to and management of their over-burdened filing system.

"Aurora's reasons for adopting imaging are more traditional than innovative, much like those expressed about four years ago by the City of Yakima Police Department when they implemented the system," DeYoung says. "Neither of these modest applications of imaging technology is on the leading edge of e-government development, but the basic purpose underlying both of them is identical to the reasoning behind the costliest projects in the country: creating improved efficiency, economy, productivity and customer service."

As in e-business, a primary goal of implementing e-government is improving customer interaction with government agencies, automating processes and delivering information instantly that used to take days or weeks to acquire. Collaborative technologies like imaging confer the ability for e-government services to do just that, whether they're serving information via a small city Web site or a vast statewide portal.

"The service aspect is the guiding light of e-government, and the availability and ease of integration of the component systems supporting it are crucial to constructing effective, easy to use e-government resources, whether the stated goal is improved internal efficiency or expanding government services onto the Net," DeYoung concludes. **is**

***For additional information about 1mage, visit www.1mage.com or call (800) 844-1468.***

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# NEWS MAKERS

## Zumasys Completes Assets Purchase of The Computer Clinic

***Premier Systems Integrator Joins Forces with Industry Leader of Tape, Data Recovery and Professional Service Solutions***

**Zumasys Inc.** has purchased the assets of The Computer Clinic, a national provider of professional services and a leading developer of tape software solutions, located in Huntington Beach, Calif. The transaction expands Zumasys' focus on national on-site installation services and complements its capabilities as a provider of custom-built servers, thin client solutions and advanced 7x24 relational database support.

Under the terms of the agreement, Zumasys will appoint Tom McTeer as VP of Professional Services and market and sell all of The Computer Clinic's products (including the SCSI Connection tape software and the new SCSI Connection Pro for PCI).

"For the past 17 years, Tom McTeer and the staff at The Computer Clinic have built an excellent reputation on providing innovative products and services to the marketplace," said Paul Giobbi, president of Zumasys. "This transaction fortifies our commitment to offer customers a 'single source' for software, hardware and technical services."

Zumasys, headquartered in San Clemente, Calif., is a premier reseller for Raining Data's database products and development tools and has more than 8,000 users under paid database support. A national provider of technology services and business computing solutions to a broad range of customers, the company offers "custom built" Terian and Compaq servers, which it integrates with Linux, Windows NT/2000, Citrix, SCO or UnixWare.

Zumasys is a member of the Citrix Solutions Network and specializes in helping customers with Unix and legacy-based computing environments implement Citrix MetaFrame XP and affordable Windows-based terminals from Boundless, Esprit and Wyse. Zumasys maintains certifications in Microsoft (MCSE & MCP), Novell (CNE), CompTIA (A+), Citrix MetaFrame (CCA & CCSP), SCO (OpenServer & UnixWare), Caldera, MvBase and D3 (AIX, Linux, SCO, NT) and holds reseller agreements with Boundless, Checkpoint, Cisco, Citrix, Compaq, Digi, Esprit, Intel, Microsoft, Raining Data, SCO, SonicWall, Systech and Tandberg. ■

## Pixel Joins Microsoft BizTalk Server 2000 Partner Program to Deliver Host Integration Adaptor

**PIXEL**, an international leader in developing host integration products, announced that it has joined the BizTalk Server 2000 Partner Program to provide a Host Integration Adaptor for Microsoft BizTalk Server

## Eydie Larson Named New VP of Development at Modular Information Systems

**Modular Information Systems,** a professional IT services firm, announced the promotion of Eydie Larson to vice president of Development Services. Larson's new responsibilities include oversight of project management, development projects, and resource allocation. She will continue to perform the duties that she held as director of Development. Larson, who joined Modular Information Systems in 1997, was also appointed to the Board of Directors.

"Eydie has been very instrumental to the success of Modular," said Lisa L. Corbett, president of Modular Information Systems. "We have seen customer satisfaction with our IT projects climb to an all time high under her leadership."

As Modular's director of Development, Larson directed several custom programming projects including: developing a shipping system for wineries, which produces bills of lading and updates a wine's data records for inter-winery shipments; and developing a grower payment system, which calculates the price of the grapes, prints checks, and tracks the grower remittance information.

She has also managed Modular's systems analysis, programming, quality assurance, help desk, and technical documentation staff. Her responsibilities included analysis to determine software requirements, preparing software enhancement technical specifications, and coordinating software releases, as well as custom programming.

Prior to joining Modular, Larson honed her technical and managerial skills during 26 years in the information systems industry including management of a custom programming department for a major software developer.

Modular Information Systems offers a complete range of professional services and products for businesses using Microsoft and UNIX based computing solutions. Modular Information Systems is a Microsoft Certified Partner, an IBM Business Partner, and an authorized reseller of many quality hardware and software solutions, including Cisco, Compaq, and Hewlett Packard. Among Modular's many offerings are Ascential's DataStage, a comprehensive Business Intelligence (BI) infrastructure solution, and the world-class winery management software suite, TSM Vintage. ■

2000. Pixel's technology will allow the information contained on any green screen of any host-based legacy application to be easily interfaced with the core integration capabilities of BizTalk Server 2000. HostAccess Gateway for BizTalk Server 2000, from Pixel, will greatly extend the number and type of integration projects easily implemented by users of BizTalk Server 2000.

Based on XML and SOAP, Microsoft BizTalk Server 2000 unites enterprise application integration, business-to-business integration and business process automation technology to allow companies to easily orchestrate XML Web services and rapidly build dynamic business processes that span applications, platforms and businesses. Until now, however, it has been challenging to interface with home-grown, host-based legacy applications or green screen applications that do not have a sufficient API or open data source. Using HostAccess Gateway for BizTalk Server 2000, green screen applications can now be connected into BizTalk Server 2000, enabling bi-directional business transaction interfaces to be developed quickly and efficiently.

"The ability to access host data that lies within legacy systems creates an opportunity for organizations to develop a powerful competitive advantage," said Dave Wascha, product manager of BizTalk Server 2000 at Microsoft Corp. "XML-enabling legacy systems is absolutely critical in moving businesses and systems onto the Internet. Pixel's HostAccess Gateway for BizTalk Server 2000 will allow companies to unlock this data and allow for seamless information flow within the enterprise and across the Internet."

Francis Carden, CEO of Pixel, stated, "We are delighted to be participating in the BizTalk Server 2000 Partner Program to provide host integration capabilities to BizTalk Server 2000. With over 70 percent of corporate information still contained in host systems, it is no wonder that technology like ours has become a hot topic with IT departments of all sizes. Our non-invasive approach to host integration provides the fastest ROI and least risk since existing business logic and processes are maintained."

HostAccess Gateway for BizTalk Server 2000 uniquely sup-

*Continues on page 18*

## Lauer, Holland Exit Raining Data Along With More Than 25 Others

**In late August,** major personnel changes took place at Raining Data Corp. (formerly PICK Systems), including the departure of well-known MultiValue industry figures Richard Lauer, who was president and COO, and Tim Holland, who was chief technical officer. The company said Lauer and Holland left Raining Data to pursue other business opportunities. Raining Data laid off approximately 30 employees in the U.S., most of whom were involved in the MultiValue market. The company also made cuts in staff and operations outside of the U.S.
Sources say besides cost-cutting reasons, the layoffs were precipitated by disagreements at the top level about the direction of the company, lower numbers than expected, and too much emphasis being placed by management on the MultiValue market, rather than other projects. The most senior MultiValue person retained is Mario Barrenechea. Also remaining with the company are Rick Davies in Engineering, Janet Crumpley in Sales, and Michele Rinehart in Marketing

### New President, CEO, and Chairman of the Board Assume Posts

**Carlton H. Baab** was named president and CEO, and Geoffrey P. Wagner assumes the role of chairman of the board. Baab is a broadly experienced executive and a managing principal with Astoria Capital Management. Wagner has served as a member of the board of directors since 1998. A company representative wasn't immediately available to comment on the status of the chief operating officer and chief technical officer posts Bryce Burns, who had served as chairman and interim chief executive, will continue to sit on the board, Raining Data said. Gilbert Figueroa, who had been chief executive and president, left the company in January to pursue other business opportunities. At the time, Burns was then named interim chief executive while Richard Lauer was given the role of president in addition to chief operating officer.

Baab, 43, joins Raining Data with more than 18 years of experience in general management, marketing and financial management, primarily in the technology industry. He previously served as chief operating officer and chief financial officer of RemarQ Communities, a Web-based provider of discussion group services, before it was acquired by Critical Path in 2000. From 1994 to 1998, Baab served as executive vice president and chief financial officer of CKS Group, a leading Internet and marketing consulting firm, before it was acquired by USWeb in December 1998. He holds a B.S. in Electrical Engineering, with honors, from the University of Southern California and an M.B.A. from the Harvard Graduate School of Business Administration. ■

# NEWS MAKERS

*Continued from page 16*

ports integration with virtually any terminal type, block-mode (IBM) or asynchronous (non-IBM), including VTxxx, Wysexx, Televideo, HP, IBM, Tandem, SCO and over 30 others. In fact, this solution can connect BizTalk Server 2000 to any green screen application that is supported by HostAccess Gateway for BizTalk Server 2000. HostAccess Gateway for BizTalk Server is currently available for delivery. ■

## AMS Services Selects Power Witness to Help Protect Customers' Data From Power Failures

**AMS Services Inc. (AMS)** of Windsor, Conn., announced its decision to include the Power Witness auto shutdown software product for D3/AIX as a recommended accessory component for its new and existing IBM RS/6000-based Sagitta Browser systems.

Recognizing the importance of power quality to data integrity, AMS will offer Power Witness by Atkin/Jones Computer Service Inc. for each RISC System/6000 sold. Power Witness works with most UPS (uninterruptible power source) models and initiates a user-defined system shutdown.

According to Bill Henson, AMS's manager of System Development, "We have been looking for an extremely reliable solution such as this for quite some time. Power Witness and our selected UPS give us the right combination of hardware and software to deliver reliable power and emergency shutdown capabilities."

"We're pretty happy about it" was the understated reaction of Greg Atkin, Atkin/Jones' board chairman, upon completion of the agreement with AMS. "We have been servicing systems in the MultiValue environment for over 20 years, and many of the problems we've seen stem from poor power quality or power failures."

If a power interruption occurs, Power Witness will alert the operator and direct an orderly shutdown according to user-specified procedures. Power Witness is the first in a series of products released by Atkin/Jones to help reduce or eliminate power-related service problems. ■

## Strategy 7 Offers Portalvision's Innovative Communication and Collaboration Technology

**Strategy 7 Corp.**, a leading provider and integrator of technology products and services, announced a strategic marketing and distribution agreement with Internet software developer Portalvision Inc.

With Portalvision's software, customers ranging from entertainment, religious and advocacy groups to businesses and Internet service providers, can transform their Web presences into marketing powerhouses, better organize and mobilize their resources and more effectively communicate with members and partners via the Internet. Customers earn new, recurring revenue streams and enhance loyalty by delivering a full suite of communication and collaboration tools to users in a fully customized online environment.

"Portalvision enables Strategy 7 to provide our customers with innovative communication and collaboration technology, as well as a powerful brand extension tool," said Strategy 7 Corp. president Joseph Rodriguez II. "We are confident that Portalvision-powered enterprises will be able to achieve a more cost-effective and broader distribution of their products and services."

"Portalvision provides its customers with a high-impact branding, relationship building and communication tool, and gives users a best of breed suite of applications that provides a great online experience," said Portalvision CEO Paul Graf. "Strategy 7's existing customer base is a great match for implementing Portalvision's software. We'll help them extend their brands, strengthen loyalty, improve efficiency and maximize communications."

Portalvision's offering includes Internet connectivity and Portalvision Desktop v.1.6. Portalvision's suite of applications integrate a Web Browser, Email, Internet Messenger, Chat, Address Book, Calendar, Shopping and Clubs in a single platform that is customized with each customer's brand, content and links. Unlike Web-based tools, Portalvision's online environment remains present on users' desktops no matter where they go on the Web.

"Portalvision is a perfect addition to our current product offering and a must-have for many of our existing customers," Rodriguez added. "We're delighted to have the privilege of offering this software product to our customers." ■

## 1mage Software's Second Quarter 2001 Revenue Up 119%

**1mage Software Inc.,** a developer of enterprise document imaging and management software for business and industry, posted revenue of $780,000, a 119% increase over the year-ago quarter, the company announced in late July. Year over year, net in-

*Continues on page 20*

## Zumasys Holds Free Seminars on Citrix MetaFrame XP & MvDesigne

***Users Can Learn How to Implement Thin Client Technology and Build Powerful Windows GUIs***

**Zumasys Inc.**, a premier reseller for Raining Data and a member of the Citrix Solutions Network, will hold three technology seminars on Citrix MetaFrame XP and MvDesigner. The seminars will be held on October 16 in San Diego, Calif.; October 18 in Temecula, Calif.; and on November 15 in Newport Beach, Calif.

The Zumasys Technology Seminars will be an excellent opportunity for IT professionals to learn about emerging software and hardware technologies. The events are co-sponsored by Citrix Systems, Compaq, Digi, Esprit and Raining Data. Vendor representatives will be on hand to answer questions and all attendees will be given a special door prize.

**8:30 am-9:00 am Registration and Complimentary Breakfast**

**9:00 am-10:15 am Citrix MetaFrame XP Seminar sponsored by Zumasys.** Zumasys will review the benefits of this powerful Windows 2000-based Thin Client software and show you how you can use Citrix to achieve super-fast remote access to "any application, from any device, over any connection." You'll be able to see notebooks and PCs connecting over a wireless network to a Citrix server and you'll learn how to utilize affordable Windows-based terminals like the Esprit 100TCE ($379) as an alternative to costly PC workstations.

**10:45 am-12:00 pm MvDesigner Seminar.** Learn how to revitalize your Pick application with a Web or Windows-based GUI using MvDesigner. MvDesigner is the most comprehensive Rapid Application Development environment specifically designed for use with MultiValue databases. This sophisticated, but simple to use RAD tool has been carefully designed to minimize the MultiValue developer's learning curve, while it maximizes efficiency during the RAD development process. ■

**Seminars are free but require an RSVP. To register, call (949) 369-8015 x106 or RSVP online at www.zumasys.com.**


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# NEWS MAKERS

*Continued from page 18*

come jumped $217,000 to $57,000, from a loss of $160,000. Diluted earnings per share also increased significantly from the year-ago quarter, rising $.07 to $.02 from a loss of $(.05). Strong demand for the company's 1MAGE suite of document imaging products, including Web solutions, accounted for a $320,000 increase (or 279%) in sales of software licenses to $434,000, as compared to $114,000 reported for the year-ago quarter.

While total second quarter revenue more than doubled for the current year, the greatest single contribution came from sales of software licenses to new end-users, accounting for 73% of the increase. Gross profit on revenue was 54%, up from 41% for the year-ago quarter.

"1mage Software's approach to imaging allows companies to make a 'real choice' in matching their existing technology investment with their need for document management," said David R. DeYoung, president and CEO. "1MAGE is designed to integrate with a company's line-of-business software and creates a seamless transition to document imaging and management without changing the way a company runs its business. With our scalable product pricing and extensive technical support, companies of all sizes can afford to install document imaging software while preserving the bottom line. Our approach seems to appeal to companies in a wide variety of industries, despite a weak economy."

During the second quarter, 1mage Software signed contracts with several significant clients including the University of Georgia, The Contributionship Companies, Brown-Strauss Steel, and Westchester Prepaid Health Services. ■

## Robert Czajkowski Appointed Director of Sales for Via Systems

**Via Systems** reported that Robert Czajkowski would be returning to the company as director of Sales. "We are extremely excited that we were able to bring Bob back to the Via Systems family," said Via Systems' president, Robert Catalano. "We feel that the combination of Bob's experience, and our product line, can only serve to increase our market presence."

After working for the last two years as western regional account manager for TeamShare, and as an account manager for NxTrend, Czajkowski brings over 15 years of sales experienced to Via Systems. "I'm delighted to be able to re-establish my relationships with my previous customer base, and look forward to working with all the new customers who found Via Systems during my absence," Czajkowsk said.

New and existing customers can expect to hear more from Via Systems, according to both Catalano and Czajkowski. "We intend to contact our existing customers, and make them more aware of our new products," Czajkowski continued, "while also getting the word out to non-Via customers who may benefit from our ViaDuct, WebWizard, UniVision, and WinLink product lines."

According to Catalano, "I'm particularly excited by the new prospects that Bob will open up for WebWizard, our Web development environment, and UniVision, our R83/ADDS/AP compatible MultiValue database. I feel very strongly that these products represent the future in the Pick marketplace."

Via Systems, a wholly owned subsidiary of EDP, Plc., is one of the most recognized names in the MultiValue industry. Established in 1978, Via Systems' first products included CompuSheet+, the industry-standard spreadsheet program. Today's products include the ViaDuct 2000 terminal emulation package; the WebWizard Web development environment; the UniVision MultiValue database; and the WinLink Windows integration toolkit. ■

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BY NATHAN RECTOR

# Diary of a PDA PROJECT

**I've discussed many different things concerning PDAs in the last few issues. I've written about the technical aspect of syncing your data. I've covered PDA design, and I've talked about programming tools. This time, I'm going to share with you an actual PDA project that I've done and how I did it.**

Who? What? When? Where? Why?

One of my long-standing clients called me about a PDA project for their production and installation staff. This business is in the construction industry, making, delivering, and installing products ranging from doors to windows to cabinets to the pretty molding you find around the base of your home. In addition to these areas, the client also has a retail hardware store.

This client wanted to do several different things with PDAs. One was to provide a device so that their manufacturing production people can enter job status and completion dates as each job is done. Another was to provide their installers electronic time sheets. Another was to provide their delivery people with an electronic copy of their delivery paperwork and locations of the materials to be delivered, then to capture the customer's signatures.

Even though I've mentioned three different projects here, for the initial planning I treated them as one large project with three sections in it. The reason I chose this was because we needed to decide which type of PDA they were going to use. There was no reason to start one project with a Palm platform and find out that another project required a Windows CE platform.

So to start with, we needed to ask the following questions: Who? What? When? Where? Why?

Who are we creating these programs for?

What are we going to be doing with the data?

When is the device going to be used and when is it not?

Where will it be used?

And lastly, but most importantly, why? Why do you need the PDA in the first place?

### Data Here, Data There!

Let's start with the first project that deals with the manufacturing floor and answer some questions.

### Manufacturing Department

What are we going to be doing with the data? In this case, the user will be updating job statuses and marking which lines on the order are complete. The items manufactured will be barcoded, so during completion, a barcode will be attached and scanned.

Where is the data coming from? The data will be coming from the MultiValue host system.

Where will the data be going? The data will be returning to the MultiValue host system.

Does the data need to be real-time or can it be batch? This data needs to be as real-time as possible, since customers and salespeople will be able to check this information on-line. They also need to get updates on the job and questions answered as they come up. Any urgent order needs to be placed in front of them as the day goes by.

### Installation Department

What are we going to be doing with the data? The data is used in payroll.

Where is the data coming from? The data will be coming from the MultiValue host system.

Where will the data be going? The data will be returning to the MultiValue host system.

Does the data need to be real-time or can it be batch? Since this information will be collected throughout the day and it is only payroll information, it can be batched and downloaded at the end of the day.

### Delivery Department

What are we going to be doing with the data? The department will be using it to view what they need to load on the truck. They need to update the items that are delivered in the company's computers and they need to capture the signature of the person signing for the receipt of the material.

Where is the data coming from? The list of items to be delivered will be from the MultiValue host system.

Where will the data be going? The items actually delivered will be returning to the MultiValue host system, but the signature must be stored on a PC file server since it will be a graphics file.

Does the data need to be real-time or can it be batch? This information can be batch-mode since once the truck is loaded up, they can't do anything until they empty it and return to get the next order to deliver. The information then can be downloaded and the new order can be uploaded.

You'll notice I have not yet decided on a Window CE or a Palm OS device yet. We still do not have enough information to decide this, other than personal preference which some people will already have going into a project.

*Continues on page 45*


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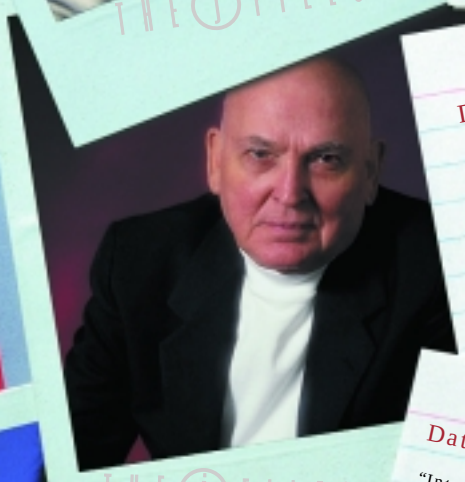

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jBASE is the launch point for connecting standard tools such as Excel, Word and Crystal Reports to the database. Once the connection is made, just access data or execute code directly from that industry-standard desktop application. jBASE OBjEX integrates seamlessly with Visual Basic for Applications (VBA). Plus, jBASE provides an OLE DB and an ODBC interface. Remember, to develop out-of-this-world applications, start with an out-of-this-world product: jBASE.

## THE FREEDOM TO INTEGRATE WITH ALIEN DATABASES.

Another innovation worth investigating is the jEDI. The jBASE External Device Interface provides a common set of rules and syntax to access any database or file system. With it, you can make the move from a MultiValue database to a normalized RDBMS system like Sybase, Oracle or SQL Server without re-writing your applications. Its flexibility even extends to its support of databases using embedded SQL. So, if your environment demands a mixture of different applications and databases, jBASE provides you with a common access method to them. This means that, even when coexisting with other data environments, the investment in knowledge is maintained because the code will be completely compatible.

## THE SHORTEST DISTANCE BETWEEN POINTS.

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Java OBjEX is a recent addition to the jBASE product set. It defines BASIC and other important jBASE elements to the Java environment, and allows the interaction of jBASE with any Java technology. Java OBjEX's versatility allows it to be used with any Java integrated development environment such as Visual Age and WebSphere. Or use it to create Enterprise Java Beans. Plus, when it's used with a Java Application Server, Java OBjEX yields a robust scalable implementation of an application for the Web or any Distributed Environment.

### Latest sighting

**jBASE WEB BUILDER**

jBASE Web Builder, the newest component of the jBASE product set, empowers developers to create industrial-strength business applications using Internet technology and their existing jBASE expertise. By providing a browser-based integrated development environment, jBASE Web Builder breaks new ground in the Web application builder arena. Simply put, it is the 'glue' that links widely available, open and standard technologies, ensuring that jBASE Web Builder applications can be deployed on all major technology platforms.

# Life After PICK

BY STEVE VANARSDALE

**DOWN IN THE CORNER between MultiValue and mainstream data processing, there is a small crack. It seems that a few authority voices in the data warehousing community have begun to murmur about the need for what they are calling "de-normalized" tables.**

## INTRODUCTION

The crisis is in system performance. It seems that even with all the CPU cycles being thrown at the column-and-row databases, they "hit the wall" when the flat files grow to millions of rows. "Not surprising," according to the father of data warehousing, Ralph Kimball, in *The Data Warehouse Lifecycle Toolkit*, (Wiley & Sons, 1998, p.361, "The source [database] may keep a rolling 12 months of data in 12 columns, or buckets. In that case, we need to create a month column and convert the record into 12 records, one for each of the 12 monthly buckets." In a test in my own data warehouse project recently, a megabyte of multi-valued sample data converted to Oracle exploded by 15,000 percent (ref: the exhibit at the end of the next article, called Appendix 1). It made everyone wonder how this can be considered the "modern" way to deal with data.

**Maybe it's not.** According to Lou Agosta, the senior industry analyst in data warehousing for the Giga Information Group, "In those organizations with superior project management, design, and integration skills, management may consider a design and implementation that denormalizes from the third-normal form of the classic fact table." (*The Essential Guide to Data Warehousing*, p.307, Prentice Hall, 2000)

The multi-valued database is essentially a de-normalized organization of facts. Yet for 20 years, MultiValue has remained a mystery to the experts that design data warehouses in traditional two-dimensional tables. Agosta's insightful work presents a Rosetta stone with which it will finally be possible to gain a place for true multi-valued databases with the mainstream data processing community.

His whole text is even more encouraging. "In those organizations with superior project management, design, and integration skills, management may consider a design and implementation that denormalizes from the third-normal form of the classic fact table. The next coordination required in the information supply chain also applies a maneuver in the time dimension. All of the quantity amount buckets in the classic fact table are keyed off of the product-customer-combination. Time becomes an implicit dimension. This greatly reduces the amount of storage required. Because space is being reduced by the inverse of multiplication, a kind of reverse combinatorial explosion — reduction — sets in. The result is a reasonably sized database of gigabyte, not terabyte, extent and improved response time. This is a counter-intuitive result — but, I submit — one that stands up to scrutiny. With a single customer-product "get row," all related quantity buckets are returned to the application. That is very powerful from a performance point of view." (Ibid)

Certainly this cannot be considered a ringing endorsement of the multi-valued database. I've spoken with Mr. Agosta, and he didn't realize that he was describing a multi-valued data model. The "state-of-the-SQL-art" that he describes still has a separate field for each value for each time period. But Agosta earlier makes the case himself for being sensible about the limitations of SQL join processing: "The number of dimensions that intersect to form a fact table in most data warehouse processes is significant enough justification to denormalize the data structures. The amount of space thus consumed is trivial in comparison with the space required for the fact structures, and performance will benefit." (Ibid, p. 276) Indeed, we "MV-users"

know that both performance and space savings can occur in a multi-valued OLAP, given enough horsepower. In a recent test, a process that would have been a ten-way SQL join producing 100,000 columns in 10,000 rows took only eight seconds in D3. on my old and battered notebook computer.

In a nutshell, this is what they're saying:

Up to now, about all we've done with business systems is to do business faster. The data warehouse finally delivers the promise of seeing the forest among the trees. It will tell us about our customers, about our products, even about our companies. The relational on-line analytical processor, or ROLAP, has long been considered the standard for the transaction layer of a data warehouse. But the fact files grow too large to navigate in a meaningful time frame. (i.e., Long enough to get the client's check to clear.) "Aggregate!" is the battle cry, with summary fields in place of the additive fields. But soon even this approach bogs down, with all the various ad hoc aggregations required and all the detail subsequently lost. (Woe to the company that doesn't realize that the record of a large purchase in the data warehouse is NOT the same as two small ones and certainly not the same as a large purchase, return, and another purchase.)

"Dimensioning!" is the solution, where customer indicative data and product data and market data are extracted from the fact rows into separate tables and "joined" at query time. Indexes on the extracted dimension tables improve performance. This "multi-dimensional" or MOLAP approach is now the fashionable component of the data staging phase. Yet this approach falters when there are more than three dimension files to be joined. And fails completely, when there are two fact tables, like transactions and customer history.

So apparently the ROLAP (relational on-line analytical processor) and the MOLAP (multi-dimensional) are inadequate. What's needed is an MROLAP. That is where a multi-valued database works perfectly, for both the data and the data-about-the-data, or metadata.

Data warehouse projects using multi-valued ETL and data staging typically show cost savings of 30 percent to 50 percent or more. It can mean hundreds of thousands or even millions on a large data warehousing project. This takes the bonanza of data warehouse knowledge generation beyond marketing, to manufacturing, retailing, and operations, even for a mid-range business organization. It means that you have a role in giant projects with Oracle and with Microsoft.

While Agosta may not have knowingly endorsed the multi-valued data model, our own intimate understanding of MV shows his words to be another in the list of praises for its characteristics. It matters little that he proposes de-normalization in the ancient form of redundant equivalent fields, rather than true multi-valued attributes and items; the import is exactly the same. Because, in truth, his learned observation is more than a common good idea; it is the tip of a greater truth: that a multi-valued database that is used as an MROLAP environment has sufficient benefit at data acquisition, transformation, and dimensioning as to be a responsible and even essential consideration for any major data warehousing project.

Perhaps the mainstream is finally coming around ... just a few decades later than we expected.

*That is the discovery we will discuss in the following few articles. Beginning with "de-normalization" in the way of multi-values, right here in this issue of* Spectrum. *Then we will discuss application of a multi-valued data model to the classical stages of a large-scale data warehouse project. Next we will discuss data acquisition for the data staging, and finally we will introduce the "perpetually spinning transform engine" concept using a D3 database. As we shall discover, the multi-valued database is more than a curiosity; it can be an essential and rewarding tool for both data and metadata, and for a career after Pick.*

*Continues on page 28*

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## The Roles of MultiValue in Data Warehousing and the Limitations of Data Warehouse SQL "Dimensioning"

# Diamond in the MAINSTREAM

### Section 1: The Multi-valued OLAP model

***"Something wonderful has happened," said Dave in Stanley Kubrick's movie "2001." It seems this quote is fitting for more reasons than the date. We have discovered a new use for the MultiValue data model ... maybe the true use. During the course of the next few articles, we will bring you a series on our innovative uses for MultiValue in data marts, operational data stores, and data warehouses, both real and proposed. Along the way we will demonstrate the method of "producing business intelligence with an intelligent budget" ... thousands of dollars instead of millions. And finally we will publish the specifications for the ultimate data warehouse tool, a data staging program that we call "the perpetually spinning transform engine."***

All data warehouse design is based upon two objectives: comprehension, or capability of the user to understand the data, and performance, usually defined to mean the relative ability of the user to navigate the data in an acceptable timeframe. According to the experts, these objectives inevitably are more difficult and more costly than it seems at the outset. *("Data Warehouse Project Management," Sid Adelman and Larissa Terpeluk Moss, p.134)*

Coincidentally, these objectives have traditionally been the major benefits of the MultiValue database: economy in both space and requirements for acceptable performance.

As illustrated in Appendix 1 at the end of this article, in many data warehouse environments the sheer volume of the fundamental transactions, or facts, overwhelms the ad hoc query mechanism. This is not unusual, given the nature of the two-dimensional "stacked table" approach to repetitive information, and the tedious mechanism of SQL. The usual remedy is called aggregation, or the process of using the sum of transactions along some pre-determined dimension, such as a week or a product number.

But aggregation results in a loss of knowledge. It is frequently observed that multiple purchases within the summarization time frame (i.e., week) are not the same as the single large purchase, and especially not the same as the purchase, return, and subsequent purchase. Even a relational on-line analytical processor (ROLAP) cannot overcome the absence of data. Only a multi-valued MROLAP eliminates this problem, by providing a data structure and retrieval method capable of multiple discrete facts within a single, fully relational row. *(See Figure 1)*

**FIGURE 1:** multi-valued fact

***Logical:***

```
                                    ] QTY3 ] PRICE3
                                    ] QTY2 ] PRICE2
sequential key ^ DATE ^ CUST.NO ^ SKU ^ QTY1 ^ PRICE1 ^ BRAND ^ MARKET ^ STYLE
```

***Physical:***

```
key^DATE ^CUST.NO ^SKU ^QTY1]QTY2]QTY3^PRICE1]PRICE2]PRICE3 ^BRAND ^MARKET^STYLE
```

In use, the MultiValue query tools can produce aggregate summarizations as they were physical record fields, and can still produce time-sequenced transactions at the lowest level.

## There Are Many Benefits

First, performance: a single query will return either summary data or atomic detail data, or both. Modern multiuser databases are burdened with overhead for each record access, and any shift of work from accessing to CPU processing is an efficiency improvement of at least two orders of magnitude.

Second, storage: while the cost of disk space is continually coming down, according to Lou Agosta in *The Essential Guide to Data Warehousing* (Prentice Hall) larger is not necessarily better when one factors in the costs for additional hardware, backup, support, staffing and the attendant technical challenges.

Third, accuracy: rather than simply becoming additional data to be maintained, multi-valued aggregate data is derived from the detail at the instant that it is delivered, eliminating inconsistencies, as well as the need for maintenance.

The fourth major benefit is elimination of the major drawback to both de-normalized tables; namely, the burden of maintaining "rolling buckets" of additive fields. In standard de-normalized models, there is a field or "bucket" for each quantity, such as the monthly total, which must be periodically maintained in sequence, adding or "rolling" from bucket to bucket. When the data is held in the multi-valued MROLAP, the latest value is inserted at its specific location within the associated set, whether it is the front, or the end, or a location established by a controlling multiple-valued field such as a series of transaction dates. Then summary or aggregated data is dynamically produced by a relational rule applied at the instant of the query. So there is no possibility that aggregate data is inaccurate or between updates.

There are more benefits, but the fundamental truth is that the multi-valued data model has unique intrinsic value, for old-school applications and for state-of-the-art data warehouse fact tables, because the multi-valued MROLAP environment is keyed to multiple equivalent values and summary functions as if they were the normal form of data.

**Which may well be the case.** Note that, as opposed to the simplifying assumptions made in the late '60s when the relational model was developed. most business customers today have more than one phone number. And make more than one purchase.

So perhaps the ability of the multi-valued MROLAP to handle the true nature of real-life data explains the widespread use of MultiValue for applications and for transaction processing, and for ad hoc reporting (several thousand commercial applications, and counting). What about MultiValue in data warehousing? That's the real news: that a major strength of multi-valued databases for OLAP squarely meets a unique problem area for a successful data warehouse.

## Dimensions Are NOT the Answer

Experts agree that the major challenge for data warehousing is not to collect the data, but rather organizing the data so it's easy to comprehend and to navigate. The performance penalty for doing otherwise is significant, because of the inherent mechanisms of traditional query tools like SQL. Not surprisingly, since SQL is the foundation for most of the OLAP tools, the current practice in data warehousing is to organize the data on the basis of indexes called "dimensions" by which the data will be searched, selected, and "joined" into results sets.

Hang on here, because it sometimes seems confusing. Here is the key: *"Dimensions" as practiced by data warehouse experts are NOT the dimensions in MultiValue databases, but rather a subsidiary table used as an accessing method.*

A dimensional table in the data warehouse is composed of related textual data, or that data that is indicative to facts rather than additive, i.e., customer data and product data, versus quantity and price. Dimensional data is extracted from each fact and put into a separate table, where usually there is a one-to-many relationship (more than one fact, like a sale, usually shares one set of related dimensional data, like a customer) Then the dimension table(s) are joined to the fact table and used for the selection and sorting phrases in the query. In this way the query performs better than if the query were to select and sort the primary fact tables.

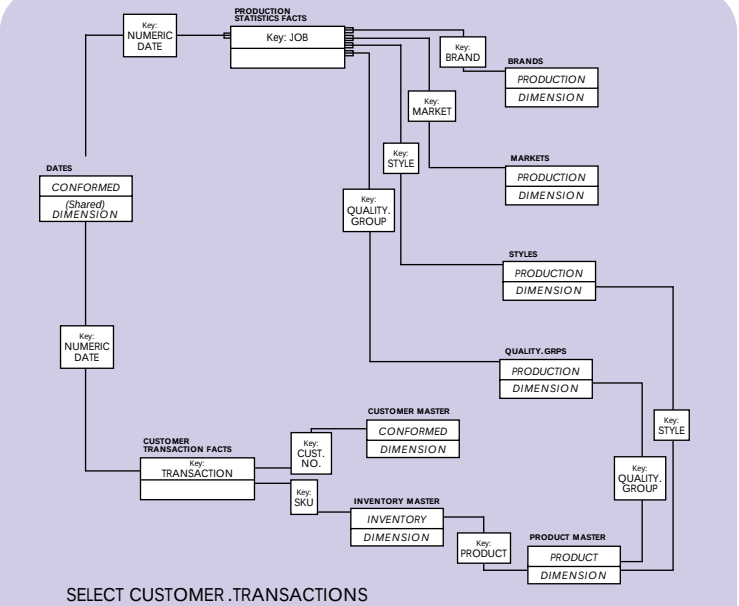
Parsing the dimension and join phrases in an SQL query is often the most time- and resource-consuming operation. In contrast, dimension tables are standard structures in the multi-valued OLAP, usually called translations. Moreover, the multi-valued database employs its relational join in the rules dictionary rather than in the query. This results in fundamental query efficiency and flexibility, and adds interesting extra capabilities.

One such capability is progressive joins, called by a single word in the query. The multi-valued operational data store is capable of progressive joins to a level beyond SQL practicality, including recursive joins. Another interesting extra capability is that foreign key indexing is not required. "Non-additive" or textual data is routinely extracted from multi-valued transactions, or left out entirely. All that remains is the unique code that identifies the data extracted and stored in another table, and the code is the key. No indexing is required. Furthermore, this type of "foreign key" can be hidden by a relational rule that serves up the joined or "translated" data to the requesting process. This translated data can be anything from a simple text string, to a complex calculation or series of progressive and recursive joins.

It can also be a join to an entirely new fact table with dimensions of its own. Following *(see Figure 2)* is an example of dimensioned fact table created for a large manufacturing operation in the northwestern United States.

*Continues on page 30*

**FIGURE 2:** multi-valued translation functions




SELECT CUSTOMER.TRANSACTIONS
WITH CITY "Chicago" AND
WITH STYLE "01" "02" "05"
BY HOLIDAY BY QUALITY.GROUP

*or, What level of quality are customers in Chicago buying during the holiday periods?*

## Diamond in the Mainstream

*Continued from page 29*

With a simple multi-valued relational join or "correlative" the dimensional data of customer, brand, market, and any other dimension can be served up from dimension tables without cluttering up the fact table and impeding query performance. Using a multi-valued database, the model was relatively easy to create, and it contains at least one unique aspect. Note the Product Master dimension table is also a fact table with dimensions of its own, STYLE and QUALITY.GROUP.

Furthermore, this feat is performed in less than half the space required for a dimensioned fact table in Oracle, SQL Server, and other traditional data warehouse fact environments. Actually much less than half (ref. Appendix I, Fact Table Sizes Case Study). And as pointed out by the expert, Agosta, even if disk space is cheap, implementation and maintenance of all the extra disk mechanisms are not. Not yet, anyway.

*This is just the first step in the benefits of MultiValue for data warehouses. For data warehouse projects, it's been said that "success is in the journey as much as in the destination." Successful data transformation from source files to target data stores means management of the data about the data, the metadata. The multi-valued database, by its nature, has a formal dictionary definition for all physical and logical (derived) fields, plus a unique ETL tool that utilizes this metadata, for both documentation and dynamic "no-code" data staging. Using a multi-valued MROLAP to manage the metadata means getting there is half the fun. Metadata is central to the subject of our next section, and the next. Please stay tuned.*

### Appendix I - Relative Fact Table Sizes Case Study

At a printing company in the Northwest, production statistics are captured for each job on each roll-fed printing press. Oracle data warehouse tables created from multi-valued database files in the legacy manufacturing system are estimated to be approximately 1.5 million rows, in seven tables, with a byte count using surrogate keys estimated to average 100 bytes per row (~150 megabytes).

***The original files in the multi-valued database occupy about 1 megabyte of disk space. ( 0.6%)***

**Plant 1, Statistical File 1** (primary table) — **Oracle tables:** 33,614 rows

**WASTE.CODE** (sub-table)

| *No. of unique value sets* | *No. of occurrences* | *Resulting sub-table rows* |
|---|---|---|
| 1 | 863 | 863 |
| 2 | 28678 | 57356 |
| 3 | 3464 | 10392 |
| 4 | 562 | 2248 |
| 5 | 44 | 220 |
| 6 | 2 | 12 |
| **Total** | **33614** | **71091 rows** |

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Other value sets:

| | | |
|---|---|---|
| **ROLL.NO** | **257193 rows** | |
| **DOWN.TIME.CAT** | **150280 rows** | |
| **SEQ.STREAM.NO** | **165527 rows** | |
| **Total Plant 1 File 1** | **=>** | **677,705 rows** |
| | | |
| **Statistical File 2** (primary table) | | **162,357 rows** |
| **WASTE.CODE** value sets | | **65041 rows** |
| **Total Plant 1 File 2** | **=>** | **227,398 rows** |
| **All other plant production statistics files:** | | |
| Plant 2, Stat File 1 | 3780 | |
| EMP.CLOCK.NO | 3915 | |
| ROLL.NO | 44246 | |
| DOWN.TIME.CAT | 5943 | |
| SEQ/STREAM.NO | 24963 | |
| Plant 2, Stat File 2 | 85232 | |
| WASTE.CODE | 50634 | |
| Plant 3, Stat File 1 | 6576 | |
| EMP.CLOCK.NO | 6606 | |
| ROLL.NO | 86779 | |
| DOWN.TIME.CAT | 22716 | |
| SEQ.STREAM.NO | 44669 | |
| Plant 3, Stat File 2 | 44657 | |
| WASTE.CODE | 7918 | |
| Plant 4, Stat File 1 | 13882 | |
| EMP.CLOCK.NO | 4118 | |
| ROLL.NO | 43154 | |
| DOWN.TIME.CAT | 4073 | |
| SEQ.STREAM.NO | 81166 | |
| Plant 4, Stat File 2 | 22127 | |
| WASTE.CODE | 15501 | |
| **Total for all other plant account files** | **=>** | **622655 rows** |
| **Total for ALL STATISTICAL files** | **=>** | **1,527,758 ROWS** |

**STEVE VANARSDALE, CPA, CDP, CCP, formerly VP at Pick Systems, and now a consulting systems architect and interim-CIO-for-rent, is an infrequent contributor to *Spectrum* who is familiar to those who've been around the MultiValue community for a long, long while. (Runner-up for the "World's Oldest Pickie" title a few years ago, Steve claims that he simply started very, very young.) Steve writes and consults from his office in Mt. Prospect, Ill., a suburb of Chicago ... not nearly as rural as it sounds. www.pick-sap.com is**

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# Application Hosting
## Targets New Business F

**APPLICATION HOSTING GROUP (AHG), a new company created to provide data center and consulting services to UniVerse and UniData (U2) users, may be a new kid on the block, but its founders are definitely not new to the scene. With more than 60 years of combined experience among them, Jon Kristofferson, Tom Dodds and Harry Reiter recently established a business schema to provide a variety of support services to U2 users and developers which they identified as lacking in the MultiValue community.**

### For the MultiValue File

**COMPANY:** Application Hosting Group (AHG)

**FOUNDERS:** Tom Dodds and Jon Kristofferson

**FOCUS:** Providing a secure and reliable data center in which to host clients' MultiValue applications. By sharing the considerable costs involved in creating a state-of-the-art data center, AHG's clients can realize substantial economical and technological benefits.

**HEADQUARTERS:** Naperville, Ill.

**E-MAIL:** info@4ahg.com

Tom Dodds, Harry Reiter and Jon Kristofferson joined forces to form Application Hosting Group, a new company that provides application hosting services to MultiValue clients who want to improve IT operations while reducing costs.

Application hosting is one of the latest trends in information technology, a trend that AHG is well-suited to address. Throughout their careers, the principals of the company have been very active in consulting services and have served in varied roles in the computing industry. Kristofferson provides a vast knowledge of the technical side of the industry melded with many years of the practical application of this technology to end users' applications. He is fluent in Unix (AIX, HP-UX), Windows (NT/2000), UniVerse, UniData, and many other languages and tools. Dodds' vast and broad exposure to the end-user application provides a depth of reality to each project. His project management experience provides a firm foundation for development, migrating, or maintenance projects. Reiter is the "solid, long-term, tenacious part of the equation," according to Dodds. His years in the industry and variety of experience often keep a project on track by identifying potential inconsistencies before they are buried deep in the application. In view of the extensive technical backgrounds of the founders,

# Group Paradigm

it's no wonder that AHG states that its roots are in service.

"During our long consulting careers, we noticed that our clients could use improvements in their computer room environments," Kristofferson says. "We were also aware that there are substantial savings, due to economies of scale, in maintaining a centralized data center. Now that the technology exists to allow companies to share common data centers, we felt that there was a marketplace for MultiValue clients wanting to improve their IT operations while at the same time reducing their costs."

We often hear the term "Application Service Provider (ASP)" bandied about. However, application hosting, as defined by AHG, is something quite different from ASP. "Our hosting differentiates itself by offering each client their own servers," Kristofferson comments. "We feel that shared servers lend themselves towards the ASP model of service. We are offering an application hosting service with dedicated servers. We also feel that we are in a unique situation in that our first data center is of such a high caliber. The data center was designed and built expressly for application hosting. We feel that the built-in redundancy and security features would appeal to everyone."

AHG maintains a staff of U2 professionals to service customers' applications in its data center facility. Its hosting service includes configuring the operating system and database for optimum performance. A full backup is performed each day with restores made by the

## Data Centers Offer Economies of Scale

### Top 6 Ways Application Hosting Saves Money

1 Eliminates hardware maintenance costs: In an age of rapidly changing technology, it can get expensive and time-consuming trying to keep your data center up-to-date. AHG updates its technology regularly to ensure the best performance for your system.

2 Eliminates operating system software maintenance costs: Operating systems pose a myriad of choices to even the most experienced user. Often IT is not your primary business, but the flawless performance of your data center can be critical to the daily operation of your business. By outsourcing your applications to a data center, you get computers that will work properly without spending excessive amounts of time adjusting your system.

3 Eliminates hardware obsolescence: A computer system is a big investment that can become obsolete in just a few short years. Replacing your computers is a process involving considerable cost and often downtime, which in itself is expensive to your business in lost productivity. When your system is hosted by AHG's data center, AHG takes care of all system maintenance, including making sure your system stays current with no interruption to your service.

4 Reduces IT staffing requirements: AHG provides support for all the applications it hosts, eliminating much of the need for a large in-house IT staff, often for less cost than even one administrator.

5 Temporary IT staff: Your needs change as your business does, and this can mean having to hire more staff to handle it. AHG provides consulting services to have staff available only when you need them.

6 Expand IT capabilities: As your application needs change AHG can increase or decrease your hardware environment. By only paying for IT resources you need you can be assured of only paying for what you need. Upgrades to your IT environment can be performed quickly and with little or no downtime. Upgrades will result in small monthly service fee increments as opposed to large capital expenditures.

**Source: Application Hosting Group Web Site, www.4ahg.com.**

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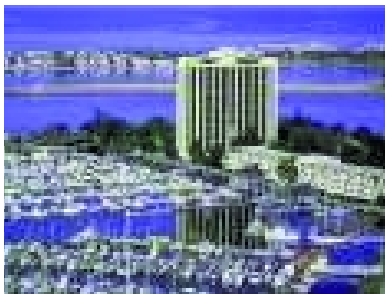

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## Application Hosting Group

*Continued from page 33*

client's request. Regular file maintenance is performed monthly on the client's application files. AHG's services also include system administration tasks such as adding and deleting users and printers, and monitoring for possible problems such as running out of disk space and runaway processes. Additional systems are also available for disaster recovery, application testing and software development.

When it comes to service, AHG definitely believes in being thorough. Among the services the company offers to enhance clients' existing professional staff are system tuning, operating system auditing and data cleansing, the process of inspecting data and cleaning it up. "This service can range from inspecting for and removing control characters from the data to correcting and updating names and addresses by processing them through postal services," Kristofferson explains. "We can purchase software and services that would otherwise be prohibitive for a single company and share them across several companies."

AHG is able to audit a client's application in an offsite, professional environment that doesn't compromise the client's daily operations or data integrity. "We will utilize a variety of in-house and third-party tools that have been selected for their applicability to the task and for their known reliability," he says. "We will also work with the client's existing staff to develop a workable written plan to implement the recommendations that have been made through the auditing process. We will, if desired, re-audit the environment after implementation to ensure completeness and accuracy."

For clients who may not have sufficient or experienced staff to implement the recommendations, AHG can implement those recommendations.

The vision that AHG's principals share is to provide a "technology haven" for its clients, Kristofferson says. "By that I mean we want to shield our clients from the ever-changing technologies by offering these new technologies as services. This would reduce hardware obsolescence and minimize the training required for the administration of new technologies. The newest technologies regarding the Internet and changing from browser-based applications to more interactive applications is one area that we are currently looking at."

Clearly, the immediate goal of the company is to continue building its hosting and consulting business. As AHG has pursued that goal, everything has not turned out exactly as the founders predicted. "We originally thought that our client base would be made up of smaller MultiValue customers," Kristofferson comments. "It's surprising to find out there is a lot of interest by large MultiValue clients as well. We have also had a large number of corporate data centers that have small MultiValue applications that they wish to outsource."

Combining the advantages of a cutting-edge data center and solid consulting services, AHG has likely hit on a winning proposition that will save clients money while allowing them to have a well-maintained, state-of-the art computer system. Kristofferson adds: "The primary benefits would be a secure, reliable data center with 24/7 monitoring and support. We can answer support issues with regard to networking, server administration and U2 database administration. We are also well-versed in U2 applications and provide tailored support for MultiValue applications. How much money we can save you depends on many things.

"Our overall cost models show that we can provide a U2 application server with adequate processor power, memory and disk, 24/7 support and monitoring, backup and U2 file resizing, all for about the salary of a system administrator. If your readers have higher costs than that, we sure would like the opportunity to talk with them." **is**

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# SEVEN YEAR ITCH

BY MELVIN SORIANO

## Webonomics Looks Back to the Future

MELVIN M. SORIANO works at Eagle Rock Information Systems (ERIS), an Internet Application Service Provider and WebWizard/MultiValue developer. ERIS has deployed enterprise-wide solutions on most MultiValue platforms and operating systems. HTM-Mel can be contacted at mel@eaglerock-is.com and visited at www.eriscorp.com. You can always call him directly at ERIS's Pasadena offices: (626) 535-9658.

**LIKE MOST THINGS IN LIFE, technology and economics change relentlessly. They ebb and cycle, shift and jump. I've been writing this Webonomics column for seven years and, as befits the hazy, lazy days of summer's end, I've been feeling a bit reflective. I thought we could look back at what many thought was going to happen webonomically and what really occurred.**

We anticipated that IS was heading away from PC-centric, client-server technology, returning instead to server-based solutions. Many in our database world welcomed such a return with unbridled glee; others feared a relapse again would lead to database ostracism and second class-citizenship. Actual events have been a surprisingly mixed result.

PCs still rule supreme on the desktop. Even when the only Windows program running on a desktop is a terminal emulator, a PC rather than a terminal sits smugly next to the telephone. But the re-centralization has definitely occurred. The Web almost created such demand single-handedly. In addition to that browser-driven demand, the mere sustained existence of all those emulators reflects our dependency on server-based solutions.

Peoplesoft astonishingly advertises that it is the only enterprise solution that does not require "client" software! Microsoft is betting the farm that its ".NET" initiative will drive server-based operating system and application software sales. Actually, more important than sales, they now prefer use-based subscriptions.

That's right. Subscriptions based on use. Can you say time-slice, 1970s, and disco?

I believe that centralization shall go further. Sun Microsystems erroneously believed that by now we all would own dumb PCs, i.e., terminals, though using browsers instead of character-based 80x24 matrices. Such think-

ing was summarized as "the network is the computer." Today, it seems to me that what with upcoming molecular fiber chips, XML, and subscription services, the WIRE ITSELF is becoming the computer.

As centralization and miniaturization continues, we will see exaggerations of what happens today. We already can count the millions of geeks and business suits turning to Palm Pilots and similar devices to stay connected or, at least, updated. As cell phones become ubiquitous communication tools, centralized services and data inevitably will move there as well.

More than technical cycles have surprised us in the past several years though. Economic forces dramatically influenced technical planning, prioritization, and implementation schedules. Moreover, one probably would not have predicted the stock market bubble that gripped America. And above all this, what once were modest trend predictions became foolish, market-making sound bites.

For example, many thought more goods and services were going to be purchased online. Extremist pundits claimed that brick-and-mortar businesses were doomed, that matter didn't matter anymore. Thank goodness they were wrong.

People want to shop and discover good deals. They like the little surprises, the people-watching, the human interaction. We judge trust-worthiness of person and product from face-to-face contact, not just from a picture. And despite the hopes of companies such as WebVan, we want to examine produce and use clipped coupons.

But neither should we ignore reality. Hundreds of billions of dollars now are traded over the Web. This will only grow in size, although not at the pace some would hope.

Physical sales were one prediction, but the shape of the universe was at stake, too! Distance and time were supposed to disappear. The Internet would put anybody in any office or location in nanoseconds. This expectation has been largely met. Of course, this prediction has been made before. It wasn't entirely true in the past and isn't today. After all, the first transatlantic telegraph line supposedly "annihilated space and time" forever.

Distance remains a peculiar problem. Despite the perception that the entire workforce could telecommute from remote mountaintops, local communities of specialization remain not just viable, but more likely, required. Academics have described such clustering as becoming even more important in a time when knowledge, creativity, collaboration and experience surface as the prized assets.

*Continues on page 38*

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## WEBONOMICS 101

*Continued from page 37*

But, despite the limitations or compacting virtual distance, progress has been made. Many businesses depend on packet-based telephones, e-mail, webcam meetings, and chat software for instant cost-effective communication. The current economic slowdown has highlighted these developments; much to the distress of airlines, business travelers are saving money by using these alternate approaches successfully. Internet microdistance is therefore a cost-saving option, but not yet a replacement for real, tacit interaction between individuals.

Time has in many ways, though, become far more compressed in the past few years. There was a time — really there was — when we could wait until we got into our hotel rooms before calling and notifying someone of our location and getting updates from the office. Now, we can and do get instantaneous e-mail, voice, video, Web pages, and even global positioning regardless of where we might be. The payphone industry has practically gone belly-up, lacking an adequate response to this instantaneous gratification. By now, we may know how important it is for that one teenager to explain via cell phone that he's watching a movie ... while sitting in the crowded theater.

Given the popularity of such devices, I have to imagine that we desperately need to compress time. Sooner or later, though, I imagine a ricochet effect, where we avoid instantaneous communication with the world. Vacation just doesn't seem like vacation anymore.

Both the distance and time contraction predictions were rooted in the belief that we have become a knowledge-based country and that people are our most prized asset. This is probably true, at least for the most part. During the recent slowdown, most companies have gone to considerable lengths to work with the laid-off employees. As the slowdown continues, however, there is evidence that generous packages have given way to more standard layoff deals. But, on the whole, it appears as though the smart, creative, knowledgeable people are valued and accommodated.

One myth has exploded rather spectacularly. It was once assumed that those who strongly established their businesses on the Web first were to gain unprecedented advantages over new entrants. First comers win. The thinking was that the Web favored those with feature-rich sites and that customers would not shop around once they became comfortable with the initial sites.

As the landscape littered with dotcom ashes might suggest, such efforts were not only quite wrong, they were astonishingly expensive. Enormous sums of money were invested on hardware, services, and software, largely because of this unproven assertion. People did not blindly stick with the first Web site they found; they wisely switched whenever financial savings or better service/products could be found.

This "first in" concept is somewhat related to another highly discussed new economy feature. The "network effect" implied that as more people participated in some new product or service, there were geometric increases in benefits to all participants. Imagine the first telephone. It was thoroughly useless. It was the second phone that made the first phone worthwhile because it created the opportunity for a connection. The third phone created not one but two chances for connection. The fourth created three chances and so on.

But this network effect was misunderstood by many. It depends on static infrastructure and behaviors. It did not imply that any item would forever be insulated from commoditization. Netscape certainly could not avoid that fate. Even today, fiber optic networks themselves have become commodities

that could be swapped out, as cost pressures force intense competition to battle until blood is spilled.

To avoid commoditization, you had to create opportunities for peer-to-peer interaction. Fax machines and telephones allow anybody to interact with anyone. Any dissimilarity in the technical standard would prevent network benefits from ever appearing.

Another prediction stemming from distance and time reduction was that the Web would thoroughly empower buyers over sellers. Price information would be totally transparent and you would need to deal with the fact that people could begin treating your products as mere commodities. They could even enlist the use of "bots" that would robotically scour the Web to find the lowest priced goods.

What might have developed instead was the rise of two distinct types of buyers. If saving money was your priority, you would act as this theory predicted. If, however, you valued time, service, locality, and predictability, you might ignore value pricing and instead select a vendor that met your own private, specific needs. Amazon has higher prices than Barnes and Noble, yet they still sell more items because they provide excellent features and shipping options.

It's possible to be both types of buyers, depending on the time of day, cost priorities of a specific item, or even if you're buying for home versus work. That's the beauty of the Web, though. As it has evolved and matured, it's flexible enough to be a tool for all people in all their moods.

College kids are now just as likely to hang out in a chat or on a music trading site as hang out in coffee shops. Women now outnumber men online and, though men spend more on computer-related items, women spend more money online. The prominence of U.S. sites is rapidly giving way to the rest of the world, including countries that don't use the Western alphabet.

A taste of the future maybe? We'll leave that for another day. For now, the flight attendant just told me to put this Palm Pilot away so that we can land. Honestly, no Palm, no cell ... what's a guy to do? **is**


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BY STEVEN BACKMAN
*President, Database Designs*

# XP and .NET Will Make a Difference

## Do you need XP? Do you want .NET?

**Better to ask, can you avoid them. Let's start with XP. Unless the government manages to derail the arriving express, new computers will come XP-bundled by November. Windows XP will come in different flavors from desktop to servers, promising to reunite the Windows family for the first time since Windows 3.1. And the developer world has faced constant hype and speculation about .NET for what seems like forever. Though, as we will see, it's "forever marketing" with Microsoft, and though software developers and system administrators may feel content in one or another niche with steadily running business applications, we should all look at these developments as opportunity first.**

### Windows as Last Bastion of Free Enterprise?

For 10 years or so, Microsoft server software has had a different underlying code base than its desktop software, like Windows 95 and 98. Windows XP promises to end that, by having a single, scalable code base running from home user desktops, to business user environments, to network and enterprise systems.

On the server side, XP will inch Windows forward as a secure, reliable platform for enterprise level network and Web server hosting. Of course, Microsoft needs this given the steady stream of black eyes it has suffered over security and stability issues this past year or two. Even with this bad press, Windows 2000 Server's improvements over Windows NT allowed it to gain ground against other network and Web server platforms. Up above 40 percent market share now, XP could push it close to a 50 percent share over the next couple years. *Business Week* reported that the market for Windows NT/2000 servers grew 32 percent last year, while UNIX/Linux-based server sales grew only 14 percent (see cover story, June 4, 2001).

A little more quietly than before the federal court suit, Microsoft continues to fire away at PC makers selling and buyers purchasing "naked machines," that is, microcomputers without an operating system installed. Ostensibly to track down use of pirated software, many observers connect this to the new frenzy against Linux and other Open Source products.

Ironically, Microsoft's own marketing practices provide some of the best arguments for Open Source. With Microsoft (along with other industry giants) using vast wealth to buy out, drive out, and weed out independent software innovators, it's hard to take at face value its argument about Open Source software distribution weakening intellectual property rights. Further, in its steady churning of systems, slogans, and software tools, Redmond often shows monopolistic contempt toward users, partners and independent developers seeking stability, security, and support at reasonable cost. So when Microsoft turns around and alerts the user community that using Linux and Linux-oriented tools means putting your mission-critical server outside the reach of market-driven, profit-oriented capitalist pressures, more and more administrators say, "Hey, sounds good to me." (See "Microsoft Again Takes Aim At Open Source," in Computer-World, May 7, 2001.)

Administrators installing separately purchased server software, such as MultiValue database environments, may continue to find it seductively easier to get started on Windows-based servers. But Linux will likely continue to outshine for week-in-and-week-out stability for those prepared to make the leap into that realm.

### Windows Everywhere, or Not

On new desktops, computer buyers probably will find it harder and harder to avoid going forward into 2002. If the new technology holds up, users will gain something in basic sturdiness, at least compared to Windows 95, 98 or (ugh) ME. And what does Microsoft get? Well, let's not leave out the likely cash windfall, which will no

doubt add to the company's $30 billion bank account. Strategically, Microsoft gets an even mightier platform from which to lure, charm, and entrap personal computer users into using as many Microsoft-related services as possible.

While computer techies may focus on Windows XP vs. Linux or Unix as systems platforms, in the big world out there, XP sets its strategic sights as much on America On Line as anything else. Now merged with media conglomerate Time Warner, AOL and Microsoft have risen to the top of a dwindling heap of Internet services conglomerates (like Yahoo). On the paid subscriber battlefield, AOL still outhustles Microsoft's MSN (as well as other national players AT&T and Earthlink), and this despite higher cost, consistently lower ratings by users on connection speed and success, and a generally claustrophobic user interface. But Microsoft's MSN has quietly clawed its way to the number two position. And when you add in Microsoft's other services, like Hotmail and its instant messaging, Microsoft has an array of tools luring about 50 million Web surfers to the MSN Web site every month, and from this delightful consumer portal, branching out to the preferred Microsoft partners.

Expect AOL to fight back hard. It recently announced that new Compaqs, though sporting Windows XP, would also give a more privileged position to AOL than to MSN in the factory-built desktops. In the bidding war for such things, Microsoft has finally found a match. While other rivals may be buffeted by the high-tech slow down, AOL/Time Warner is less hurt for cash. More significantly, watch for AOL to take growing advantage of Time Warner's other, non-personal computer strengths such as cable TV. Observers expect it to seek an end run around Windows-based desktops rather than challenging it directly. For its part, Microsoft has new artillery in store.

Database administrators and application developers have enough to worry about already thinking about integrating personal digital assistants. Why should they concern themselves with the battle for game machine, personal digital assistant, cell phone, cable TV controller, not to mention auto dashboard, microwave and refrigerator software "desktops"? The next few years will likely show that guerilla wars won and lost on these more esoteric but vastly larger consumer appliance battlegrounds will turn around and affect what business users see and developers can use for core applications.

It's important to weigh in these factors because a systems manager or software developer may lose sight of the critical big bucks driving forces in the timing and framing of new Microsoft technology. Microsoft constantly seeks to enter new markets, and has enough resources such that even while some investments flop, others gain ground. It's genuinely hard to recall that period in the early 1990s when Bill Gates had to acknowledge Microsoft's misjudgment of the importance of the World Wide Web. While so many .COM start-ups folded or went on life support last year, Microsoft's earnings and stock value rose.

## Load Up the Servers

Now that we have a picture of the coming desktop and server software wave, let's peek at what will get loaded on it. In the database realm, IBM and Oracle now battle it out for the top spot. Microsoft seems content to continue to gain ground chiefly based on lower price. By all accounts, Oracle continues to lead the way technologically for applications with the most demanding requirements. But this power comes at a steep price, in complexity, and therefore implementation time, as well as licensing and consultant costs. Many shops without deep enough pockets have found this out the hard way.

IBM meanwhile has come back hard in recent years, offering much greater flexibility in adapting users' choice of tools to the task than does Oracle. It also continues to bolster its non-mainframe product line, including acquisition of third-ranking Informix. IBM's strategy of offering wide choices in database and supporting tool technologies may bode well for UniVerse and UniData users now finding themselves in the IBM fold.

In a *ComputerWorld* poll of enterprise level users last spring (reported June 18, taken just before the Informix purchase), IBM edged out Oracle on its core DB2 pricing. Though Oracle continues to get the highest marks among mainstream database environments for features at the high end of things, it has had to cut back on its totally outrageous costs. Whatever their relative differences, both IBM and Oracle both had significantly higher approval ratings than Microsoft on scalability, reliability, onerous licensing, tech support and other service factors. Rounding out the commercial relational database pantheon, Informix and Sybase have languished at the bottom of the heap with Microsoft, but without Redmond's other resources (did someone say "monopoly" again?) to press forward the case. Open Source database software, like MySQL and Open Ingres play important roles on the Internet particularly, but so far lack the full-service programmability of the mainstream products, though this may change over the next year or so. And has ever been the case, other database software "worlds" rarely get distinguished from catch-all "other" or "legacy" categories, certainly doing a disservice to high performance realms like MultiValue.

In any event, while IBM and Oracle, typically running on high end Unix systems, steadily come out at the top of the heap, Microsoft SQL Server running on Windows makes up for this deficit chiefly through its lower raw cost. Year after year, Microsoft eats away at the database market from two ends.

First, where the top vendors stumble in servicing or pricing updates for enterprise scale sites, Microsoft stands ready to move in. It may not win that many of these battles, but enough to gain momentum.

Second, it scoops up lower end sites that have outgrown desktop databases, a market which Microsoft now owns with Access and FoxPro. It similarly picks up smaller sites moving off of older niche products, including applications based on MultiValue database environments. In some cases, shops retool custom applications; in others, they purchase new packages reliant on SQL Server. SQL Server's lower licensing costs along with the abundance of developers familiar with Microsoft-oriented programming tools encourages this process. A MultiValue or other older system shop, for example, may have a powerful and highly customized sales order or other strategic system, but find itself absorbing a SQL Server-based general ledger package or taking a close look at a packaged Web product using SQL Server. Developers and consultants often face the challenge to either integrate the two or justify not abandoning the older sales system altogether.

## The Road from COM to .NET

This brings us to Microsoft's new developer offensive, all summarizing around the .NET initiative. .NET includes both specific new tools, a methodology for Web-based development, and yet another campaign to cast Microsoft client technology as the de facto standard. Microsofties have been buzzing about .NET for a year or more, but industry professionals still have a hard time getting their hands around it.

Microsoft has had so many developer-oriented slogans and acronyms; it's hard for anyone to keep up. In a general sort of way, COM (the Common Object Model) sum-

*Continues from page 42*

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**2. Is your company a (check one):**

☐ Computer System Supplier ☐ Dealer/OEM/VAR ☐ Software House
☐ Consultant ☐ End User ☐ Other _____

**3. What MultiValue Databases does your company use?** (check all that apply)

☐ D3 ☐ Native MultiValue ☐ Reality ☐ Other _____
☐ jBASE ☐ uniData ☐ uniVerse ☐ uniVision

**5. What major business/industry most clearly describes your company?**

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☐ Education ☐ Insurance ☐ Other _____

**6. What are your firm's approximate gross annual sales?**

☐ Under $500,000 ☐ $500,000 - $1 million
☐ Over $1 million - $5 million ☐ Over $5 million - $10 million
☐ Over $10 million - $25 million ☐ Over $25 million - $100 million
☐ Over $100 million - $500 million ☐ Over $500 million

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## XP and .NET *Continued from page 41*

marizes the whole sweep of software development history since MS-DOS. During this time, Microsoft steadily gathered the mightiest legion of professional programmers to create graphical-based programs for Windows desktops running on networks. During much of this time, Microsoft's late start on the Internet loomed over it all, with serious Java types and others sneering at Microsoft, and even Microsoft loyalists grumbling at frequently changing or Microsoft-only options. .NET builds on COM, but represents Microsoft's bold foray into not only consolidating its own back field, but also having an intelligent story to tell Unix and Linux based developers about integrating other applications.

For IT managers with their eye on the bottom line, .NET means upgrades, conversions, consulting and training. Microsoft will shortly release a new version of its Visual Studio suite of programming tools. As developers know, up until now, Visual Studio has been less of a true suite and more of a grab bag of unrelated and often overlapping stuff, held together by — surprise, surprise — Microsoft marketing magic.

The .NET Framework, mostly gathered in the Visual Studio .NET, tantalizes project planners and integrators with substantial integration. Programmers can combine code elements from separate languages and tools much more freely, utilizing a new underlying Common Language Framework. Also, the development environment will look the same across the board. For example, developers working on Microsoft-oriented Web sites (Active Server Pages, .NET) will have the ability to create entry forms and write server code directly in any .NET language. This will supplant use of more limited scripting languages to then call or activate separately compiled modules.

The problem is that, after a couple years of working with Visual Studio 6, many developers and software publishers have worked out reasonable ways of doing things. In our own work, we're fiddling around with the .NET beta, but continuing to improve our use of existing tools, including for developing complex MultiValue database-backed systems.

Even without the inevitable worries about initial release bugginess and missing features, project leaders will have to justify the cost of switching against substantially improved programming capabilities. For example, Visual Basic developers have complained that their favorite business application tool could stand to have true object-oriented capabilities. This would en-

## XP and .NET *Continued from page 43*

of business services. And at least for now, otherwise foes of Microsoft, such as IBM, have bought into the concept.

Of course, with Microsoft the tool maker generously promoting the new glue, and Microsoft the corporate funder churning up lots of tempting Internet-based services, it's easy to get a bit paranoid, but it's a fascinating vista (See "Servicing the Web," *International Spectrum*, July/August 2001).

What will it all mean for organizations with long-standing MultiValue and other older generation systems?

Given that Microsoft has rushed Windows XP into production to try to pre-empt any Justice Department court activity, we can only hope that it ships in a relatively stable form. But Microsoft has gotten better at delivering its desktop system and office productivity software in well-tested form. All but the largest Information Technology departments should find it relatively smooth to upgrade to Windows and Office XP.

It's hard to be so sanguine about the new developer tools. Coming in a period of widespread retrenchment in computer services spending, developer teams will most likely find little pressure to rush and upgrade tools and software applications. In many ways, that's a shame because of the new features and easier Web-enabling technology.

Over time, however, the .NET initiative ups the ante in the critical divide between maximizing use of off-the-shelf tools versus using platform specific tools. The MultiValue sector, for example, now has the benefit of Web development tools like Web Wizard, mv.Designer and RedBack, and other software which maximizes control of interactive Web sites from inside the database server. These make for easy and familiar starting points for sophisticated Web sites and other new development. .NET-oriented approaches, along with other frameworks like server-side Java, run on the concepts of component-based development, construction and reuse of business objects.

Possibly some of these proprietary environments will create integration mechanisms for working with Web Services and .NET generally, and that would be a good thing. It's important to know that .NET will "out of the box" include a compatibility feature that will allow objects created in the previous Microsoft COM environment to work in .NET. We have a project under development now that uses the Web Services beta to link a Cold Fusion Web server in one city with a UniVerse database in another through an object layer built with VantagePoint's tool set. Expect to see more capabilities like this in the popular MultiValue tools.

Looking at things in the fall of 2001, with the debris of the .COM craze all around us, including over-sold and under-brained broadband Internet connections, it's tempting to figure on a few more years to just play in our own sandboxes. This would be a big mistake. Ruthlessly market-driven, self-serving otherwise, Microsoft, as well as its top of the heap technology buddies, responds to the unmistakable drift toward a globally connected economy. It almost always makes sense to start the search for new technology from familiar faces who talk the same language. But in today's world, interesting things get built in layers, and as the layers get further from the original database environment and closer to the big wide world, it also makes sense to seek out standards and tools based on those standards. Nothing guarantees software longevity anymore, but it's probably the better gamble to try.

As for Microsoft, it's at least fascinating to watch it maneuver. If it's the 800 pound gorilla, it certainly knows how to dance, and it will continue to command our attention in making short- and long-term plans for some time to come. **is**

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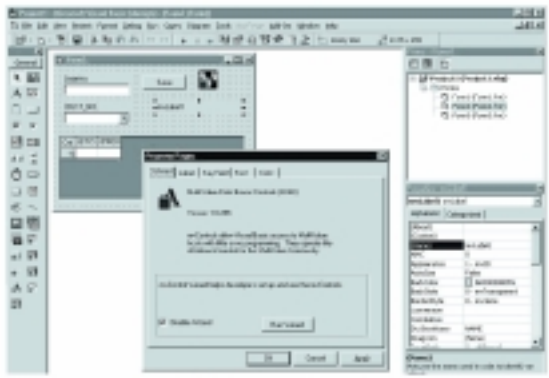

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## Diary of a PDA Project

*Continued from page 23*

### Oops, I Dropped It in the Toilet!

The "who" and "where" questions are very important to the type of PDA hardware device, not to mention the cost of the device, that is chosen.

Much of the reason PDAs are so nice in production environments is because they fit into shirt pockets, or can be clipped to belts. There is only one problem with this, they also fall out of pockets or get knocked off belts when working in some environments. So the question of "where" is a very important question and often goes hand in hand with "who."

So let's answer these questions for these projects.

### Manufacturing Department

Who? The person that will be using this is a general laborer. They are going to be moving around, lifting heavy things, using saws and hammers. They are not used to working with computers and are likely to drop the PDA off a forklift, or smash it with a 2x4.

Where? This will be used in a warehouse with a lot of dust and activity.

### Installation Department

Who? The person that will be using this will be in and out of other companies or people's homes installing things. They will be on ladders or under counters. They are likely to leave the PDA at a job site.

Where? It will be used on the road and at job sites where it can be left by accident and/or viewed by people that shouldn't have access to the information.

### Delivery Department

Who? The people that will be using this will be drivers. They are not used to working with computers, and for the most part, are accustomed to getting in and out of the job site as quickly as possible. Customers will also be signing their name upon receipt of the material.

Where? In a truck or in the rain or snow at the job site.

Now based on this information, and the "what" information, we have a basis to make some decisions. We need a device that is rugged that can be dropped and still work. It also needs to be something reasonably priced since it will be broken.

The people that will be using the device are not computer oriented, so the device needs to be easy to operate and as "idiot-proof" as you can get. Since the devices need to read barcodes, this made us look in the direction of Symbol Technologies (www.symbol.com). They have a device that includes a barcode scanner and is designed to be dropped from a distance of three feet with no damage. Being dropped in the toilet or run over with a forklift is not covered unfortunately, but they are not cheap devices. They start around $1,000.00 list.

### This Is Too Disruptive!

The next step is to work with the people to find out what works best for them when using the device. This is the "when" question. This question usually doesn't come up or can be answered during the design stages since it requires the users to work with the software and devices.

The "when" question helps isolate how complex or simple the application becomes. Again, here are the examples:

### Manufacturing Department

When? As each line of a job is completed, the status needs to be entered. This can be 50 items an hour, but on average it is 10 items. Since this is disruptive, the user should have to do very little.

### Installation Department

When? As the person starts each job and finishes each job, they need to update their time and what they where working on: painting, installing, remolding, driving, lunch, and/or break. This is payroll information and is used to pay the installer the correct payroll rate depending on what they are doing. It must be as accurate as possible, and is done at the end of each job as part of the check off list.

### Delivery Department

When? After everything is unloaded, and before the driver leaves.

This isn't going to work.

The following "why" question should always be asked: "Why do we really need this?" PDAs are the latest and greatest technology to include in a business. Make sure there is an actual application for the devices.

During the "why" questioning, we found the delivery department's original idea for using the PDA was not a valid reason. Since hard copies had to be given to the customer of what was delivered and received, they still needed the printed paperwork. Since printed paperwork was still required, having a PDA for loading was not required.

### Conclusion

After exploring all the different questions and finding the answers, the choice for the PDA was the Palm due to its size and simplicity. It was the easiest to use for non-computer-oriented people. If the delivery project had continued, the Windows CE may have been chosen due to a tablet size device needed for delivery to function. The screen size on the Palm devices was too small to display all the information needed and capture a signature. **is**

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# Do Your People *Get* The Big Picture?

BY STEVE WATERHOUSE

**Sales people are the front end of many businesses. For many companies, they are the most influential people in the client relationship. For this reason, if for no other, it is critical that sales people know, understand, believe and support the company's goals and objectives. They should have internalized the company spirit so that it comes across to the customer.**

I was facilitating a two-day meeting for a client at the Irvine Marriott in Irvine, Calif. We were discussing ways to get the entire company to support a new and critical initiative. This initiative was so critical that the entire senior management team, CEO included, stayed off-site for both days. On Wednesday morning, I was pondering my opening remarks when I walked into the hotel men's room. Not totally awake, I was surprised by the thin figure that sped past me wishing me a "good morning, sir." I turned to see a slender man who was in a virtual frenzy of work. With the towel under his right foot he cleaned up every little drop of water that appeared on the floor around the sinks. At the same time, one hand was wiping down the counter tops and the other was checking the soap and towel supply. Suddenly, he darted out of the wash area and made a quick survey of the supplies in every stall before returning to cleaning the wash area.

Now don't get me wrong, this man, while busier than a sales manager at forecast time, was not focused on these mundane tasks. As each person came in the door, he looked up and greeted them with a strong, "Good morning, sir," "How are you this morning, sir," or "Thank you for coming to the Irvine Marriott today, sir. We appreciate your business." His name is Bobby and you owe it to yourself to meet this wonderful man. Bobby gets it! Bobby understands the company goals and objectives and knows what he can do to move them forward toward reality. He is not whining about the number of bathrooms that he has to keep spotless or about the boss who insists on it. He's not complaining about his work conditions or the lack of support he gets. In fact, he's thrilled to be doing his job.

The key to Bobby's attitude comes from his understanding of the company goals and his place in them. I asked Bobby what the most important aspect of his job was. Without a moment's hesitation he replied, "Hospitality! I greet every person and make them feel welcome. I make them want to come back and do business with us again." Bobby sees the importance of his role and knows that the unpleasant tasks that come with it are a necessary evil. After all, if the bathroom didn't need constant attention, he would not have the perfect place to stand and make the best sales pitch Marriott ever had!

Clients often call me to "motivate" their sales teams, and I can do a great speech or training program that will pump them up. But what they really need is what we call "total alignment." It's a process of ensuring that everyone in the company is truly functioning together, working towards a common set of goals with the same ultimate objectives and feeling supported along the way. Motivation is a part of the cure, but so are communications, prioritization, recognition, compensation and resource allocation. Bobby feels supported in his "hospitality" role and he has the prestigious JW Marriott Excellence Award to prove it. He also has a crew of fellow Marriott workers who would do anything to help him thrill a customer and a boss that takes time stick his head in the men's room once in a while, just to say "Hi, Bobby. Nice job."

If you aren't sure if your sales people are as enthusiastic as Bobby, if they whine and complain about the dirty little jobs that have to get done, maybe it's time to examine how they are treated. It could be that Bobby was born with a positive attitude, but I know that at the very least, Marriott worked hard to avoid beating it out of him.

The next time you are in Irvine, Calif., stop into the men's room at the Marriott (sorry, ladies). It's refreshing to see a real sales person loving their job! **is**

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**STEVE WATERHOUSE is a consultant, speaker and trainer who helps sales organizations worldwide. He can be reached at steve@stevewaterhouse.com or www.stevewaterhouse.com.**

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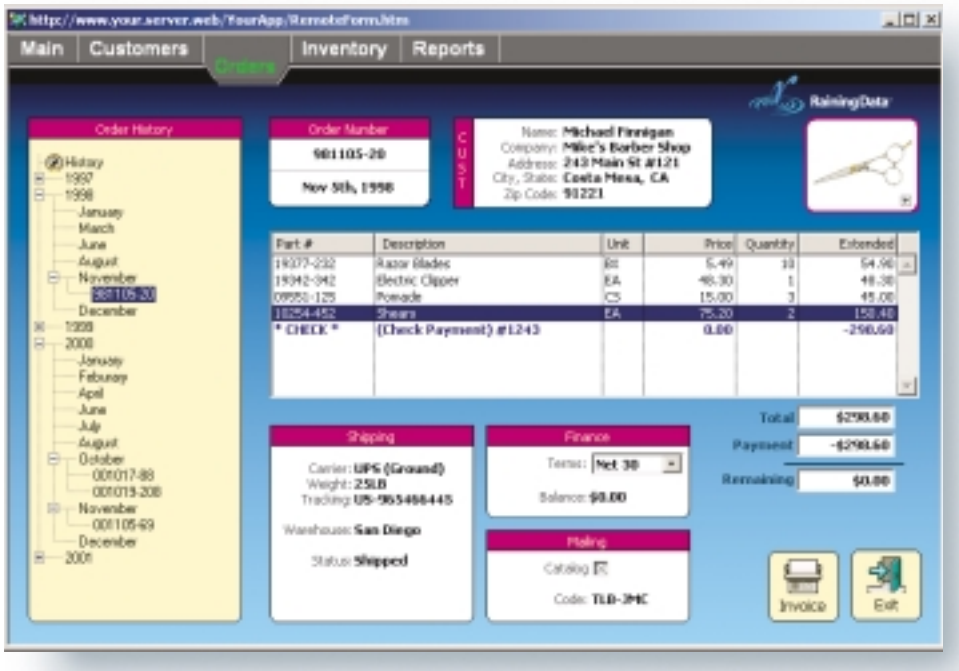


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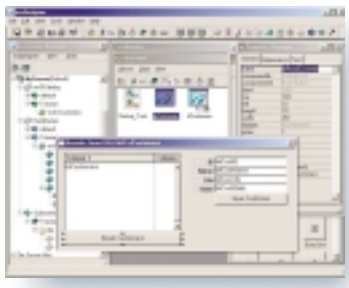

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