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DATABASE AND APPLICATION INTEGRATION

Data Integrity Depends on Definitions

By Helen Rollins Lord

Helen Rollins Lord is principal of Data Integrity Associates in York Harbor, Maine. With more than 30 years' experience in organizing, documenting and using accurate data, her personal mission is to provide quality data for profitable customer relationship management. She has worked for companies in advertising, banking, cosmetics, telecommunications, as well as many small companies and nonprofit organizations.

Although no one wants to face an emergency situation, what would happen to your business if you were incapacitated or unavailable? What kind of information would be required for someone to take your place?

Business continuation plans stress many aspects of this kind of scenario, but rarely focus on some of the finer aspects of your systems; in particular, the data itself. As a result, the importance of data definitions as a primary part of any data systems' work cannot be underestimated.

Data definitions are a part of "Metadata" — written documentation of "data about your data" that should include all the information about your data that will enable anyone coming into your business to understand and run your business's systems without you. I often tell my clients they should write down everything about their data they want a loved one to know in case they are incapacitated ... only much more.

Generally, it is agreed that there are two types of metadata: back-end and front-end metadata, and some also include middleware metadata. While we will not discuss middleware metadata in this article, the objective is the same: accurate and complete definitions to eliminate ambiguities.

Back-end metadata tells system analysts, programmers and technical management about what systems the data comes from and goes to; what type of data (alpha, numeric, date) is being moved and/or processed; what size field, if necessary; and whether it is a repeating field like the ones found in tranaction processing.

Conversely, front-end metadata is the data with which most accounting and financial professionals will want to be familiar. Front-end describes the data in "English" for less technical users. It contains the definitions of each item or field of data; the source(s) of the data; the type of data; any codes or abbreviations; and specifically, what those codes, abbreviations and SKUs mean. If a product has many colors and/or sizes, each combination may have a code, and that code's description appears in the data definitions. This documentation effort

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is, arguably, the most tedious, yet most important part of any systems project.

Why you Need Data Definitions

In addition to eliminating the torture of ambiguity, there are several other major benefits to documenting data definitions:

❖ Anyone using your system will be able to refer to this documentation and instantly understand what the data means, along with what the information it is supposed to provide.

❖ The existence of definitions saves enormous amounts of time for management explanations and for the person searching for information. This is especially important for ad hoc reports that less technical users may be creating themselves.

❖ In addition to the timesaving pre-defined reporting systems, there always are some users (typically called "power users") who need a greater understanding of the data. Data definitions are especially important for these people, and accuracy is essential to prevent disastrous decisions based on erroneous data.

❖ When you migrate from a legacy system, you will have assurance that like-data, is being mapped to like-data regardless of name similarities or dissimilarities. For example, the term "unit" has many different meanings, from a division of a company to one piece of one product. Needless to say, any calls for "unit," without making sure which "unit" is being discussed, would produce interesting results (and not in a good way). Only complete data definitions eliminate ambiguity.

One of my favorite stories about documentation and data definitions is about a large bank whose database marketing group was, gleefully, about to reap the benefits of the repeal of the Glass-Steagall Act Banking Act. The Glass-Steagall Act prevented banks from selling stocks and bonds either themselves or through an affiliate and/or

> **For the rest of us, writing down, as clearly as we and our circle of advisors possibly can, what a data field is used for, why it is there, where the data is used, how it used and when it is created/used, will lead us to solid business rules.**

from underwriting insurance. Conversely, securities dealers were prohibited from commercial banking. This Act was brought into law in 1933 after the banking industry's collapse. Gradually, over the years, the law weakened to allow commercial banks to sell through affiliates until it was completely repealed in 1999. Weakening of the Act allowed banks to sell the various instruments, but these instruments had to be managed as "silo'ed" businesses. This meant that all the data about each line of business, including customers' names and addresses, had to be kept completely separate from any other line of business. The bank's customers may have had accounts in several of these silos, but received separate monthly statements for each product account.

As any good bank's marketing department would do, all efforts to obtain every share of each person's business were made.

Data Definition Map							
Field Details				Scope			
Field Name	Update Frequency	Type	Length	Source	Definition Values (input)	Possible Values (output)	Validation and Business Rules

During this time, I was asked to review a 'cross-sell' database that was developed by a less experienced person. The purpose of this database was to compare how many products the same unique person had with the bank and to sell them any products they did not already use. No documentation had been developed to describe the database, and I was asked to see if it could be made useable.

This situation in and of itself is challenging to anyone, but to an outside consultant, it can be quite exciting. I determined that there were 11 lines of business represented and that a great deal of coding was created — not coding in conventional programming code, but coding as in "give everything a code rather than an 'English' or generally recognizable name." My unmet challenge boiled down to ... you guessed it ... no product code definitions.

There was no way to determine what the product codes meant, because there were no data definitions. The designer had not used the codes the lines of business already used. In addition, the coding was duplicated between the lines of business, so there was no possibility of drilling down to figure it out. A million dollar database had to be discarded, because someone had not taken the time to do the data definitions.

How to Create Your own Definitions

To keep something like this from happening to you, I suggest that if you do not already have a complete set of data definitions, create them! Note, too, that metadata is a "living document" and must be updated to remain useful. Don't forget to add new definitions and update existing ones as new fields are added to your system.

My favorite data definition "map" serves several purposes, and is very useful for data definitions. Look at the example provided on this page. Once data is put in rows and columns, it can be imported or exported to any other system, so this method is useful, especially if you are growing quickly and your definitions are going to be merged into a large metadata system.

Field Details — The first four fields provide a picture of what the item "looks" like:

❖ Field Name — *The name you want everyone to use for that piece of data.*

❖ Update frequency — *How often that one piece of data is updated: real-time, minute, hour, day, week, etc.*

❖ Type — *Is it Alpha, Numeric, Date, Currency?*

❖ Length — *How many characters have been allotted to this field (max 256)?*

Source — From where did the data come? Examples include a phone call, a newspaper ad, sales, another system(s) or all of these. Each source must be documented.

Definition — This is the "English" verbiage that describes what the data is.

Possible Values (input) — Samples of what data goes into the field.

Possible Values (output) — Samples of data that comes out the field. Also, this is where validation and Business Rules go. You and your staff decide the rules around each field. For example, there may be different ways to treat income for taxes from which you can choose. Your choice would be included in the Business Rules. If your choices are many, you can define which choice to use at what time. Any algorithms or formulas used to derive a field should be included in the business rules (see "What are Business Rules" for more information on this topic).

Maybe you already know that your definitions are correct and can just put them in a standardized format. Or, perhaps you need

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to go through an exercise in which you figure out the "what, when, where, how and who" to achieve your data definitions. Here are some suggestions about the definitions.

❖ **The What:** What is currently in the field, what do you want to have in the field and do the two match? Determine the validity of your assumptions about what the item of data means by looking at each field of data within your files and see how others have used the field. There is usually some junk in each field put there by an improperly designed input screen or just a rushed person. This is also called data profiling or running frequencies.

❖ **The When:** This tells users how often the field is updated. There are rules called business rules that tell others when or how often you have decided a field should be updated/created in order to run your business.

❖ **The Where:** Have a clear understanding of where each field of data comes. Is it from one of your various call centers, stores or departments; an outside vendor; a different system; or other data source? If a customer's address is coming from accounting instead of sales, and sales is responsible for ensuring the customer's addresses are correct, there may be an issue around accuracy that needs to be discussed, decided on, verified and documented.

❖ **The How:** These are the processes, formulas, derivations and algorithms that calculate just how many millions you did make this year.

❖ **The Who:** "Who" is what department creates a field, imports data into a field, and "owns" the data, such as the sales department owning the sales figures that are sent to accounting to make sure you got the check.

As you can see, documenting data definitions is a very detail-oriented process, but one that will pay off down the line, even if you do not see the purpose at this point. Above all, it is a very good way to maintain control over your data. We are the experts

in our jobs only as long as we can depend on the fact that the data we are using is correct.

What are Business Rules?
By Helen Rollins Lord

This is a huge subject with debate going on about what this term means. If you would like to read more about some of these issues, there is a formal group called the Business Rules Group at *www.businessrulesgroup.org*.

For the rest of us, writing down, as clearly as we and our circle of advisors possibly can, what a data field is used for, why it is there, where the data is used, how it used and when it is created/used, will lead us to solid business rules. A fellow acquaintance also felt it was very important to know that the field was there because it is useful to think of these rules as "setting policy." Business rules also may be the differentiating factor between you and your competitors.

The term business rule is usually associated with programmed computer systems. However, rules are the guidelines and policies for your business, and can just be put in a notebook for reference.

Examples of business rules include:

Industry knowledge and the information requirements of your particular industry. The many rules associated with the accounting industry can be described and programmed.

General business knowledge, such as name and address information, or payment information. State abbreviations are always two alpha digits, zip codes are always nine text digits and you always should use two decimal points for dollar information. Use whole numbers for percentages.

Logic is used for the calculations you use to conduct your business become rules. The "if and then" of your business will tell employees, old and new, how your business works. For example, if bills are not paid within 30 days, then add x % to the bill and resend the bill; if a bill is not paid within 60 days, add x +10% and resend bill, etc. Or, if a prospect has been in the file for two years and if there has been no contact with the prospect during this time, then update the prospects address through the National Change of Address database (*www.usps.com*).

Mathematical formulas used to obtain a certain field should be kept with the field information. If other fields are part of the formula, that information should be kept with each variable of the formula. If someone coming into the system does not understand why a particular field is there, he or she may be tempted to delete it or not pay attention to its update frequency. That is not a good thing.

Expert knowledge — Each of us has an expertise that can often be diagramed, described and defined. If this expert knowledge is what brings in the majority of your profits, it is well worth your time and effort to write it down.

Watch for No-No's to maintain data integrity. One of the biggest messes I ever saw was someone who allowed xxx's into their system. They had offered a sales promotion over the Internet and in came xx's, xxx's and x's into the registration fields. Unfortunately, these were counted as true respondents because the system program that was used did not know *not* to accept these as junk fields. Always tell your system what you don't want as well as what you do want!

Contact Helen Rollins Lord at *info@data-integrity-associates.com.* ●

AICPA Conference Features Innovations, Updated Member Tools

By Scott H. Cytron, ABC

Always-on availability, wireless transmissions, portability, and many other high-tech tools and issues were the focus of this year's AICPA Information and Technology Conference in Las Vegas, May 3-5, 2004, at the Venetian Hotel.

Still, in the midst of this environment, the "personal" aspects were not soon forgotten. Kicking off this year's conference in keynote fashion was Neil Lebovits of Ajilon Finance in Saddle Brook, N.J., whose session, "Prepare for Tomorrow — Update Your Team Today" set the tone by integrating the human aspects of our business environment with the future need for qualified, productive staff.

"If you don't have the best people working for you, you're going to lag behind your competition," he says. "For far too long, we've gotten by with a Band-aid situation, but people show up as costs on the financial statement. With 53 percent of U.S. workers changing jobs this year, we must focus on strategy and our core culture."

Lebovits described four fundamental core cultures: customer service, innovation-based, organizational excellence, and spirit. He then challenged the 700+ attendees to understand what kind of culture they have, what kind of culture they would like to have and the means required to get to the desired outcome.

Networking + Education

Many attendees at this year's conference noticed and commented that there was far more networking time built into the agenda. According to David Cieslak, CPA.CITP, GSEC, this was *not* unintentional.

"Tech 2004 is a true showcase for CPAs and their staffs who provide consulting services to their clients and employers, but one quality we all share is the need to learn from best practices," says Cieslak, 2005 conference chairman and a member of the 2004 Planning Committee. "You can't do this by sitting in a classroom

environment or operating in your own grassroots backyard. You must be able to swap stories and interact with others who share the kinds of problems and opportunities you encounter in your own business."

One highlight during the conference was a luncheon presentation on the CITP (Certified Information Technology Professional) credential by Michael Dickson, CPA.CITP. Dickson is president of Business Technology Group, LLC, in Columbus, Ohio, and also serves on the AICPA's IT Executive Committee.

Dickson thanked the CITP community, including all the new CITPs in attendance at the conference, for their enthusiastic support for the credential.

"The new accreditation team in place at the AICPA is dedicated to building a quality IT community with new, innovative deliverables to help CITPs deliver enhanced value to their employers and customers," he says.

The CITP specialty credential is available exclusively to CPA business technologists who meet rigorous professional requirements in the IT field. It is designed for those who bridge the gap

between business and technology, and is a "unique" credential — unlike other certifications that recognize only a narrow scope of skills.

The CITP credential encourages and recognizes excellence in providing technology-related services by the profession. The AICPA provides the tools, training and support for CPAs to become technologically adept, and to benefit the business and academic communities they serve.

To learn more about the CITP credential visit *www.aicpa.org/citp*.

Richardson Receives CITP Lifetime Achievement Award

One of the perennial favorites at the Tech Conference is Rick Richardson, CPA.CITP, who serves as CEO of Richardson Media & Technologies in Canton, Conn. Just prior to his presentation, "Technology Futures 2004," Richardson received the CITP Lifetime Achievement award for his extensive work with the CPA profession over the last 24 years in the area of information technology.

"I am truly honored to be recognized by my profession for my life's work in technology," says Richardson. "A CPA who works with technology has many roles — as business advisors, auditors, CFOs, CEOs, financial managers and others. The CITP credential evidences a CPA's skill and credibility as a business technologist and sets he or she apart in the marketplace from non-CPA technologists."

Improved InfoTech Web site/ CITP Forum Unveiled

Also highlighted at the conference was the new IT Membership Section Web site, *www.aicpa.org/infotech*. Some of the new features include:

> **A CPA who works with technology has many roles — as business advisors, auditors, CFOs, CEOs, financial managers and others.**

Rick Richardson, CPA.CITP (right)
and Michael Dickson, CPA.CITP.

❖ a calendar of key events for IT Section members, including important conferences;

❖ access to the most recent IT Section Chair Letter; and

❖ links to valuable resources and tools.

As a member of the IT Membership Section, you will need a special User ID and Password to access the exclusive Members-only area of the site pertaining to the IT Membership Section. The user ID is ITMS, and the password is "photonics." The Web site is constantly being updated with new information as well, so check back often.

Another new Web site is the revised CITP Forum, available to CITPs only (see screen shot). This Web site features discussion threads on a variety of topics, and is a tremendous benefit to credential holders.

"As a peer to peer knowledge sharing tool, the CITP forum adds the ability for better, more long-term collaboration," says Susan E. Bradley, CPA.CITP, MCP, GSEC, a principal with Tamiyasu, Smith, Horn and Braun in Fresno, Calif., who also serves as chairman of the AICPA's Top Ten Technologies Task Force. "Add to that the ability to obtain the information via RSS feeds to organize our inboxes just a little bit better, and the new Forum is definitely a win-win tool all around."

The AICPA and the IT Membership Section is interested in gaining feedback from its members. If you have thoughts, suggestions or topics to share, send an e-mail to *infotech@aicpa.org*.

Scott H. Cytron, ABC, is editor of *InfoTech Update*. Contact him at *scytron@sbcglobal.net*. ●

Michele Herzog, CPA.CITP, Provides Accounting Acumen

By Scott H. Cytron, ABC

Sleek lines … burled wood … cutting-edge design. No, these words don't describe this month's *Ideas In Motion* profile. Instead, they are more indicative of the contemporary Danish furniture our featured accountant's employer, Club 8 Company, Inc, produces in Denmark.

Halfway across the world in Lenexa, Kan. (a suburb of Kansas City), you'll find Michele Herzog, CPA.CITP. Michele is the CFO and controller of the U.S.-based operation for Club 8, a 52-year-old company that manufacturers furniture in Denmark and then resells it across the world through retail stores and franchises. She also works in the accounting capacity with three corporate-owned Bo-Concept stores.

I met Michele during the AICPA Tech 2004 Conference and was immediately impressed by her business acumen, but more than that, her ability to multi-task

> **Being a CITP will require me to keep up with continuing education in the technology world.**

many activities. Obviously, she works in the accounting arena, but also is Club 8's financial analyst, IT administrator, legal officer and human resources contact for the organization.

Michele was also very complimentary of her employer's business practices and the company in general. Her home, naturally, is outfitted with much of Club 8's furniture because she enjoys the environment, both in and out of the office.

Michele has held CFO and controller positions for more than 17 years, and has spent the last four years with Club. In her position, she travels to Denmark about two times a year to touch base with the corporate parent and become more aware of the company's goals, strategy and vision. This knowledge is then brought back to the United States, where she creates methods and ways to consistently remain efficient and effective.

When we met, I asked her about the accounting software she uses at Club 8, and discovered she's a dedicated Best Software customer.

"Club 8 has used MAS 90 for nine years and I have been using MAS 90 with other companies for eight years; it is a fabulous product and I have not thought about going to any other software," she says. "I have used Great Plains, QuickBooks, Peachtree, Control G and other accounting software packages, and none of them add up to MAS 90. In fact, when I used Control G at a former company, I converted them to MAS 90. Our headquarters in Denmark wants us to switch to (Microsoft) Axapta in about a year, but my own preference is to stay with MAS 90. The program comes with just about everything you need, whereas Axapta has to be built every step of the way."

Michele Herzog, CPA.CITP

Because she is the U.S.-based accounting contact, Michele's world is much larger than just the confines of Kansas or Missouri; she works remotely with many of the organization's retailers and franchise owners to ensure the software continuously delivers on-point solutions for the organization. The product they currently use is Axapta; previously, Club 8 was a Navision customer.

"In the United States, I have had full say as to the kind of software we choose and use," she says. "However, about a year ago the headquarters in Denmark decided we would use Axapta worldwide with our retail stores. With our corporate office in Denmark choosing Axapta, my job is very challenging, because changing to Axapta has not been an easy process. Although I would have much rather preferred to implement MAS 90 in the stores, my knowledge base of accounting software with Axapta continues to broaden. I still use MAS 90 for all of the store financials and also use F9, which directly imports from MAS 90."

With F9, Michele says she can create a variety of reports for budget comparison, gross margins, a breakdown by division, trend reports and much more.

"While I can also create these types of reports directly in MAS 90, the F9 product gives more functionality. For example, I can create graphs directly on the same page of a report. Currently, by using two accounting packages for the corporate owned retail stores, I have to do a journal entry into MAS 90 from the Axapta sales figures to get a full financial."

Using two software programs at the same time is not the most efficient way to work; however, in order to get valuable, usable monthly reporting, Michele says she'll continue to use MAS 90 as long as possible.

"Unfortunately, F9 does not work with Axapta. However, through some research a similar product, Atlas does. When Club 8 Company in the United States is fully on Axapta, I am sure that Atlas will become part of our new program."

Sounds like a Yin/Yang situation, certainly. And, in addition to monitoring the software processes, implementation and administration, she also must respond to the organization's other IT needs. Changes in technology, for example, generate good ... and bad ... reactions.

"While the hardware seems to get smaller, less expensive and faster, the huge increase in Internet users generates much more spam and viruses than ever before," says Michele. "This slows the system down and causes havoc at the same time."

Another piece of accounting she currently is investigating is the company's adherence to some of the regulations in the Sarbanes-Oxley Act of 2002 (SOX). While Club 8 in the United States is not a public company, Club 8 in Denmark is. As a result, Michele says she will most likely consider adopting SOX rules to ensure consistency across the world.

"You have to be very aware of *everything* going on in today's business environment to remain effective in the accounting function," she says. "We want to ensure our customers realize we are addressing compliance, not only to protect ourselves, but their interests as well. The people we work with in this post-Enron marketplace no longer take what we do for granted, and we don't either."

Several activities help keep her up to speed, including attending the technology conference and other appropriate educational opportunities. She also sports the CITP (Certified Information Technology Professional) designation from AICPA.

"I am the IT administrator for Club 8 Company, so being a CITP adds to my credentials of being competent for the job. We currently have 54 corporate employees in the United States and many of them have different ideas and opinions of what technology they should have and what they should be allowed to do. Being a CITP will require me to keep up with continuing education in the technology world. As a result, I will be able to better accommodate employee and corporate needs. Also, with the high standards of education that society places on individuals, having another certification can only be a plus in the business world." ●

> **You have to be very aware of everything going on in today's business environment to remain effective in the accounting function.**

EMERGING TECHNOLOGIES

Autonomic Computers Self-Heal Themselves

By Sandi Smith, CPA, CMA, CDP

Since 1993, Sandi Smth, CPA, CMA, CDP, has worked with business owners and organization leaders to understand and implement new technologies. She brings together a bottom-line business focus, her technology leadership experience and a straightforward communication style to produce immediate results for clients.

When I encounter a scary situation, my heart begins to race and adrenaline pumps into my system to give me the energy I need to react to the scary stimulus. These bodily responses are initiated automatically by my autonomic nervous system — a self-regulating system of organs and muscles that controls our sleep, digestion and fight-or-flight responses.

When a computer system needs to react to a stimulus, such as a hacker, an upgrade, or a change in business requirements, what are your options? Does a human operator have to intervene, or can the system develop autonomic capabilities similar to our nervous system? Several IT vendors already offer tools that help computers become more self-sufficient and less reliant on the workers that have to maintain them. However, the ultimate autonomic dream — a system that can modify itself for changes in business strategy — is still far, far away.

A wide variety of applications can benefit from these self-managed systems. Peter Hughes, IT Division assistant chief for Technology at Maryland-based NASA's Goddard Space Flight Center, calls autonomic computing a "breakthrough technology." Its use in deep space missions is promising for the Center. However, Hughes adds that there are many challenges to overcome in several areas, such as scalability and handling compound problems that affect numerous functions.

What is Autonomic Computing?

Autonomic computing already frees up IT workers from mundane, repetitive tasks, such as restoring a failed system or moving around network resources. The focus for the next few years for vendors will be to deliver systems and networks that feature self-healing capabilities across resources and applications. According to experts, a computing infrastructure that modifies itself for business strategy and operational needs is likely a decade away.

As a market/research leader, IBM sees autonomic computing in five levels or stages. Stage One contains no coordinated systems management. Stage Two offers management tools that are centralized and require human intervention. Systems begin to analyze problems and suggest solutions in Level Three. In Level Four, systems correct problems without humans. Level Five brings in an

Resources for Autonomic Computers

Matt Hamblen, "System, Cure Thyself," *Computerworld*, Jan. 12, 2004.

Matt Hamblen, "The Once and Future IT," *Computerworld*, Sept. 8, 2003.

Matt Hamblen, "HP Combines Tools to Unify Management of its Server Lines," *Computerworld*, Nov. 17, 2003.

Autonomic Computing Center, *www.iam.com.*

John Moore, "Vendors Approaches to Autonomic Computing Differ," *Federal Computer Week*, FCW.com, March 29, 2004.

John Moore, "IBM's Autonomic Goals,"," *Federal Computer Week*, FCW.com, March 29, 2004.

Paul Roberts, Cisco Releases New Security Products, Features, *Computerworld*, March 11, 2004.

Marc L. Songini, "IBM Releases DB2 Beta," *Computerworld*, May 3, 2004.

Patrick Thibodeau, "Autonomic Technology Faces Big Challenges, Panel Says," *Computerworld*, Nov. 10, 2003.

organization's business objectives so that the system can manage to those objectives.

Taking it to the Bank

The reality for CPAs and accounting professionals who provide consulting services is to offer their clients, employers and customers specific information about how autonomic computers can help an organization save time, money and other resources.

Because of the newness associated with this technology, some of the long-lasting effects are still not completely known. However, experts already are projecting that the potential for cost savings from using autonomic computers is enormous. A Forrester Research study, for example, reports that server utilization rates could jump from the current average of 20 percent to 80 percent or higher. With a server capable of constantly monitoring its own efficiency instead of a network analyst who would be bored performing this task, companies will be able to do much more with much less computing power, as well as less labor. In addition to reducing labor costs, this technology is predicted to significantly speed up

response times and overall system efficiency by using less computer power more productively.

Vendors Offering Autonomy

Already, there are a number of well-known vendors that have developed solutions.

❖ IBM has developed autonomic system management tools to help with data center management and system optimization. A beta version of its DB2 Universal database was released in May 2004. This product contains autonomic database performance optimization, a tool that enables databases to respond to user information requests faster. It also includes other methods to make the database more efficient for the users: a client rerouting capability to reduce downtime and learning optimization technology where the software actually learns and improves its system corrections. All of these autonomic features are designed to improve data access times for the database user. IBM offers many more self-managing products, and in 2004, it offered seminars throughout the country on autonomic computing.

❖ HP offers dozens of IT management tools that it terms as "autonomic." Last year, it announced the new Systems Insight Manager, a systems management software capability that works on Microsoft (MS) Windows, Linux and Unix systems. Its Virtual Server Environment allows managers to plug in service-level objectives, such as uptime percentages that the system must meet by autonomically shifting resources. For example, in the case of an uptime requirement, the system can replace a server that has gone down to keep the system running smoothly.

❖ ZENworks is Novell's product for IT management automation, offering resource management for desktops, servers, laptops and handheld devices within the organization. ZENworks supports multiple platforms, including MS Windows, Linux, Solaris and Netware.

❖ Computer Associates International, Inc. has offered Unicenter Enterprise Management for some time now. This system automates day-to-day IT management tasks, proactively identifies problems, automates software installation and dynamically allocates resources, such as replacing a failed hard drive or adding more servers when a spike in demand is detected.

❖ Cisco offers its Self-Defending Network strategy to autonomically attack network security threats.

The Semantics of Autonomy

Autonomic computing is beginning to infiltrate our technology environment in other ways as well. For example, numerous other vendors are including the word "autonomic" in their sales literature. A sampling of vendors that are working on autonomic initiatives include Sun Microsystems, Inc., BMC Software, Inc., Microsoft Corp. and EMC Corp.

In relation to autonomic computing, you might see the phrase "self-healing" in computer literature. Some analysts say self-healing technologies comprise autonomic computing, but actually also include resource and utility management, while autonomic computing focuses on problem identification and resolution. In fact, the definition of autonomic computing given in the AICPA Top 10 Technologies program includes the term "self-healing:"

"Tools and strategies to manage and maintain all systems across the enterprise, including system maintenance, upgrades, automatic patching and self-healing (for example, ZenWorks, Unicenter TNG, management alerts). This is an approach toward self-managed computing systems with a minimum of human interference. The term derives from the body's autonomic nervous system, which controls key functions without conscious awareness or involvement."

IBM considers an autonomic system to be able to perform four major functions: Self-healing, Self-optimization, Self-configuring and Self-protecting.

Another critical aspect of autonomic computing is to meet certain business policies and rules. For example, the system must be able to manage itself through a set of policies and objectives, and must know how to react to input controls, including service levels, resource objectives, user priorities and other business policies.

Some definitions of autonomic computing include the function of grid computing, which is a cluster of networks, computers and databases that work together to form a supercomputer. Control of the grid infrastructure is centralized and automated.

Although the lines are blurry between the terms "autonomic" and "self-healing," we can arrive at a generally accepted agreement about what autonomic computing is: the concept of a systems intelligence that runs an enterprise-wide systems infrastructure with limited human intervention. It also is run on predefined business policies and objectives.

One day, CPAs will be able to describe the business processes that they want automated, and the systems will simply assemble themselves. That's the vision of IBM's Vice President of Autonomic Computing, Alan Ganek, and the potential of autonomic computing in our future. For now, CPAs can be content with potential savings in network hardware and labor, and the knowledge that on the horizon, their business's computing infrastructure will become increasingly easier to manage. ●

Editor's Note: Autonomic Computers is one of five Emerging Technologies identifed in this year's Top Technologies program. Visit *www.aicpa.org/infotech* for a complete listing.

E-BITZ focuses on practical applications of various technologies to enhance a practice or business.

E-BITZ WITH SUSAN BRADLEY

Hard Drive Recoveries in the Worst Scenarios

It's about three or four inches across, about five or six inches long and contains much of what we hold near and dear. Inside, it's a rotating conglomeration of spinning parts, whirling anywhere from 3,600 to 15,000 rpm, with an arm that can move across the surface of the disk at a rate of 50 times per second. This little box — your hard drive — powers the world and most of its data. Should it fail, it can bring your operation to its knees.

The next time you are upgrading your computer, open up the old hard drive and take a look inside. From the outside, it looks sturdy enough. Perhaps that's why we jostle, drop and abuse them. We allow dust to collect all around them, yet what we don't realize is that the tiniest spec of dust inside the drive could cause permanent damage to our most important data. We fail to recognize the importance of our hard drives and how we depend on them – until they malfunction. For example, this article alone will have been sent to, and stored on, at least a half-dozen hard drives by the time it makes its way from my desktop to the printing house that produces this newsletter.

What happens to your data if your hard drive becomes damaged? Recently, a local firm woke up to the news that its office building was on fire. What's worse, all of the firm's client files were stored onsite in that same building ... all they could do was watch it all go up in flames, right? Not always. Smoke damage, and especially water damage, are some of the worst things that could happen to a hard drive. *Still, that does not mean that all is lost.* While it may look hopeless, the reality is that much of your valuable data can be recovered from damaged drives.

Safety First

How you handle damaged hard drives can make a difference in how successful the recovery process is. First, don't plug in a wet computer. Remember the movie, Apollo 13, where the astronauts were worried about the impact condensation had on the spacecraft's idle circuitry? Luckily, their systems worked in extremely damp conditions. Don't assume yours will. You could damage the motherboard or other electronic components if the system is damp inside.

Do not attempt to dry or clean out the hard drive by yourself. It's better to seal the drive in a plastic bag while damp and take it to be serviced. Water has impurities and could leave minerals on the surface of the disk. Salt water, in particular, can be very damaging to the media. Even a small amount of water may cause a short and surface deposits could lead to a hard drive crash.

If the hard drive is inside a melted computer, leave it inside and contact a data recovery services company. The air movement during the fire can pull contaminants into the hard drive, and you may cause more damage if you try to boot up the drive. It is much safer to leave things alone and have an expert examine the drive.
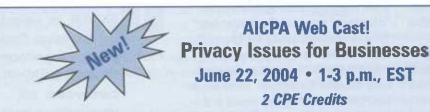
One notable data recovery firm is Drivesavers. On its Web site, Drivesavers provides an entertaining museum of "Diskasters," from which they have recovered data — *www.drivesavers.com/museum/index.html*. Experts like this group who work in the disaster recovery business will not attempt to get the existing drive operational, but will try to get the data off the drive to a stable platform as soon as possible. During the recovery process, they are "cloning," or taking an exact duplicate of the drive's con-tents and ensuring the data is rendered onto a stable platform (typically another hard drive).

The recovery process starts with soaking the drives in a clear solution in a clean, sterile atmosphere. Data recovery firms are best equipped to handle this process. Even if the hard drive is not waterlogged or suffering from smoke damage, noises from your hard drive system warrant an immediate call to action.

While most companies will recommend drive utilities to fix minor problems, such as instances of data corruption, remember that any utilities may actually cause *more* damage than any good. If you are attempting to recover from backup tapes, proper handling of the tapes post-incident is crucial. Broken or stretched tape, or folded and bent edges mean that the data cannot be read by a normal tape-reading device. Still, most of the time the recovery of data from this type of damage is around a 98 percent success rate.

Logical data recovery is more difficult, and, thus more expensive. It typically occurs when there is something wrong with the mechanism writing the data to the device. For example, when tapes are written with misaligned heads, they cannot be read in another device that also is not misaligned. Therefore, to ensure your backups can be restored, you might want to see if you can find a similar system on which to test your tapes.

Now let's look at another hard drive catastrophe: intrusions into your network. Yes, I do consider this a "hard drive catastrophe" because the recommended way to recover from such an intrusion after the law enforcement folk have arrived to examine the evidence is to do what I call "flattening the box." The recommended recovery method is

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