

5th Anniversary Issue

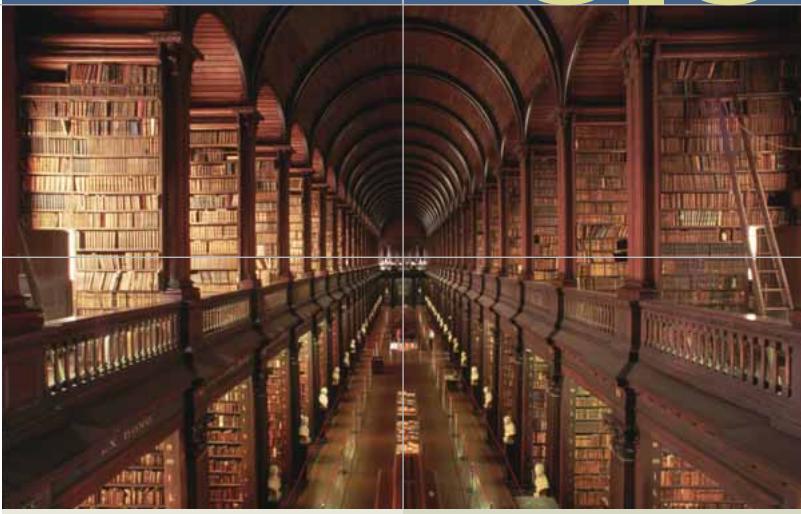


Strategies for
IT Business Leaders

May 2006
Number 67

ZIFF DAVIS

CIO INSIGHT



Case Study

Open Culture, Open Tech

Backcountry.com bets the store on open source

Analysis

What's the IT Value of an MBA?

B-schools start closing the tech gap

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Inside Jeff Hawkins' Brain

How neuroscience could change computing

Research

Best Value in Emerging Technologies

Team collaboration tools top the list

Technology

The Struggle to Secure Documents

Can enterprise-rights management do it?

Perspectives:

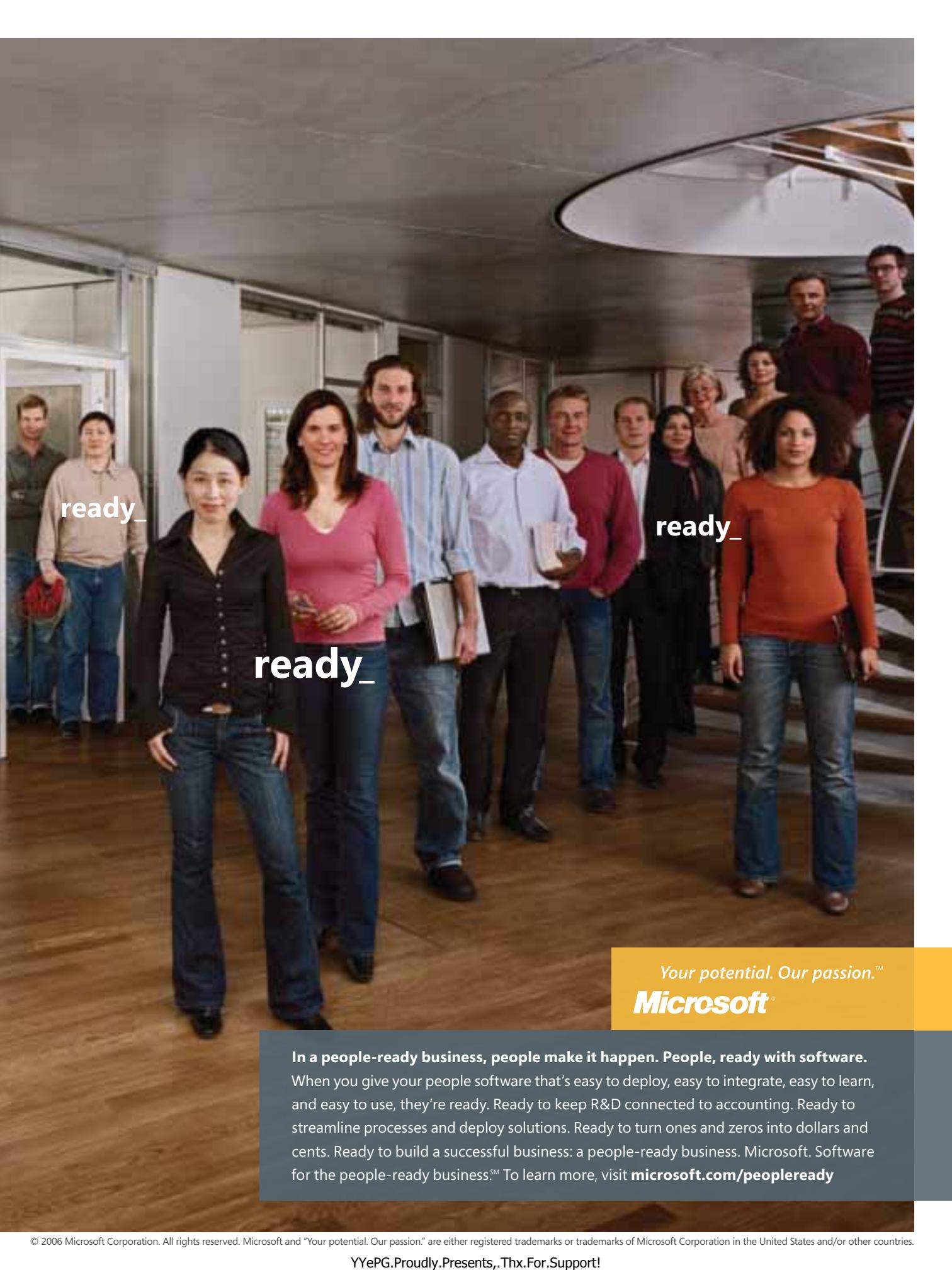
- Larry Downes on Apple v. Apple
- Backcountry CTO Jenkins on attracting talent

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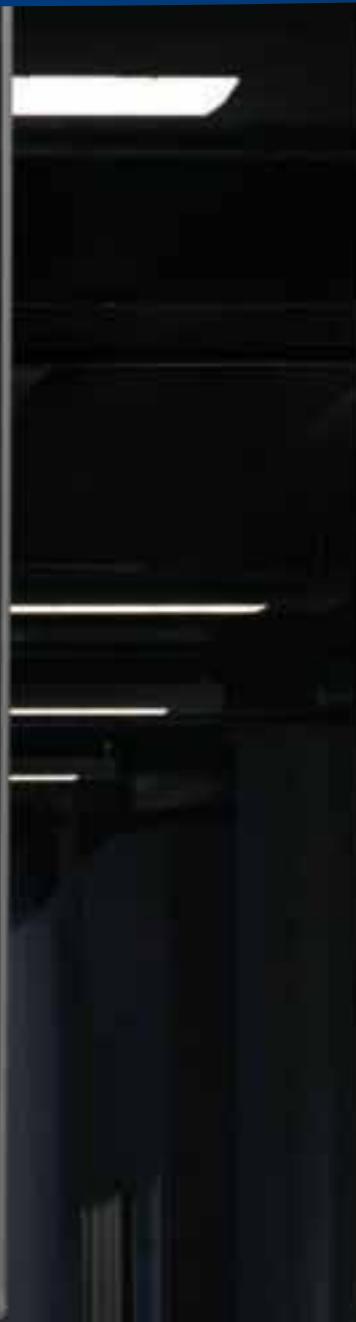


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ALWAYS AT YOUR SERVICE

CIOs embrace CA's "Improve Service" initiative to fulfill strategic business objectives.

AL PORCO OVERSEES one of the nation's most mission-critical networks. As CIO of Kings County Medical Center in Brooklyn, N.Y., Porco must ensure that all IT systems remain responsive to doctor and patient needs every hour of every day.

"In a health care setting, downtime isn't an option," Porco said during a recent CIO roundtable in New York hosted by Ziff Davis Media. "You've got to have a nimble, flexible IT infrastructure that's always meeting your organization's demands."

Peer CIOs agree with Porco's perspective. According to *CIO Insight*, 70 percent of CIOs say their top priority is aligning IT with the needs of the business. In addition to defining and delivering mission-critical IT services, CIOs must make sure those services are available in cost-effective, efficient manners to support business goals.

For many companies, this means embracing a service-oriented architecture. Indeed, 23 percent of CIOs say their organizations have an SOA in place, and 19 percent are currently testing or piloting an SOA, according to *CIO Insight* (see chart below).

"IT must become a committed, ser-

vice-driven organization," notes Mark Barrenechea, EVP and Chief Technology Officer at CA Inc. "Progressive IT organizations must be process-oriented and managed based on business needs, with metrics that the business easily understands. An organization's ability to improve IT service is a proxy for increasing the value of IT."

CA IMPROVES SERVICE

With these goals in mind, CA's "Improve Service" initiative enables IT organizations to quickly respond to changing business conditions, take advantage of new ways of conducting business, improve productivity, and ensure the optimal, efficient use of IT assets and resources, says Barrenechea.

The Improve Service initiative has two key components: the CA Service Availability Solution and the CA Service Management Solution. (See "At a Glance" for information on these solutions.)

Enterprises that embrace the Improve Service strategy are seeing quantifiable benefits. At Kings County Medical Center, for instance, more than 66 percent of employees use a self-service Web-based Service Desk system rather than phone-based help-desk services. The system, deployed by CA partner CompuCom, has significantly improved the reliability and security of Kings County Medical Center's network, notes CIO Porco.

SECRETS TO SUCCESS

To design a service-driven IT organization, technology managers require tools that:

- identify the IT services that contribute to business goals and align IT with the business;
- establish the service levels required to

AT A GLANCE

Company: CA Inc.

Spotlight Initiative: CA's "Improve Service"

Key Components:

CA SERVICE AVAILABILITY SOLUTION

- Purpose: Assures reliable access to IT services by securing, automating and optimizing the IT infrastructure to meet changing business demands.
- Results: Improved service quality, fast problem identification and resolution, and comprehensive service metrics analysis.

CA SERVICE MANAGEMENT SOLUTION

- Purpose: Helps IT connect to the business, restoring credibility and viability by enabling IT services to be defined and delivered in business terms throughout their lifecycle.
- Results: Improved IT flexibility and service quality, as well as enhanced operational transparency.

Benefits to CIOs:

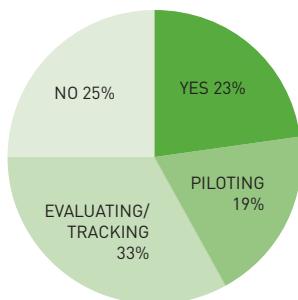
- Aligns IT with business.
- Increases IT responsiveness.
- Ensures a flexible IT infrastructure.
- Enables IT to deliver changes at lower costs.

For more information, visit www.ca.com.

- meet those performance goals;
- aggregate the costs of delivering the services to deliver improved transparency;
- improve visibility and mitigate the business impact of a problem with those services; and
- identify the assets needed to deliver the services.

CA's Improve Service initiative addresses these requirements head-on, according to Ed Golod, president of Revenue Accelerators, a New York consulting firm that serves senior technology and sales executives. "CA is ultimately empowering CIOs to transform IT from a cost center to a strategic partner that contributes to the bottom line," he says. ■

SOA GAINS TRACTION Has your company deployed a service-oriented architecture?



SOURCE: CIO INSIGHT

CHANGE = STABILITY

If there's one constant in business today, it's change. But large or small, internal or external, change doesn't have to impede IT service delivery. Think of change as an opportunity for IT to satisfy fluctuating demand while maintaining a stable, productive work environment. With integrated CA software solutions for service management and service availability, you can unify and simplify the way you manage complex IT services across the enterprise. Anticipate and prioritize shifting demand. Automate processes to ensure timely delivery and reliability of service. And leverage industry best practices such as ITIL. It's all possible with our unique approach to managing technology called Enterprise IT Management (EITM). To learn more about how CA solutions can stabilize change to create a true service-driven IT environment, visit ca.com/deliver.



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“We are following a policy of attrition. We will not buy any more Windows licenses—only open source.”

Dave Jenkins
CTO, Backcountry.com
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CASE STUDY

BACKCOUNTRY.COM | 44

Great Wide Open By Debra D'Agostino

Backcountry.com is by no means the biggest player in the outdoor sporting-goods market. But its strategic commitment to open source—nearly every corporate system runs on it—has kept the company growing at an impressive pace.

THINKING OUT LOUD | 00

How does a small business in Park City, Utah, hire top developers? Easy. Offer them a lifestyle, not just a job.

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The Modern-Day MBA By Edward Cone

The disconnect between academia and the real world is especially pronounced in IT. To address the problem, a small but growing number of MBA programs are folding technology training into their traditional business curricula.

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JEFF HAWKINS | 78

Mind Over Matter With Debra D'Agostino and Edward Baker

Palm Computing founder Jeff Hawkins has developed a radical new theory about how the brain works. Now he's working to build a new breed of intelligent machines, and he plans to aim them at the toughest business computing problems.



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and one new CIO

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FOREWORD



“People don't believe at first that it doesn't collect information on where you have been.”

Jim Whitty

Project manager, Oregon Road User Fee Pilot Project
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powered 2.4 million
new servers, and
the office park
to put them in

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“Our technology will automatically come up with a way of representing the world just like humans do, and draw conclusions based on that model.”

Jeff Hawkins
 Numenta Inc.
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WHAT'S NEW ONLINE

THE NEW RULES OF WIRELESS

Additional commentary by Jeff Hawkins | go.cioinsight.com/hawkins

Jeff Hawkins, the creator of the Palm Pilot and Treo smartphones, says the future of mobility isn't about handhelds or laptops. A fast, ubiquitous wireless network is the key to device independence.

THE PRICE OF PRODUCTIVITY

By John Parkinson | go.cioinsight.com/parkinson

Outspoken technologist and *CIO Insight* contributing editor John Parkinson looks at how Windows Vista could initially hurt productivity.

A VIEW FROM THIRTY-THOUSAND

By Dr. Karen Sobel Lojeski | go.cioinsight.com/lojeski

With this installment on management practices created for the Industrial Age but outdated for the Information Age, Dr. Lojeski, chief executive officer of Virtual Distance Inc., launches her monthly online column.

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THE RUSSIANS ARE COMING, THE RUSSIANS ARE COMING

A three-day travelogue by Dean Lane | go.cioinsight.com/russia

When Dean Lane, former CIO and current chief executive of VariTRAK, was invited to give the keynote speech at an IT conference in Russia, he figured he'd better learn as much as he could about his audience.

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BLOGS



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EXCERPT

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BY ED CONE SENIOR WRITER

go.cioinsight.com/blogs/knowital

Live from the intersection of the enterprise and Web 2.0... You don't have time to read everything out there. Now you don't have to.

EXCERPT

"Corporate culture will have to change if user-created apps are going to thrive. From what I saw on Saturday, legal culture has some adjustments ahead, too."



THE STRATEGIST

BY EDWARD BAKER

CIO INSIGHT EDITOR

go.cioinsight.com/blogs/strategist

Timely commentary bringing together an original perspective on the daily hot spots where technology meets business strategy.

EXCERPT

"These same telecoms are hell-bent on stopping the efforts of municipalities to provide high-speed Internet access, even where they themselves haven't bothered to help. Let's see: You get to control who gets broadband, and who gets to see what, for how much money."

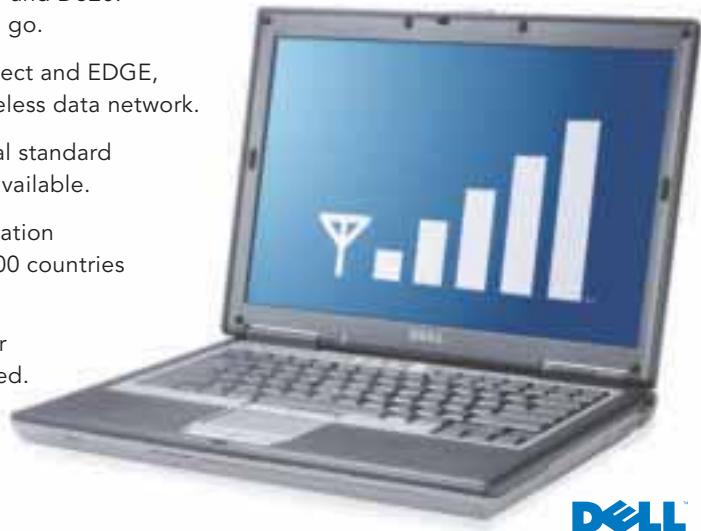


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The First Five Years

THIS ISSUE MARKS OUR FIFTH anniversary. Five years provides enough time for some pretty significant accomplishments, whether in publishing or elsewhere.

Consider the following achievements, which were all completed over a five-year period: the waging and completion of World War II, the filming of the \$100 million movie *War and Peace*, the writing of *Madame Bovary* by Gustave Flaubert, and the building and opening of the Golden Gate Bridge to vehicular traffic.

Five years has allowed *CIO Insight* to meet some significant milestones too: We earned 35 national and regional awards for editorial excellence, conducted 65 online research studies that gauged the attitudes of IT executives toward technology and business strategies, and wrote and edited close to 700 articles designed to keep CIOs informed with the strategic knowledge you need to succeed.

We launched in 2001, a year that will forever be embedded in our memories for the losses sustained by our country, families and friends. Security has become a priority for CIOs since then, and we have published four special issues on the topic (a fifth is due this September). In all, we've written 19 special theme issues, seven of which have received editorial or design awards. Most recently, our March 2005 Special Issue on Globalization won the Jesse H. Neal gold award for best special issue.



We've analyzed the business and technology strategies of scores of companies, including Johnson & Johnson, Union Pacific, PepsiCo, 99 Cents Only Stores, Commerce Bank and Avnet, to name a few.

We've interviewed many experts to get their particular take on thought-provoking topics, including Peter Weill on infrastructure, Lawrence Bossidy on execution, Don Tapscott on transparency, Jakob Nielsen on Web design, Thomas Friedman on globalization and Geoffrey Moore on innovation. And we've analyzed the trends and brought you countless in-depth stories on a wide variety of topics critical to corporate IT executives. They include becoming an adaptive organization, making the most of open source, dealing with the curse of complexity, managing the outsourcing backlash, boosting U.S. innovation and preparing for Web 2.0.

But time never stands still. As we enter our sixth year, we will continue to write about the trends, people and companies that are helping to shape the future of business and IT. Some of our commentary will show up solely on our Web site (check out "What's New Online" on page 14 for some of the special coverage you'll find).

No one can predict what the next five years will bring, but we can be sure of one thing: It will require all of us to change and grow.

—Ellen Pearlman



VIRTUALIZATION GETS REAL

A virtualized IT infrastructure can deliver significant operational and economic benefits—boosting availability while slashing cost of ownership. Dell, Intel, VMware, Altiris and EMC provide industry-leading virtualization solutions that companies use today to gain a competitive edge.

When it comes to quantifiable business benefits, there's nothing "virtual" about a virtualized IT infrastructure. The payback is real—just ask Bob Neuberger, the Server, Storage and Database Manager for National Semiconductor. Santa Clara, Calif.-based National is the industry's leading manufacturer of high-performance analog devices and subsystems, reporting sales of \$1.91 billion in its most recent fiscal year.

Like many firms, National experienced years of growth in the de-

mand for Windows-based business applications. To provide the isolation necessary to run these programs reliably, National followed the common practice of deploying each on a dedicated server. Eventually the number of Windows-based servers and the cost of maintaining them became overwhelming—and most were very significantly underutilized.

"We had this beautiful farm of Dell PowerEdge servers," recalls Neuberger, "but many were only running at 5 percent of capacity."

Neuberger and his team chose an optimization strategy—based on Dell servers and VMware virtual infrastructure—that allowed them to consolidate up to eight physical servers as virtual machines running on a single Dell server.

"Our goal was to implement VMware software without purchasing any additional servers," Neuberger says. "We've easily accomplished that, despite continually implementing new Windows applications to support our internal customers."

www.dell.com/virtualizationtoday

A HIGHER STANDARD OF INTEGRATION

The close integration that distinguishes server virtualization solutions from Dell and competing offerings is nowhere better illustrated than in the partnership and joint development initiative between VMware and Altiris. The two companies have joined forces to address the challenges of concurrently managing both a host server infrastructure and a fleet of VMware virtual machines running on it.

Together, the two companies have created a hybrid administrative discipline called "Managed Virtualization." This combines Altiris' simplified approach to IT lifecycle management with the power of VMware virtualization. This innovative approach fosters efficient ways to manage not only physical servers, but also VMware virtual machines running as virtualized servers.

Managed Virtualization combines VMware technology with Altiris Server Deployment and Altiris Server Management Suite. This combination provides IT administrators with enhanced capabilities to provision, deploy, manage and update Dell servers based on 64-bit Intel® Xeon® processors and VMware ESX Server running on that hardware.

The benefits that can result from this integration are clear and compelling: faster deployment of new services, streamlined management, reduced administration and improved responsiveness.

The payback? An expected 33 percent reduction in costs.

BELIEVE THE HYPE

National's experience is being duplicated in data centers around the globe. Analysts at Framingham, Mass.-based IDC believe, based on a 2005 study of server virtualization, that companies are rapidly adopting virtualized servers by partitioning x86 systems to contain costs and handle growing workloads. This study further found that survey respondents currently using server virtualization technologies expect 45 percent of new servers purchased this year to be virtualized.

IDC expects spending on virtualization to approach \$15 billion worldwide by 2009. Analysts at Stamford, Conn.-based Gartner, Inc., concur. At Gartner Symposium/ITxpo 2005, the firm classified virtualization as a "megatrend," saying that it's the best tool that companies have right now to increase efficiency and drive up server utilization.

By decoupling workloads from physical server and storage resources through virtualization, enterprises can also:

- Enable dynamic capacity allocation
- Increase availability
- Simplify business continuity planning
- Reduce the cost of service delivery
- Lower total cost of ownership

The bottom line is that virtualization enables a more flexible and agile infrastructure—one that can respond readily to business change.

Regardless of the benefits, IT professionals may initially be wary of trading familiar challenges for new ones. Indeed, managing the transition from a physical data center environment to

a virtual one can be a seemingly complex undertaking, preventing many organizations from realizing the financial and operational benefits. Consider the steps involved in a typical virtual infrastructure rollout:

- Determine hardware requirements and select a virtual infrastructure partner to provide planning and assessment services
- Implement the appropriate supporting storage environment
- Select and deploy virtualization software, as well as management tools for both physical and virtual resources
- Manage the cutover with minimal downtime

There are also cultural issues to consider. For instance, some customers and managers are accustomed to "owning" a physical server. In some cases, they may need to be convinced that a virtual environment can deliver the same levels of security, performance, reliability and scalability as a physical one.

Objections aside, however, the simple truth is that the operational and economic benefits of a virtualized IT infrastructure are far too significant to ignore. Companies hoping to leverage the advantages of virtualization must find a viable and economical way to address the issues.

MAKING VIRTUALIZATION MANAGEABLE

With these challenges in mind, powerful industry leaders—comprised of Dell, Intel, VMware, Altiris and EMC—are joining forces to bring standards-based innovation, volume production, and direct distribution to a virtualized IT infrastructure space.

Dell and its partners have worked



together to assemble and integrate a solution stack that makes the transition from a physical to virtual infrastructure swift and practical. The result is an easy-to-implement solution that packages leading hardware and software technologies, delivers them directly to the end user, and wraps them in the security of single-source support from the industry's most efficient provider of high-performance IT solutions.

Virtualization is an integral component of Dell's Scalable Enterprise Architecture, a framework for a highly efficient data center infrastructure. This framework combines standardized hardware and software components and a services organization capable of delivering automated, policy-based management in the future. It will enable dynamic real-time resource allocation in response to changing business conditions.

Dell brings together best-of-breed solutions, including server systems, SANs, services, virtual infrastructure software, virtual environment management software, and systems deployment and management software. Several key features set these solutions apart from the competition, including:

- A single, global point of contact for every aspect of assessment, design, delivery, deployment and support.
- Integration between management tools for both the physical and virtual environments.
- A full range of customizable virtualization solutions for small, medium and large companies.

Organizations worldwide are deploying these standards-based platforms today due to their unique combination of performance, tight integration, ease of deployment and unmatched value. Dell virtualization solutions address issues of low utilization and high management costs of existing environments, while preparing the IT infrastructure to scale and adapt more efficiently in the future.

DELIVERING PERFORMANCE AND VALUE

The core components of virtualization solutions available through Dell are standards-based hardware, software and services that deliver optimal performance and integration without locking the user into proprietary technologies that inflate costs or limit flexibility. These components include:

■ **Dell PowerEdge Servers** offer a complete portfolio of blade and rack systems, in 2-way and 4-way configurations powered by Dual-Core Intel® Xeon® processors. Equipped with advanced reliability features for business-critical applications, Dell servers are designed to reduce the cost and complexity of enterprise environments by providing a standardized, high-performance platform for flexible, highly available and easily manageable scale-out architectures.

■ **Intel Virtualization Technology** provides silicon-level software support specifically architected for virtual machine monitors that improves the dependability and interoperability of Dell PowerEdge servers with leading virtual infrastructure solutions such as VMware ESX and VMware Virtual Center. Intel also provides core server platform technologies such as Dual-Core Intel® Xeon® processors that enhance server performance and conserve power, and provide the reliability and scalability to help grow your business, reduce costs and mitigate risk.

■ **VMware Virtual Infrastructure Technology** empowers IT organizations to match IT infrastructure—servers, storage and networks—to the information access and computing needs of their business. In a VMware virtual infrastructure the servers, storage and networking infrastructure can be treated as a common resource pool of flexible capacity. This is highly beneficial as a virtual infrastructure provides capabilities to rapidly deliver applications

THE TRUE VALUE OF A PACKAGED SOLUTION

To fully appreciate the value of Dell's comprehensive and proven virtualization solutions, consider the technical and organizational complexity of designing and implementing a solution. Tasks include:

- Confront and overcome the cultural objections to a virtual infrastructure solution. Don't be surprised to find business owners deeply attached to the "one application, one server" paradigm.
- Assess the current level of resource utilization and the available underutilized capacity.
- Assess the physical requirements of the intended virtual infrastructure.
- Select and deploy a virtualization software solution that is compatible with the physical hardware and software components.
- Select and deploy appropriate software tools to monitor and manage the physical resource pool.
- Select and deploy appropriate software tools to monitor and manage the virtual environment.
- Plan and manage the cutover from physical to virtual resources without interrupting service delivery or negatively impacting normal business processes.

When viewed in this light—particularly with respect to the internal resources required to complete the tasks on this list—the net worth of a fully integrated, tested and proven solution rises significantly.

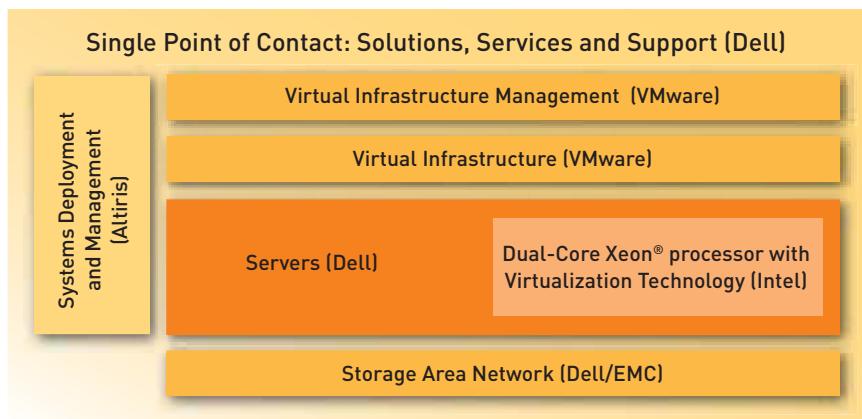
and services on the fly to users across the enterprise without the common effort and time required to procure and configure new IT resources.

VMware has a full range of software technologies that include a platform for migration of live virtual machine workloads across x86 host servers in a virtual infrastructure; systems management of virtual infrastructures; utilities that enable physical-to-virtual migration and simple server partitioning to manage multiple OS/application workloads on a single x86 host server. VMware virtualization technology provides many benefits to customers and lowers risk in the IT environment.

■ **Altiris Enterprise Systems Deployment and Management Tools** give IT administrators a comprehensive solution for monitoring and managing both virtual services and the physical servers that support them. Designed to simplify the entire server life cycle, the Altiris Server Management Suite provides deployment, management and monitoring functions from a centralized console to automate operations, improve system availability, and reduce overall infrastructure costs. It significantly reduces management complexity with comprehensive tools that streamline and automate provisioning, deployment, patch management, desired-state management and recovery services.

■ **Dell/EMC Storage Systems.** To eliminate virtual server dependencies on specific physical storage resources, consolidated storage is often necessary. Dell/EMC storage solutions combine EMC's data management technology leadership with Dell's unsurpassed capabilities in system design, manufacturing and distribution, providing a high-performance solution to support any size virtual environment.

■ **Dell Services** help companies realize the benefits of virtualization with solutions that deliver flexibility, ease



DELL VIRTUALIZED I.T. INFRASTRUCTURE SOLUTIONS INCLUDE:

- Dell PowerEdge servers powered by 64-bit, dual core Intel® Xeon® processors
- VMware virtual infrastructure and management software
- Dell/EMC storage area network solutions
- Altiris systems deployment and management tools
- Dell Services for planning, implementing and maintaining virtual physical environments

of integration and deployment options that match business and budget requirements. Offerings are grouped into three phases: assessment, design, and implementation. During assessment, Dell service professionals determine current and future system requirements and provide ROI and TCO analyses. Next, a scalable solution is crafted with minimal end-user disruption in mind. For the implementation phase, designs are validated, a pilot consolidation is conducted, and data is migrated to the new system. Finally, Dell Enterprise Support Services provide proactive support with 24/7 rapid response and resolution. By delivering complete, end-to-end solutions, Dell Services ensure smooth transitions and speed time-to-benefit.

VIRTUALIZATION: A PRACTICAL BUSINESS STRATEGY

Dell brings together the industry's foremost standards-based server, silicon, storage, virtualization and systems management technologies in a tightly integrated package that is business proven, deployment-ready and that offers immediate benefits and positive

ROI. These virtualization solutions are helping organizations worldwide unlock the power, potential and capacity of existing IT infrastructure, reduce costs, and respond more rapidly and profitably to new opportunities.

Just ask National's Neuberger. "When there's a hot new initiative, we can provision new servers in minutes," he explains, "and that helps reduce product development cycles. One of the main functions of IT at National is to enable the business to produce faster and more efficiently. The Dell-VMware combination is helping advance that goal by giving us tremendous on-demand capacity to meet the needs of our business."

By providing the business customer with a single source of sales and service responsibility, Dell is helping to bring the financial and operational advantages of a virtualized IT infrastructure to a wider range of potential beneficiaries. Whether your goal is consolidation, cost reduction, improved utilization, business continuity or increased agility, Dell server virtualization solutions hold the key to success.

For more information, visit www.dell.com/virtualizationtoday. ■

www.dell.com/virtualizationtoday

LETTERS TO THE EDITORS

THINKING OUTSIDE THE SILO

Re: "Turf Wars" (January 2006). Patrick Lencioni's thinking about silos is very shallow and misses the whole point. There have been historical advantages to silos, and for some companies today, they still represent some advantages, depending on the maturity of the company and its industry.

If we change our focus to organizational psychology, we note that certain cultures are less prone to silos than others. The professionally managed culture, for example, with its emphasis on high functional accountability, naturally reinforces silos; while more empowered cultures are able to bridge across functions and silos more successfully. Like most management thinkers, Lencioni has reached his "Peter Principle" by trying to extend his previous theories into an area that is much more complex than his previous work.

Peter S. DeLisi
President, Organizational Synergies
Fremont, Calif.

OUTSOURCING RESPONSIBILITY

Regarding Comac's decision against offshoring because of their need for "agile programming" in "Think Big" (March 2006), I'd suggest that they would have missed most of the benefits anyway. In my opinion, most of the success reported for offshore development is really due to the defense it gives to IT management against the pressures for requirements and specification changes. It's so easy to say, "You can't change that, it's being done in India."

Dave Larkin
CIO, Pfizer Japan (retired)
East Sandwich, Mass.

FROM RUSSIA, WITH LOVE

Re: "Global IT: The Russians Are Coming, The Russians Are Coming" (go.cioinsight.com/Russia). While the article's intent is to show how far the Russians have come in the world of IT, it actually makes a rather scary assessment of how far behind the times we are in the U.S. I'd be interested in seeing a similar article about China.

Michael Piacente
Partner, CVPartners
San Francisco

FROM OUR BLOGS...

THE ABSURD CRACKDOWN ON FREE INTERNET

go.cioinsight.com/crackdown

➤ It's rarely a good idea to adopt the heavy-handed approach of banning new technologies based on FUD. Productivity problems lie with the individual employee; they aren't created by technology.
—Cory

➤ The network and the technology are available to employees for one reason, which is to return shareholder value, not to extend their personal relationships into the work environment. —Kevin

BIG MOTHER: THE ADVENT OF CHILD-TRACKING TECHNOLOGY

go.cioinsight.com/mother

➤ Instead of spying on children, I think there's a lot of potential value in spying on our teens. That's where the real value comes in.
—Brenda

When a global leader in building management needed to update its IT systems, Web services were an integral component of the solution. Critical information became more accessible, opening up new levels of accessibility for employees.

When you give your people the right tools, success is inevitable.



Now, customers can access building controls remotely and share data between separate applications. The net result is an increase in cost savings and productivity.

See the full details of this case study at microsoft.com/peopleready

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**IS YOUR BUSINESS TRAPPED UNDER THE WEIGHT
OF A BLOATED, BUREAUCRATIC GLOBAL IP PROVIDER?**



THERE IS AN ALTERNATIVE

Your global IP carrier should set you free, not hold you down. It should be nimble and flexible enough to deliver innovative IP solutions and superior support yet expansive enough to offer the global scope and scale your business requires. Enter Global Crossing. Our wholly-owned global IP network connects you virtually anywhere instantly. It works effortlessly with your current legacy system and with IP services yet to be envisioned. All with the security, support and control you'd expect from an industry leader. It's no wonder so many FORTUNE 500® companies depend on us. Learn more at www.globalcrossing.com



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BOOK REVIEW

Spy Hard

“**S**URE YOU NEED GOOD SERVICE, products that perform, and customers to buy from you. You also need intelligence. Intelligence helps you see both threats and opportunities to your business and your ability to sell, develop or purchase.”

So says author Fuld, who runs a consulting firm specializing in competitive intelligence. His premise: It's critical that you see your competitors clearly, understand their strategy and act early on what you have learned.

Why this is important is easy to understand. You want to know as early as possible what new niches the competi-

and Fuld offers a solid series of rules of thumb:

⊕ Ask why your competition is disclosing a choice bit of information *now*. If a firm suddenly publishes a lot of technical data in one area, it could be a sign they are going to be abandoning that part of the market. If they were going after it full bore, they would keep the information to themselves for as long as possible.

⊕ Follow the transaction trail. “Whenever money is exchanged, so is information.” For example, in announcing an acquisition, the acquirer often mentions, deep down in the news release, what bit of software or hardware it is particularly happy to acquire. That should indicate what markets it may target next.

⊕ Talk to the people who are supplying your competitors, and to those who buy from

them, to find out their appeal.

⊕ Eliminate any bottlenecks that keep information from getting to the people who need it.

Fuld's self-referential (and self-reverential) stories grow tiresome, but after a while you learn to skip them. And you can use the time gained to focus on what he is really advocating: Come up with as much information, from as many different credible sources, as possible. And then analyze that data from as many different angles as you can.

That is a good description of competitive intelligence. It is also the formula the best executives have always followed. ⊕

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PAUL B. BROWN is the author of numerous business books including *Publishing Confidential: The Insider's Guide to What It Really Takes to Land a Nonfiction Book Deal*, published by Amazon. Please send questions and comments on this article to editors@cioinsight-ziffdavis.com.

SHORT TAKES

Creating Competitive Advantage: Give Customers a Reason to Choose You Over Your Competitors

By Jaynie L. Smith
with William G. Flanagan

DOUBLEDAY CURRENCY, APRIL 2006
240 PAGES, \$19.95

No phrase in business is more overused than “competitive advantage.” So why can so few businesses articulate—succinctly and in detail—what theirs is? Consultant Smith provides a primer that stresses, among other things, that competitive advantage is objective, not subjective; quantifiable, not arbitrary; and unique, in that it can't also be claimed by the competition and it isn't a cliché (such as “we exceed our customers' expectations”). These thoughts may help you produce a memorable answer the next time a customer asks, “Why should I do business with you?”

Management by Baseball: The Official Rules for Winning Management in Any Field

By Jeff Angus

HARPERBUSINESS, MAY 2006
272 PAGES, \$22.95

As Yogi Berra once said, “you can observe a lot by just watching,” and that is what consultant Angus has done here. He draws on the wisdom of baseball legends such as Earl Weaver (“A manager wins games in December. He tries not to lose them in July.”). And he draws useful analogies between baseball moves and business—such as a team's decision to carry a left-handed relief specialist whose sole job is to get out tough left-handed hitters. (Should you ask that creative guy down the hall to do lots of detail-oriented work?) As a result, Angus makes it fun to rethink your strategies.



The Secret Language of Competitive Intelligence: How to See Through and Stay Ahead of Business Disruptions, Distortions, Rumors, and Smoke Screens

By Leonard Fuld

CROWN BUSINESS, MAY 2006
320 PAGES, \$24.95

tion is after (especially if they're some of the same ones you are planning to target), where they think the growth is, and why they are abandoning fields that you think have great potential.

But perhaps Fuld's biggest contribution here is in explaining that the easiest way to gain true intelligence about the competition is by getting out of your own way.

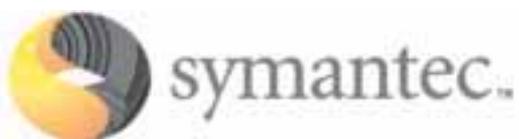
Begin by accepting reality. For years, Eastman Kodak blamed slowing film and camera sales on everything from Sept. 11 to a slumping economy. Only belatedly did the company accept that people really like digital cameras. The moral: You need to take an objective look at the numbers that are coming in, instead of either seeing what you want to see, or looking for excuses to explain away data you don't like.

Once your blinders are off, you can start looking for news you can use,

Security Without Boundaries



**How to protect your infrastructure,
information and interactions in an increasingly
collaborative world without boundaries.**



A NEW BUSINESS MODEL is emerging that is also introducing new threats and security requirements for chief information officers (CIOs) and chief information security officers (CISOs) in a wide spectrum of industries.

In this new model, businesses collaborate over the Internet with employees, customers, suppliers and other business partners in a way that essentially breaks down all the old boundaries. “Networks are becoming the locus for innovation,” says Walter W. Powell, a professor of organizational behavior, sociology and communications at Stanford University. “Firms are becoming much more porous and decentralized.”

For the business side, this new, collaborative model offers several important benefits. Companies can be more responsive to the changing—even very fast-changing—needs of customers. Costs can be reduced at a time when global pricing pressure has never been greater. And increasingly, this continuous flow of information transforms the way business is done. “There’s a fundamental shift in power,” says Pierre Omidyar, founder and chairman of online marketplace eBay Inc. “Everywhere, people are getting together and—using the Internet—they are disrupting whatever activities they’re involved in.”

Take Coleman Co., one of the largest manufacturers of outdoor equipment and camping gear. Coleman has improved its product-development process to allow collaboration between its employees and global suppliers. Ericsson, the Swedish telecom equipment manufacturer, has implemented a business process that tracks and manages customer orders from receipt to supplier authorization; Ericsson order

information is available not only throughout the enterprise, but also to more than 35 first-through-fourth-tier suppliers. The Institute for Johns Hopkins Nursing in Baltimore hopes to improve the quality of life for palliative-care patients by using advanced collaborative technology that shares information with more than 460,000 nurses working in some 50 U.S. organizations.

But greater online collaboration also brings greater online security risks. CIOs and CISOs must realize that the new business model carries a great, new need for protecting their organizations’ infrastructure, information and, increasingly, interactions. Indeed, more than two-thirds of senior business executives say that ensuring reliable network security is the single most critical factor in the successful implementation of a converged IP network, according to a 2005 survey of more than 235 executives in 50 countries conducted by AT&T and the Economist Intelligence Unit. More than 60 percent of the executives said that processing customer data online exposes their organizations to electronic security breaches.

“Over the last 14 months, we are starting to see what I would call a crisis in confidence,” says Paul Kurtz, executive director of the Cyber Security Industry Alliance, an advocacy group. “People are becoming more uncertain.”

In fact, today’s new-school security protection must cover four crucial platforms: corporate boundaries, both physical and virtual; infrastructures, both mobile and fixed; assets, both internal and external; and devices, both managed (that is, company-owned) and unmanaged.

Pervasive Connectivity

Key to the new, connected business model is a huge increase in both the frequency and richness of electronic interactions among enterprises and their suppliers, partners and customers. Today, information flows virtually non-stop by way of telephone, e-mail, fax, even old-fashioned snail mail. Meanwhile, transactions are conducted by way of supply-chain integration, e-commerce and other online systems, many of which are outsourced. And both collaboration and co-dependence are encouraged through knowledge sharing, the emergence of virtual teams, continuous innovation, and the development of user communities.

As these conditions proliferate, business reaches a state known as pervasive connectivity. In essence, everyone is connected. This new generation of information technology is likely to “dramatically change the relationship between information, technology and the world,” says Alex Soojung-Kim Pang, research director at Institute for the Future, a nonprofit research group, and an expert on pervasive computing.

Mobile access to corporate networks is also sharply on the rise. The goals are admirable: higher productivity, greater flexibility, and faster responses to customers. In fact, when asked why they permit mobile access to their networks, nearly three-quarters of companies said their goal was to improve the productivity of employees, according to a 2006 mobile survey conducted by the Economist Intelligence Unit. Yet

STEPS TO SECURITY SUCCESS

Here are four steps CIOs and CISOs can take to provide bullet-proof security in a connected world without boundaries.

- 1. Look Ahead:** Anticipate and preempt all targeted, low-profile threats, both internal (that is, from employees and contractors) and external (those originating from customers, hackers and other non-employees).
- 2. Guard the Gates:** Do whatever it takes to adequately protect all enterprise information, infrastructure, and interactions—regardless of their location and who owns them.
- 3. Empower People:** Securely accommodate employees, partners, customers and vendors within both physical and virtual corporate boundaries.
- 4. Play by the Rules:** Comply with both the organization’s internal governance rules and all local, state, federal and international regulations. Once compliance is achieved, then be able to prove it.

CIO VIEWPOINT

Symantec Senior Vice President and Chief Information Officer David Thompson shares his thoughts on information security in an increasingly collaborative world.

For CIOs, how critical an issue is security in this connected world without boundaries?

Any CIO would have information security as one of their top priorities based on where technology is going and the current threat environment. The CIO needs to have a staff that's focused in this area to make sure that it's resourced correctly and managed effectively.



the life of their data, since data typically moves beyond the enterprise through backup and other materials and may be stored or managed by third parties. Protecting data in these environments has become one of the newer things we've had to worry about. Personal and confidential information must be protected throughout the entire information lifecycle, so you need to have a strategy to address this.

What does a state-of-the-art enterprise security system look like today?

First you should protect the corporate infrastructure—protect your assets and data center through firewall, IDS and encryption technology. Endpoint protection is also quite important, as users have a lot of critical data available to them on mobile devices. Protecting those assets from threats such as spyware is crucial.

In addition, more CIOs are looking at

What's your opinion of the position of chief security officer?

I'm a big proponent of the chief security officer role, because most CIOs are very focused on the business drivers of a company and managing the organization of IT. By having a chief security officer in place, it allows you to have very focused attention on information and asset protection.

What advice would you give CIOs trying to prepare for future security needs?

I think the unknown and unexpected is probably the most troublesome thing for us as CIOs—it's one thing that keeps me up at night. But the real benefit that I enjoy is that I have a great partner in Symantec, being one of the leaders in this space. CIOs need to leverage relationships with firms that are experts and use them as an early warning system.

What sets Symantec apart from the competition?

The content we provide within our security solutions is some of the best and most current in the industry. We also have services that really can help a CIO to stay ahead of the curve. By having a firm that specializes in this that is a true partner who's involved in your business, they can help assure that you're protecting all of your assets and infrastructure.

mobile devices also introduce new, and serious, security risks. Mobile computers—both those of employees and non-employees—are the single most common source of Internet worm attacks, according to a 2005 study from Enterprise Security Group.

Pervasive connectivity also opens the door to increasingly sophisticated attacks by criminals. While early Internet hackers aimed merely for amusement or notoriety within the online community, today's Internet bad guys use highly sophisticated techniques to steal valuable data and enrich themselves. Today's attack techniques include denial of service (DoS), keystroke logging, spyware, click fraud, phishing and bot networks for hire.

"Over the past few years, we have seen hacking transform from a hobbyist activity to a criminal one," says Bruce Schneier, founder and CTO of Counterpane Internet Security Inc., a provider of managed security services. "The new criminal attacks have a more focused goal: profit. This difference makes the new attackers more dangerous and potentially more damaging."

Indeed, last year nearly 60 companies fell victim to serious criminal attacks aimed at stealing their critical customer, employee and business-partner information stored in applications and databases linked to the Web, up from just 16 in the previous year, reports the Web Application Security

Consortium (WASC), an international security-standards group. This attack rate will likely rise again. In just the first three months of this year, for instance, 20 attacks (or more than all for 2004) were reported, WASC says.

These attacks are increasingly sophisticated. Phishing scammers recently hacked the Web sites of three Florida banks and redirected customers to spoof pages in the one hour before their attack was detected. The attacks—made against Capital City Bank, Wakulla Bank, and Premier Bank—began when hackers broke into the servers of ElectroNet, a Tallahassee, Fla., service provider that hosts Web sites for the three banks. The attackers then redirected the banks' URLs to spoof sites on offshore servers, which asked customers to provide login details.

While the Florida banks say no valuable data was stolen, other organizations have been less fortunate. Thieves posing as employees of Ford Motor Credit Co. accessed a credit-bureau database and stole the credit reports of more than 30,000 consumers, resulting in losses that exceeded \$2.7 million, according to the U.S. Attorney's Office. In California, hackers recently broke into the state controller's computer system, gaining access to the names and Social Security numbers of 265,000 state employees—including the governor and all 120 state legislators. And earlier this year, thieves stole 8 million credit-card numbers from the database of a

company that processes transactions for Visa, MasterCard, American Express and Discover.

Rx for Security

Preemption is key to providing security without boundaries. Preemption means anticipating threats based on intelligence gathered both internally and externally, then adapting the security infrastructure in real time to block targeted attacks before they occur.

Preemption starts with an expert analysis of internal events, logs and other information gathered through selective filtering and correlation. Next, it moves to action: defending vulnerabilities, removing viruses and other forms of malware, backing up systems, applying patches, shutting down ID-stealing phishing sites, and constantly monitoring for new forms of malware—before they can attack. “Taking a reactive approach is not enough to combat the real-time nature of these threats,” says Howard A. Schmidt, a former White House special advisor for cybersecurity.

Preemptive protection becomes increasingly important as the number of published online vulnerabilities increases. And that number climbed by nearly 35 percent last year, according to Symantec’s latest Internet Threat Report. During the last six months of 2005, the number of published vulnerabilities reached an all-time high of 1,896, Symantec reports.

Pervasive security is needed on all devices to protect every part of corporate infrastructure, information and interactions, not just along the perimeter. What’s more, protection must be offered at all times, regardless of device type, ownership or location.

Looking deeper, pervasive security comprises both policy management and preemptive security intelligence. Physically, it starts at the firewall and in virtual private networks (VPNs). From the firewall, a company can deploy behavioral analysis as well as anti-spyware and anti-virus tools. From the VPN, a company can deploy intrusion prevention and detection, plus additional anti-virus tools.

Protecting every device requires a broad portfolio of security approaches: at the gateway; on critical systems in the corporate data center; across the corporate network (including clients and workgroup servers); and on the mobile, wireless and branch devices of mobile and guest users.

Policy management, meanwhile, lets companies define the levels of protection and access to information for various classes of identities and information. Policy simplifies the management of the thousands—even tens of thousands—of countermeasures that a typical enterprise deploys on a companywide basis.

Policy management also requires both security manage-

BY THE NUMBERS: SECURITY

- 500** | Companies worldwide that look to Symantec to manage their security environment
- 18,000** | Product versions for which Symantec tracks vulnerabilities
- 40,000** | Registered sensors located in 180 countries from which Symantec gathers intelligence on security incidents in real-time
- 65,000,000** | Customers who have used Symantec’s free Security Check feature to test for exposure to online threats
- 318,000,000** | Daily sessions of Symantec Live Update

ment and network-access control. Security management, to first scan and validate IT security controls, then generate statements of security-policy compliance. Network-access control, to ensure that a new device complies with the company’s security policies, then periodically ensure continued compliance on a device-by-device basis.

The Symantec Solution

Symantec is a leader in both preemptive security intelligence and policy-based management. The company tracks vulnerabilities in more than 18,000 product versions from 2,200 vendors.

To do so, Symantec delivers detailed intelligence on real-time security incidents gathered from more than 40,000 registered sensors in 180 countries. Over 500 companies worldwide look to Symantec to manage their security environment from one of Symantec’s Security Operations Centers in Australia, Germany, Japan, the U.K., and the United States. Also, some 65 million customers have used Symantec’s free Security Check feature, an online feature that tests a visitor’s exposure to a wide range of online threats. Similarly, each day customers launch more than 318 million sessions of Symantec’s Live Update, technology that connects a user’s system to remote servers for program and content updates, such as virus-definition updates.

Organizations look to Symantec to consolidate security to a single footprint, using its common management and global, preemptive intelligence. Symantec offers the industry’s broadest portfolio of market-leading security solutions, and it provides market-leading protections for both interactions and infrastructure. In this way, Symantec is poised to protect enterprises in this brave new age of boundary-less computing. ■

Visit www.symantec.com for more information on Symantec solutions for preemptive security intelligence and policy-based management.

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FOREWORD

▶ BUSINESS ▶ TECHNOLOGY ▶ MANAGEMENT

TAX TECH

The Green Mile

WITH GASOLINE PRICES HIGH AND LIKELY to stay that way, fuel efficiency is chic again for the first time since the heyday of disco. But the trend toward hybrid cars and other abstemious vehicles poses a problem for states that derive much of their road maintenance and construction budgets from gas taxes. Lower gas consumption means less tax revenue, and the high prices at the pump also make increasing the per-gallon tax rate politically unfeasible.

So what's a revenue-hungry state to do? Charge by the mile instead of the gallon.

In Oregon, one solution now being tested by the Department of Transportation's Office of Innovative Partnerships and Alternative Funding is a mileage-monitoring system that would tax drivers by the distance they travel on state roads, rather than by the amount of fuel they consume. Using global-positioning satellites and wireless technology, the Oregon Road User Fee Pilot Project tracks vehicles in transit and then captures their mileage data when they stop to refuel; an onsite computer at selected gas stations calculates the distance tax and adds it to their fuel bill.

The tax rate for the test is 1.2 cents per mile; the goal is to achieve rough revenue parity with the amount generated by Oregon's gas tax, which is currently 24 cents per gallon and which accounted for 86 percent of funds used for road construction, maintenance and repair in 2004. Meanwhile, Oregon's gas tax has not kept pace with infla-



tion in recent years, say state officials, and voters show little inclination toward raising it.

Oregon started its test program in late March, and project manager Jim Whitty says broad implementation could begin soon if the trial goes well. "We designed it so that it's ready to go if the pilot is successful," he says. The version being tested uses off-the-shelf GPS technology and simple connections to the electronic odometers common in newer cars. Oregon is spending about \$3 million on the project, paid for with state and federal funds.

The system, which Whitty says would cost about \$33 million to implement at Oregon's approximately 2,000 gas stations, would be applied only to new cars, which will increasingly have GPS receivers as standard equipment. It could charge different rates for travel in particular areas, or at certain times of day, in order to give drivers an incentive to avoid rush hours or high-maintenance roads. And the ▶

FOREWORD

satellite tracking will count in-state mileage only, so that drivers won't be taxed for trips on roads the taxes don't support. "The borders of the state are determined by the GPS, so you don't have to build anything extra to make it work," says Whitty.

There is an undeniable Big Brotherish aspect to having the government count your mileage, but Whitty is well-practiced at answering the questions that inevitably arise when people first hear about the plan. For instance, the system does not track where a driver goes, just how far he or she has traveled. "It's not where they've been, but the number of miles in each zone," Whitty says. Since no location information is gathered, there is no threat to privacy, and because the radio transmitter that sends data from a car's electronic odometer to the receiver on a gas pump has a range of only a few feet, poaching of driver information is unlikely.

Still, admits Whitty, "People don't believe at first that it doesn't collect information on where you have been, that it doesn't follow you around. It's a hurdle, but people have grown more comfortable with it over time." He compares it to the E-Z Pass toll system common in the northeastern U.S., which once aroused privacy fears but is now seen by millions of drivers as a commonplace convenience.

Ironically, the mileage tax will eliminate at least some of the incentive to buy fuel-efficient vehicles, a consequence that is not the concern of Oregon officials. "People think the purpose of the existing gas tax is to advantage fuel-efficient vehicles, but it's meant to maintain the road system. It's not doing that. If you want the tax to accomplish other goals, you can do that, but its purpose is to maintain the roads," says Whitty.

—Edward Cone

EMPLOYEE MONITORING

IT Spying on the Rise



WATCH YOUR BACK. ACCORDING TO THE "2005 ELECTRONIC Monitoring & Surveillance Survey," published by the American Management Association and the ePolicy Institute, electronic employee monitoring is on the rise. Roughly 76 percent of all companies monitor workers' Web site connections, and 36 percent track content, keystrokes and time spent at the keyboard. Half of all U.S. companies store and review employees' computer files, and 55 percent review e-mail messages.

Although the IT department is most often responsible for the monitoring, they're not the only ones, says Liz Beckhardt, a consultant and former product manager for IBM Corp.'s Lotus QuickPlace, a collaboration software package. "IT just wants to make sure that people aren't uploading huge amounts of data—managers want to see what their direct reports are actually doing." She says that once Lotus QuickPlace became popular, several Fortune 500 companies pressured IBM to create universal logins that would give managers access to their underlings' workspaces—without their knowledge.

That kind of snooping can have disastrous effects on a company, says Jeremy Gruber, legal director for the National Workrights Institute, in Princeton, N.J. "First of all, monitoring programs create a very stressful environment in the office, which often results in high turnover and job dissatisfaction." It also erodes the level of trust between worker and employer, resulting in decreased productivity.

And then there's the other side of the argument: that employee monitoring is necessary to protect the company from litigation and ensure that employees behave responsibly. "To the extent that employees are sending inappropriate jokes or photos that can create a liability to the corporation, management has clear responsibility to keep that from happening," says attorney Randolph Kahn, founder of Highland Park, Ill.-based information and compliance management firm Kahn Consulting Inc., and author of *Privacy Nation* (AIMM, 2006). However, Kahn also admits that snooping happens more often than necessary. "The idea of looking just for the sake of looking is inappropriate—and not uncommon."

Some companies make their monitoring policies clear to all employees—including the IT department. "We do not read employee e-mails unless given official permission from human resources or our office of business practices, but when there is an official complaint or irregularity we must investigate," says Timothy Koh, manager of human strategy and planning for Caterpillar Inc., the \$36 billion construction and mining equipment manufacturer. "Sarbanes-Oxley requires us to have such policies in place, and we tell our employees from Day One that e-mail belongs to the company and we have a right to monitor it." —Debra D'Agostino



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FOREWORD

MULTISOURCING

Changing of the Guard?

ARE AMERICAN IT OUTSOURCING firms at the end of an era of dominance? The outsourcing advisory firm TPI Inc. says they might be.

According to a January report released by the Woodlands, Texas-based firm, 325 IT outsourcing contracts (roughly 20 percent of all active outsourcing deals worldwide) will come up for renewal in the next two years—at a value of about \$100 billion. At the moment, 72 percent of those contracts are held by six companies: Accenture Ltd., Affiliated Computer Services Inc., Computer Sciences Corp., EDS Corp., Hewlett-Packard Co. and IBM Corp.

But the report suggests that increasing competition among upstart outsourcing firms in the U.S. and abroad will change the outsourcing landscape over the next few years. Companies will be awarding fewer megadeals to giant firms, and will instead dole out smaller contracts to multiple vendors—in other words, multisourcing.

In support of its theory, TPI offers the following figures on the rise of multisourcing: Of the 293 contracts signed in 2005, 70 percent were small and medium-size contracts (between \$50 and \$200 million), up from 65 percent in 2004 and 61 percent in 2003. Furthermore, the six largest outsourcers won fewer deals in 2005 than in previous years, snagging slightly more than half of the Top 100 deals in 2005, compared with 73 percent in 2003.

This shift creates a great opportunity for smaller companies, says Brian Rogan, senior vice president of strategic business and marketing

at Fremont, Calif.-based outsourcing provider Sierra Atlantic Inc. “Companies are still doing business with the large outsourcing firms, but they are adding to the mix some offshore providers and smaller niche players, companies that have expertise in a particular area like finance or manufacturing. Having several outsourcing contracts diversifies the mix and forces companies to compete more.”

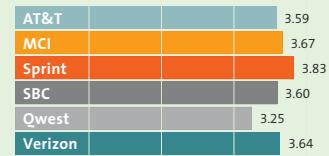
But multisourcing doesn’t necessarily mean that the large outsourcing firms will lose big. “When contracts expire, most of them are renewed with the incumbent service provider,” says Mary Lacity, professor of information systems at the University of Missouri–St. Louis and coauthor of the forthcoming book, *Global Sourcing of Business and IT Services* (Palgrave, 2006). “If a company does decide to switch, it’s often a remixing among the top suppliers.” —*Debra D’Agostino*

THE NUMBERS

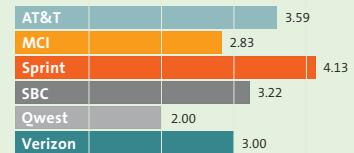
Comparing Carriers

Nemertes Research asked IT executives how their telecom providers stacked up in four different areas.

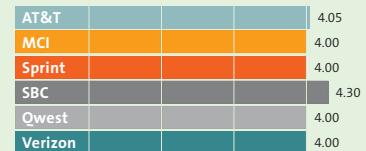
TECHNOLOGY



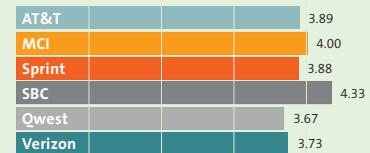
MANAGEMENT PORTALS



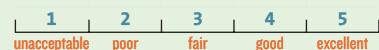
NETWORK PERFORMANCE



SECURITY



RATING SCALE



SOURCE: NEMERTES RESEARCH INC.

CIO INSIGHT ASKS

Do CIOs Do Web 2.0 Too?

Many CIOs may be pushing 50, but that doesn't mean they are behind the technology times.

Rank	Which of the following Web-based applications do you personally use?	Total
1	Web mapping (e.g., Google Earth, MapQuest)	69%
2	Team collaboration tools (e.g., shared workspaces, team rooms)	54
3	Blogs	36
4	RSS (Really Simple Syndication)	34
5	Wikis	29
6	Social networking (e.g., tagging, social bookmarks, community sites)	28
7	Podcasts	27
8	Expertise location and sharing	21
9	None of the above	13

SOURCE: CIO INSIGHT, MARCH 2006 N=170

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FOREWORD

Q&A: DONALD CHAND AND GARY DAVID

Finding Common Ground



THOUGH WELL-INTENTIONED, some attempts to bridge cultural gaps on global teams just result in creating more sophisticated stereotypes. So say two professors at Bentley College in Waltham, Mass.—Donald Chand (left), professor of information and process management, and Gary David, associate professor of sociology. The two researchers are studying how multicultural teams can avoid conflicts and work together more productively. Their advice, after studying IT organizations at four global companies: Focus on finding common ground, not differences.

CIO INSIGHT: What's wrong with focusing on cultural differences?

DAVID: It creates sophisticated stereotypes. Generalizing a national culture is inherently problematic, because it stereotypes the group it's meant to portray.

CHAND: The IT component of a finance company we studied added people from India to a project team that consisted of people from the U.S. and Ireland. The manager observed the Indian team was not able to produce the way he expected. Timeliness was an issue. He assumed that because the attitude toward time in India is elastic, the Indians were not grasping the significance of deadlines. He resorted to micromanagement to make them conscious of the time issue.

DAVID: The manager thought it was because people in India aren't sensitive to time, but it was really because of their inexperience. The manager came to an incorrect conclusion because of the cultural training he had received.

But don't we need to understand cultural differences?

DAVID: Yes, relevant ones. Books on India talk about the caste system, but

in our research we found no examples where the caste system was relevant, especially with the younger generation that works in IT. Cultural training has to focus on aspects of culture that are relevant to the workplace setting. Don't talk about India in general. Explore the relevant characteristics of the group that the people in the U.S. will work with, be it age, gender, or professional experience.

What steps should CIOs take to build understanding on global teams?

DAVID: Try to give people the skills to identify the relevant aspects of culture that are affecting the workplace relationship. Like age: It could impact how workers use technology.

What's more important if you want to get to know someone from Boston: understanding American history, or knowing about the Boston Red Sox? Obviously the Red Sox. Nevertheless, when we talk about training in India, you get these general descriptions of Indian culture, but nothing on cricket. Well, if you want people to have small talk, train them on the topics they can share. Companies should have training on baseball; if it's football season, on football, taught by one of their team members. Now you are creating a shared experience that can facilitate closer social relationships. And in the end, hopefully, you will achieve greater trust, which helps solve problems faster since people are more likely to contact one another with questions. It's less likely there will be a breakdown in communications. All this is based on small talk. If you can't do small talk, you can't do big talk.

—Allan Alter



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FOREWORD

COURT ORDER

The Case for Technology

In preparation for hearings on whether nuclear waste should be buried in the Yucca Mountains, the Nuclear Regulatory Commission has spent \$6.2 million building the courtroom of the future. Networking courtrooms in Nevada and Maryland, the commission is using voice-activated video-conferencing, a digital video recorder, computer terminals on each desk, flat-panel video monitors on the walls, and searchable transcripts of the proceedings. The hearings are not expected to begin until 2008.

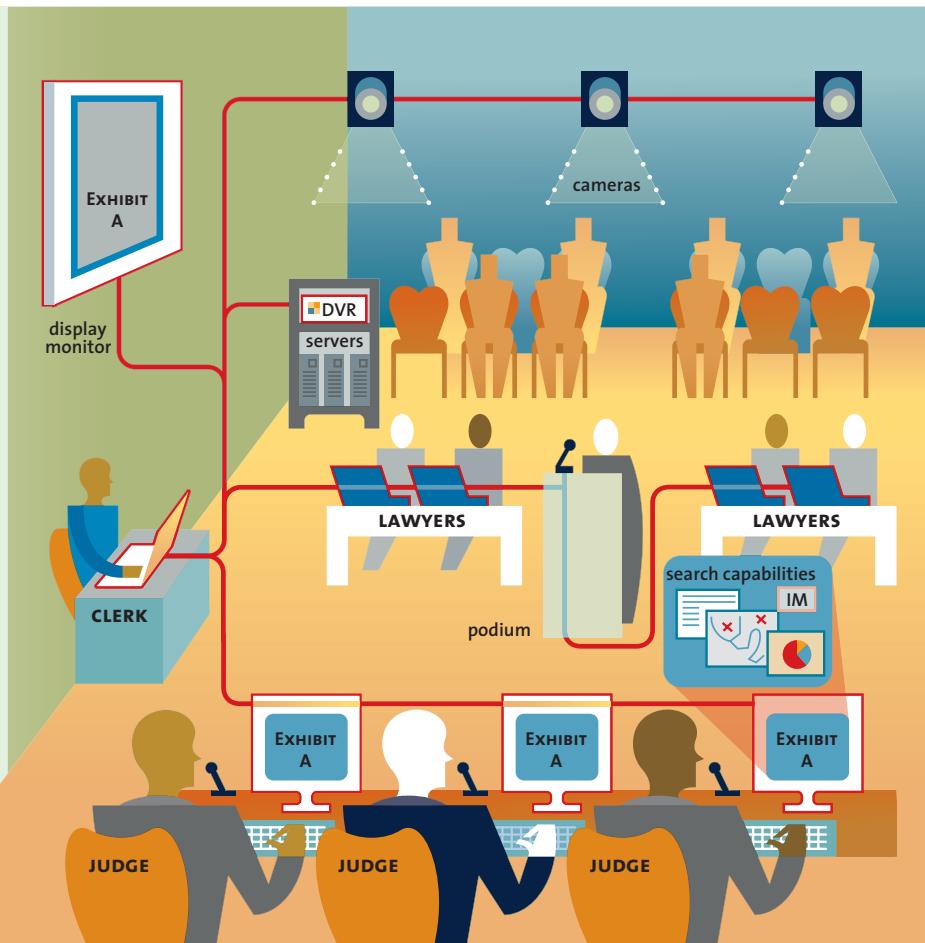


ILLUSTRATION BY JEAN TUTTLE

DAYLIGHT SAVINGS

The Sky Isn't Falling

SIGNED INTO LAW IN AUGUST 2005, the Energy Policy Act gives tax credits to owners of hybrid cars, authorizes subsidies to alternative energy producers, and does a real number on your VCR settings. Oh, and it could screw up your computer systems as well.

The act will increase the length of daylight savings time by four weeks, so that, beginning in 2007, daylight savings will go into effect on the second Sunday in March and end the first Sunday in November. Most IT systems and electronic devices, however, are set to "spring ahead" automatically, on the first Sunday of April. "An individual, if they fail to reset their clocks and computers manually, may

wake up an hour late and miss an appointment," says Luis Rodriguez, director of market management for IBM Tivoli in Somers, N.Y. (Heaven forbid.)

While it's not exactly Y2K all over again, there could be some concerns for businesses in financial services or security, which depend on specific timing. Software vendors will be making patches available for companies to install, to make sure their systems stay on the correct time. "We're not looking at this as if it were another Y2K," Rodriguez says, "but from an operational standpoint, it's not a good idea to just wait and see what's going to happen if you do nothing." —Sheena Mohan

ORACLE AND MICROSOFT: INTEROPERABILITY PAYS BUSINESS DIVIDENDS

The world isn't flat—and no company runs its business on a single set of applications. But IT diversity doesn't have to be a showstopper to get more value out of your investments.

Welcome to the age of the heterogeneous business. Today, many companies—probably yours included—use a wide variety of packaged applications, legacy systems, Web-based applications and infrastructure to run it all. Perhaps your organization merged with or acquired another, or perhaps different divisions use different applications to serve customers or manage suppliers, or maybe the diversity exists on a global level—with different regions or countries supporting their own IT ecosystems. Regardless of how you got here, the realities of the heterogeneous business are real.

The promised payoff of adding each new system was tempting: Web-enable internal and customer-facing processes, provide better service, save money. Along the way, though, the cost and complexity of traditional approaches to integrating and managing all of these applications and systems from point to point exploded; increasing costs, complicating changes and hindering the ability to scale and expand. And it's not just the largest enterprises feeling the pinch. Even smaller companies are discovering that while adding new functionality to enterprise-wide processes brings tangible benefits, it comes at a price.

Yet companies need these applications and systems—whether from Oracle, Microsoft or other vendors—to work together efficiently and seamlessly to meet business objectives and respond to changes in competition or market trends. The challenge is clear: Companies must find a way to capitalize on technology diversity for the long term and have it work to their advantage.



ORACLE AND MICROSOFT: FOCAL POINTS FOR INTEROPERABILITY

Today, many companies rely on Oracle and Microsoft. The ubiquity of Oracle database and enterprise applications

and rapid growth of Oracle Fusion Middleware, along with Microsoft's Office desktop tools and Windows operating system, logically makes these products and technologies focal points of enterprise interoperability efforts. And as more corporations turn to service-oriented architectures (SOA) to improve business and IT alignment and resource re-use they will expect new service-oriented applications to deliver enhanced functionality across computing platforms.

While Oracle and Microsoft have been competitors historically and still compete in key areas such as the database, both companies recognize that their technologies must work together to drive business value—customers rightfully expect this. That's why Oracle has been a leading provider of enterprise applications for the Microsoft Windows platform for more than a decade. Indicative of this "co-operation" is the fact that Oracle released its Database version 10g for Windows 2003 on the same day the new version of the operating system was made generally available.

BUSINESS BENEFITS

Rather than choosing one environment over the other—and ripping and replacing existing IT investments—savvy companies are using middleware to integrate Oracle and Microsoft technologies to:

- Quickly roll out new services to address market changes and opportunities
- Control rising total cost of ownership expenses by reducing IT complexity
- Capitalize on extensive in-house expertise in both platforms
- Strengthen the foundation for new technologies, such as Web services
- Improve productivity with familiar desktop tools that connect with enterprise resources

When focusing on interoperability between Oracle and Microsoft, there are three key areas to consider:

1. The Windows platform. Windows is one of the primary platforms that has grown in use and popularity. Oracle supports all editions of Windows in addition to other popular platforms such as Linux and Unix.

2. Microsoft .NET and the Windows Server System. Oracle technologies and solutions, including Oracle Fusion Middleware, support the standards and provide the best practices necessary to work with the Microsoft .NET platform and Windows Server System. This means that applications built using .NET and Web services run efficiently across enterprise infrastructures, and can be used as the foundation or extension of any enterprise-wide SOA environment using Oracle Fusion Middleware.

3. Microsoft Office. Oracle middleware lets companies leverage the capabilities of Microsoft Office, so users can interact with enterprise applications, SOA environments, and custom programs using the desktop tools they use every day.

Let's now take a closer look at how organizations can take advantage of the synergies between Oracle and Microsoft.

THE ROAD TO BUSINESS IMPROVEMENT: START IN THE MIDDLE

While multiple benefits are possible, organizations that effectively leverage their investments in Oracle and Microsoft should focus on three key areas:

1. Streamline IT operations by simplifying and extending the ability to develop and manage heterogeneous IT systems and deliver on vendor-independent SOA strategies (across Java, .NET, legacy, packaged applications).

2. Address information security and compliance issues by leveraging investments in Active Directory to provide comprehensive provisioning, access control, governance and security capabilities.

3. Increase user productivity by enabling workers to be more productive by using familiar desktop tools to access, analyze and work with enterprise information.

STREAMLINE IT OPERATIONS

One of the challenges that companies face with disparate IT systems is how to manage them efficiently and cost-effectively. It's not uncommon for organizations to manage each system individually—with a different person (or even department) and a distinct skill set, armed with one or more tools and management interfaces, for each. "Managing" in this fashion is inefficient, time-consuming and costly. It also forces additional IT investments as new applications are added, rather than enabling organizations to get the most out of what they already own.

Oracle Enterprise Manager, a solution for monitoring applications and services through a single, integrated console, helps tackle these issues head-on. This solution enables corporations to deliver higher quality of service and reduce related administrative and management complexity by giving them the tools to monitor, automate and test systems and applications—regardless of origin—from a single vantage point. As a result, IT staff can manage proactively, identifying and resolving potential issues before they impact business performance. Better tools also enable IT staff to reduce the amount of time that they spend managing systems, which means more time for strategic planning or other business-focused projects.

Cutting complexities from the complete life cycle of an investment, Microsoft plug-ins for Oracle Enterprise Manager help companies oversee configuration changes and enforce standardized policies within Oracle and Microsoft environments simultaneously. Support for the .NET Framework and Windows Server System enables administrators to view, monitor and manage Microsoft products and applications that leverage Active Directory, BizTalk or SQL Server and the .NET Framework from a single vantage point.

Build composite applications using Web services

This type of integrated, "single view" environ-

INTEROPERABILITY SNAPSHOTS

Company: Provider of outsourcing, consulting, IT services to government clients

Solution: Oracle SOA Suite (which includes BPEL Process Manager to orchestrate Web services)

Environment: BEA WebLogic J2EE run-time, .NET-based front-end user interface

Business benefit: Enabled standards-based architecture that will allow company to adapt quickly to changing legislation and serve multiple states with varying regulations.

Company: Major food retailer and distributor

Solution: Oracle Database, Oracle SOA Suite

Environment: .NET-based front-end user interface, IBM MQSeries for messaging with legacy mainframe system

Business benefit: Automated process flow that manages transaction logs from IBM point-of-sale systems in over 200 stores and provides key sales metrics to those that need it to make optimal decisions on merchandizing and managing suppliers.

ment is also useful at the project or strategic initiative level, making it easier to leverage different types of Web services—be they based on Java, .NET, legacy or packaged applications—to enable standards-based software development. This major step on the road to SOA enables developers or even trained business analysts to quickly build composite applications to address business challenges that can be flexibly changed later on if need arises.

The importance of this ability cannot be overstated. Developers continue to embrace two main platforms for building Web services (J2EE and Microsoft .NET). Some companies may choose one platform over the other, hoping to leverage as much existing application programming as possible. But ideally, shouldn't all of this software code be available to those developing composite applications? This is one of the basic tenets of SOA—use (and re-use) what you already own to increase agility and meet new business challenges quickly.

Once services are developed, mutual support for Web services standards such as BPEL (Business Process Execution Language) ensures interoperability between Oracle BPEL Process Manager and Microsoft's BizTalk servers. BPEL allows companies to exchange business process models between platforms and manage BizTalk activities within larger BPEL-defined business processes in Oracle BPEL Process Manager, a part of the Oracle SOA Suite. As a result, composite applications that address evolving business requirements can be developed and brought online faster.

Oracle Fusion Middleware enables truly cross-platform SOA by supporting both J2EE and .NET. To ensure SOA success, the company conducts real-world interoperability testing to confirm the utility in mixed environments. Additionally, Oracle Web Services Manager provides the answer to extending security to SOA environments and making it easier to manage disparate Web services. With the Oracle solution, you gain the capability to secure, manage and enforce operational policies for both Java and .NET Web services, all from a single interface.

The Oracle solution delivers a number of business benefits to customers. Chief among these is the ability to continue to derive value from existing investments. Second, speed drives competitive advantage—and the importance of these factors will only intensify as more companies embrace SOA. Finally, the ability to secure, manage and enforce policies related to Web services consistently, from a single interface, helps companies bolster information security and compliance efforts.

REAL-WORLD EXPERIENCES

A leading Web-based employment company valued the diverse computing environment it built using a mix of customized Oracle Financials, Siebel CRM, and Microsoft SQL Server, .NET, and Active Directory technologies. But when it needed to improve the automation of its end-to-end order management process, it found that fragile, hard-coded point-to-point interfaces were failing regularly.

For help, the company turned to a service-oriented architecture using Oracle Fusion Middleware.

The company now identifies five key business advantages:

- Middleware bridged the gap between the CRM and ERP systems
- Unreliable custom interfaces are eliminated and replaced with standard interfaces
- Middleware-enabled portals provide simplified access to role-based applications and content
- New business intelligence capabilities turn real-time operational data into sales and marketing insights
- Synchronization between the Oracle HR application and Microsoft Active Directory provides a single system of record for all employees, which is vital for regulatory compliance

ADDRESS INFORMATION SECURITY AND COMPLIANCE

Securing corporate information and ensuring corporate and regulatory compliance are among the most difficult issues faced by enterprises today. Access to information is often one of the major points of contention. From a business point of view, companies must give employees access to the information they need—regardless of where they are, or what type of device they're using. Unfortunately, "proper" access is like a moving target—as employees come and go, and change jobs within a company, their access rights will need to change and evolve. Otherwise, confidential information may fall into the wrong hands, exposing a company to unnecessary risk.

Many organizations have standardized on Active Directory as the main user directory or record of employees, or they use Active Directory as one of many different LDAP servers implemented departmentally. Oracle Identity Management—the company's solution for managing the end-to-end life cycle of user identities within diverse IT environments—supports single sign-on (SSO) using Active Directory as one of its core capabilities. This means that existing user information in Active Directory can be fully leveraged and utilized with the Oracle Identity Management solution.

In addition to improving accuracy of security records, this lowers user administration costs by reducing the need for IT to change user information manually for things like role changes

and active/inactive employee status and automating updates to user information to all relevant systems. When employees come on board, they are granted access to the appropriate systems. When they leave, they can be de-provisioned quickly, so that information security and integrity are not compromised—particularly crucial for those employees who leave to join a competing organization.

INCREASE USER PRODUCTIVITY

Every day, over 400 million people use Microsoft Office. It makes sense, therefore, to derive the most value from this tool and users' knowledge of it as possible.

Oracle Fusion Middleware can help companies address the issue of employee productivity by connecting Microsoft Office products such as Word, Excel and PowerPoint with Oracle E-Business Suite, PeopleSoft, JD Edwards and Siebel as well as non-Oracle applications. For example, productivity rises if the accounting staff can perform financial analyses using familiar desktop tools such as Excel instead of specialized "power-user" tools.

Overall, by building applications that use Office as the front end to underlying Oracle technologies and applications, companies can reduce errors, eliminate duplication of efforts, and help their workers become more productive.

Oracle delivers on this opportunity by enabling organizations to connect Microsoft Office with their business applications to work together effortlessly on typical enterprise processes such as expense reporting, time management or employee management. For example, managers work directly in Outlook or Excel to interact with HR processes such as request for salary increase, spot bonus for employees or review team vacations or expenses. Field personnel can use Outlook to book customer meetings, requests and document service calls in Word, kicking off automated Siebel-based processes for delivery on the customer need. For example, a service rep can schedule technical support to fix a known issue, starting up a process to assign, staff

and resolve an active case via Outlook and Word.

Business analysts who are familiar with macros and Excel pivot tables for running scenarios and building models can use Oracle Business Intelligence and Excel to analyze online analytical processing (OLAP) data to better understand their customers and markets. Finally, Oracle's XML Publisher streamlines the tedious and IT-intensive process of creating reports and high-fidelity outputs such as checks, work orders, and invoices. While the data from back-end

systems remains in the domain of IT, business users can format outputs and even regionalize documents with only minimal ramp-up using Word or Excel to build the templates. Across the board, retraining time is minimized or eliminated altogether because workers stay within familiar environments using everyday productivity tools that they've already mastered.

FULL SPEED AHEAD

Heterogeneous IT systems can no longer stand in the way of getting the information needed to serve customers better and drive business growth. Companies must ensure that their customer service reps have the latest order histories at hand when a customer calls, and that they maintain accurate and up-to-date records to keep inventories replenished in concert with sales trends. Barriers to meeting business challenges are falling every day with the introduction of new standards, renewed interoperability testing between vendors, and sweeping initiatives like SOA.

As many companies have discovered, numerous benefits are possible with a combined portfolio of Microsoft and Oracle technologies and applications. This was true for a leading job search site that beefed up its compliance efforts by exploiting synergies between Oracle applications and Microsoft Active Directory—making connections and managing risk by leveraging what they already own. Indeed, technology diversity is a matter of course these days—and it's imperative to make it work for your company for the long haul. ■

SNAPSHOT: MANAGING SECURITY, COMPLIANCE, AND COMPLEXITY

Company: European IT services provider

Solution: Oracle Identity Management, Oracle Application Server (including the Portal)

Environment: Four homegrown departmental portal environments and four separate user administrations, separate Internet and intranet platforms, and three separate Microsoft Active Directory implementations. To accommodate this infrastructure, company has been maintaining five data centers that store over 250 terabytes of information and running 1,300+ Windows servers.

Business benefit: Unified disparate portal environments into a single Oracle Portal implementation utilizing existing investment in Active Directory, .NET Web services and .NET servers. For IT, they were able to reuse existing investment in Microsoft technologies. For intranet users, they now have single sign-on through Windows log-in, so no more multiple user names and passwords to remember to access enterprise resources. Now the company has simplified and cost-effective central user administration for customers and employees that's easy to maintain moving forward. IT now spends a lot less time making manual changes to identity management infrastructure and is able to work on strategic projects for the business.



THE LEGAL JUNGLE

By Larry Downes

They Can't Work it Out

The trademark case between Apple Corps and Apple Computer shows just how difficult—and dangerous—it is to try to predict the future of technology.

A BRITISH COURT RECENTLY TRIED A CASE THAT PITTED Apple Computer against Apple Corps, the latter being the record company created by the Beatles and owned today by the band's former members. Apple Corps argued that Apple Computer's entry into the music business with its iPod and iTunes violates the terms of a trademark agreement the two companies signed in 1991. The case raises interesting questions at the intersection of trademark law and technological innovation. As we'll see, however, it has even more to say about the dangers of turning over decisions about business strategy to lawyers, especially in industries where technology is rapidly changing the rules.

But first, some background. What is a trademark? Most legal definitions describe it as a word, term, name or symbol that uniquely identifies the source of a product or service. Marks have ancient origins, going back to cave paintings identifying the owner of particular bison. Throughout commercial history, such marks have been used to designate the artist, craftsman or guild that made or endorsed particular goods. Today, a mark can be as simple as the Nike "swoosh" or as complex as the layout of a fast-food restaurant. The modern practice of brand development and management simply updates for the global, consumer economy the ancient practice of marking.

When companies use marks consistently, consumers associate the quality of goods and services with the mark of its provider, thus reducing consumer search costs for future purchases. I expect that the experience

I might have at a McDonald's restaurant anywhere in the world—price, speed, quality, taste and decor—will be roughly the same, and to the extent that is true, the brand and its marks become valuable indicators. This is one reason why companies with strong brands are so obsessed with ensuring consistent experiences, and it explains why they work so hard to make sure consumers are not given false signals by other companies using marks that are the same or similar. If my experience at a McDonald's, or at a McDonald's knockoff, varies from the norm, the brand loses value and the mark loses meaning.

Trademark law protects marks because doing so benefits consumers, not because the marks are a kind of "property." Trademarks, unlike copyrights and patents, never expire, and need not be registered to be enforceable. They can, however, fade away: If consumers no longer associate a mark with a particular source, the mark loses its meaning and its legal protection. In Canada, for example, "Aspirin" is still the brand name of

a product sold by the Bayer Group, but in the U.S., where the aspirin mark became synonymous in consumers' minds with all forms of acetylsalicylic acid, the term can be used by anyone. This is yet another reason why companies are so keen to maintain a strong association between their marks and their products and services. If the association ends, the mark loses legal protection.

The holder of a mark can sue to stop misleading uses of their own or similar marks, but only because the law recognizes the holder as having the best incentive to pro-

Apple v. Apple has much to say about the dangers of turning over decisions about business strategy to lawyers.

THE LEGAL JUNGLE

tect consumers. That is why, in order to prove trademark infringement, the plaintiff must demonstrate that the defendant's mark creates a "likelihood of confusion" in the minds of relevant consumers, leading to consumers mistaking the defendant's product or service with the plaintiff's. In other words, no matter how close two marks are in appearance (or how far apart), the only relevant test for courts is whether consumer search costs are materially increased by the defendant's activities. If not, with certain exceptions, there is no infringement.

If *Apple v. Apple* rested on this bedrock principle of trademark law, there would be no case at all. Apple Computer's mark is the well-known profile of an apple with a bite taken out of it; Apple Corps' mark is the equally well-known green apple.

It's hard to imagine that a survey of any relevant group of music or technology consumers would find anyone having trouble distinguishing between the two. For purposes of the present dispute, Apple Corps would have to prove that consumers seeing the Apple Computer logo on the iTunes Web site were likely to be confused into thinking that Apple Corps was somehow involved in the enterprise.

But as it turns out, the case has little to do with trademark law. After earlier litigation, and protracted negotiations, the two companies decided in 1991 to leave unresolved whether or not there was any likelihood of confusion. Instead, they chose simply to carve up their respective markets and keep them separated. In particular, they agreed that Apple Computer's exclusive fields of use included "computer software of any kind on any medium," while Apple Corps' exclusive fields of use included "music and/or musical performances; regardless of the means by which those works are recorded, or communicated, whether tangible or intangible."

Help!

There can be no doubt that iTunes and the iTunes music store sell songs in the form of "computer software." Nor can there be any doubt that iTunes are music "recorded or communicated" in an "intangible" form. Indeed, Justice Edward Mann, the British judge who heard the case last month, noted that if the intention of the lawyers who drafted the 1991 agreement was "to create obscurity and

difficulty for lawyers to debate in future years, they have succeeded handsomely."

Apple Corps was formed in 1968; Apple Computer was launched in 1976. It's possible that Apple Computer's lawyers thought the 1991 agreement saved the younger company's logos. But as far as we know (the complete 1991 agreement has not been made public, and a spokesperson for Apple Computer was not aware of any later modifications), the companies agreed not to use their respective marks in each other's fields of use until the end of time.

Neither side seems to have considered what would happen if those fields converged, as they so clearly have. Make no mistake: Justice Mann will find no silver bullet in the evidence presented by the two companies to make his decision obvious, or his opinion clear. This is a mess, and a mess created by the two companies—or rather, by their lawyers.

Ironically, had the parties left themselves to the law of trademarks, which adapts itself quite nicely to changing market conditions and changing consumer perceptions, Apple Corps would be hard-pressed to make any case today.

Unfortunately, an agreement seemingly designed to forever avoid resolving the trademark issue has tied Apple Computer's current management to restrictions on their business that no longer make sense—and that no longer have anything to do with protecting consumers from confusing marks, the source of the conflict in the first place. Once again, technology has undone the work of lawyers unable to see even a few years into the future.

Short-sightedness in this case may prove expensive for Apple Computer, but not in the way most commentators predict. Up until now, Apple Corps has refused to license any of its catalog—notably, recordings by the Beatles themselves—for digital distribution. At trial, however, Apple Corps admitted it is now remastering in preparation for digital release. iTunes, the first commercially successful digital distributor, would be the natural distribution partner. My guess is that the lawsuit is actually just part of the negotiations. Helter-skelter, baby. ☺

LARRY DOWNES is Associate Dean of the UC–Berkeley School of Information Management and Systems. He is the author of *Unleashing the Killer App and The Strategy Machine*. His next column will appear in July. Please send comments on this column to editors@cioinsight-ziffdavis.com.

**Neither side seems to have considered
what would happen if the fields
of music and technology converged,
as they so clearly have.**

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CASE STUDY | BACKCOUNTRY.COM

Backcountry.com is a small player in the outdoor sporting-goods market, but it's growing fast—and gaining market share—by betting on open source.

By Debra D'Agostino

It was the last week of December 2005,

the height of ski season in Park City, Utah. Visitors from around the country had converged on the tiny resort town, high in the Wasatch Mountains, to ring in the New Year and enjoy the top-notch slopes. But not everyone felt like celebrating.

In fact, Dave Jenkins, the normally laid-back CTO of Backcountry.com Inc., the \$52 million Park City-based outdoor-sporting-goods e-tailer, was in a downright bind—and not of the skiing kind. Jenkins needed to prepare for the company's annual sale in February, but things didn't look pretty. "The season change happens on February 15, when suppliers drop their prices on old merchandise," Jenkins says. For Backcountry, that means that more than 250 brands, and 25,000 products, have to be discounted on its Web site. But back then, the only way to do that was by hand, page by tedious Web page.

The previous year, just prior to Jenkins' arrival in March 2005, the sale had been a disaster. Backcountry had been short staffed, so it was unable to dedicate a team

PHOTOGRAPHY BY LORI ADAMSKI-PEEK

Dave Jenkins, CTO, Backcountry.com

company profile

Company

Backcountry.com Inc.

Corporate Headquarters

Park City, Utah

CTO

Dave Jenkins

Revenues

\$52 million

IT Budget

\$1 million

Number of employees

260

of employees to properly analyze which items should be discounted, and by how much. In the end, the company decided to apply the same discount to every item in its inventory. It was a costly mistake: Jenkins estimates the company missed roughly \$400,000 in sales. “We lost margin on the hot items that would have sold out no matter what, and lost again on the products that would have sold had they been discounted more heavily.” Jenkins couldn’t afford a repeat performance, so he turned to his engineers: “I asked them if they could put together a script that would automatically calculate the best discount price based on each item’s sales history and current inventory.”

They could—and did. Within six weeks, Jenkins’ team had designed a new program to automate the entire process. “The script cut the time it took our programmers to input the discounts from four weeks to four days,” Jenkins says. The February 2006 sale was a success, generating \$1 million in purchases. And as a bonus, the new program enables Backcountry to adjust prices monthly, daily—even hourly.

What was the secret to putting such a complex script together in such a short period of time? Open source. At Backcountry.com, nearly every system runs on it, from ERP to e-mail to e-commerce. And while using open source requires Jenkins to keep a small army of developers on staff, it’s also the key to Backcountry’s success, keeping the company agile and innovative enough to compete in an industry dominated by brick-and-mortar retail chains. Also, it doesn’t hurt that the company’s strategy, philosophy and corporate culture all align perfectly to the ethos of open source. “We’re really all just a bunch of ski bums and river rafters,” says Jenkins, who hits the slopes at least once a week. “It’s all about open source, open ideas, and an open marketplace where the best ideas win.” Groovy.

On the Cheap

Backcountry.com began in 1996 as a home-based Web site that quickly turned into

full-time careers for two nontechie outdoors enthusiasts. President John Bresee had taught skiing in Stowe, Vt., while Jim Holland, now Backcountry’s CEO, had been a member of the U.S. Ski Team. The two cobbled together some Web pages and a simple shopping-cart script and convinced a few suppliers to sign on—all with just \$2,000 in startup money.

By 2000, the company was netting \$3 million a year, and Bresee knew that he needed a more comprehensive e-commerce system. “We looked at WebSphere, Oracle and others, but we just didn’t have the money,” he says. Then he came across Red Hat Inc., which was developing an open-source e-commerce platform called Interchange. Because the dot-com world was showing signs of deterioration, with software startups quickly going out of business, Bresee realized he’d need a system that would allow him to control the source code. “Otherwise we could get stuck,” he says. The cost to install Interchange and set up Backcountry with the necessary open-source architecture: \$100,000. Jenkins estimates similar proprietary systems would have cost at least five times as much. Thus began the company’s love affair with open source.

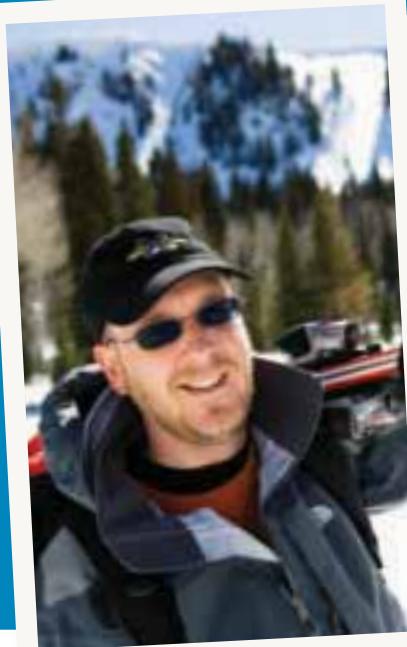
Unlike proprietary systems, which place customization restrictions on users and often require heavy license fees, open-source software allows users to make and distribute copies of applications, share source code freely and improve or customize software as needed—at a fraction of the cost of proprietary software. And Backcountry.com isn’t the only company that’s taken notice. Gartner Inc. predicts that 90 percent of the Global 2000 will have formal open-source management strategies—including assessment of risk, total cost of ownership and return on investment—by 2010. According to a *CIO Insight* research survey published in November, 81 percent of companies have deployed or are considering deploying open-source applications, and 67 percent of companies say that open source has helped lower IT costs.

So what does an open-source enter-

THINKING OUT LOUD | DAVE JENKINS

ski bums welcome

David Jenkins is a self-professed open-source evangelist. But to run a truly open-source shop requires a big commitment to IT. In the year since he joined Backcountry.com as CTO, Jenkins has hired 16 new engineers, bringing the total to 22—and counting. Considering the company employs just 260 people, that's a lot of resources dedicated to programming. Jenkins recently spoke with *CIO Insight* about his IT recruitment strategy.



CIO INSIGHT: Most small companies wouldn't take the approach you've taken, hiring such a large IT staff and assuming responsibility for your own programming.

Why did you go that route?

JENKINS: We have a slogan here: The risky way is the safe way. If you're going to make your mark, you have to take risks and do things other people aren't doing. That means we have to be able to tinker with anything and everything we touch. We want to try crazy ideas, hack things ourselves.

But doesn't having so many programmers increase your risk on some level? It's a lot of responsibility to take on.

It does increase the complexity to have so many programmers, but I think that's the price of being an e-commerce company. Amazon has thousands of developers. This is a very entrepreneurial company that rewards innovation very strongly. Everyone here is encouraged to come up with

their own ideas, and sometimes the biggest challenge for us is to pick which ideas will work, out of the 100 harebrained schemes we've got running around. That's the advantage of having an in-house development team. Open source lets us react quickly.

Is everyone who works at Backcountry.com an outdoors enthusiast?

Yes. Everyone here is a skier, snowboarder or mountain biker. Even the engineers, and that's the really interesting part. Normally IT people are a pretty geeky lot. They usually collect *Star Wars* figures and quote *Star Trek*.

How do you find qualified people?

You ask the right questions in an interview. Most companies don't think that hobbies matter, but I disagree. For me, hobbies are 45 percent of the interview; the other 55 percent is all about skill. If your hobbies include rock climbing, hiking and a two-week trek through Peru last summer,

come on in. If you just enjoy reading books and watching movies, you won't get hired here. That sounds cruel, but the fact is if you don't fit into the culture here—if you don't socialize, don't love the gear—you won't enjoy working here.

Is it difficult to find engineers who fit the Backcountry.com culture?

Not at all. There are plenty of geeks out there who hate that *Star Trek* stereotype, who want to be something else. Every time I post a job opening, that's the biggest sell. That's worth \$10,000 in salary to them. I can't pay programmers as much as they might make at a big company, but qualified people will come here for the entrepreneurial culture. If someone is waiting around for orders, they get let go. I don't have the time or patience, or even the tools, to micromanage someone. And our engineers give me incredible performance, because on any given day they know they can take off and go skiing. —D.D.

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“Open source is a great way for a small, hungry company to build on a sophisticated platform and get a competitive edge—far more cheaply than it could with proprietary software.”

—Eric Von Hippel,
professor,
MIT Sloan School
of Management

prise look like? Jenkins, who worked for Red Hat where he was Backcountry’s sales rep before he was hired away to become the company’s CTO, says the company operates a hybrid of what’s known as LAMP architecture: Linux for the operating system, Apache for the Web servers, MySQL for the databases (though Backcountry works on PostgreSQL), and Perl for the application scripts. The firm uses Firefox for its Web browsers and manages e-mail with open-source software from Zimbra Inc. “With an open-source product like Zimbra, we can do things like tie e-mails directly into our order management system,” Jenkins says.

For example, customer order numbers in Zimbra e-mails are linked directly to the order management system, so customer service reps don’t have to open separate applications. Jenkins estimates that “gearheads”—Backcountry’s affectionate nickname for its CSRs—save three hours a week as a result, translating to roughly \$150,000 in savings a year. “It wouldn’t be possible to do something like that with Microsoft Outlook or some other proprietary system,” he says. “Plus, it’s one-tenth the cost.” And while Jenkins admits that some copies of Microsoft Word and Excel still exist, he also says, “We are following a policy of attrition. We will not buy any more Windows licenses—only open source.”

Free Spirit

While cost is a large part of the equation, Jenkins says that it’s not the only reason Backcountry.com is committed to open source. “At the end of the day, the most important thing to this company is innovation. We want to do crazy, kooky things in retail.”

Not surprising for a company that seems full of crazy, kooky people. The corporate atmosphere at Backcountry is nothing if not iconoclastic. Like many dot-com companies, there are no dress codes, no set hours and no offices, except for those of Bresee and CEO Jim Holland, who share a simple, unadorned workspace. Like his IT staff, Jenkins works in a six-by-six-foot cubicle made of particleboard and brushed aluminum. Staff-

ers test and retest all equipment and clothing the company sells—and most spend as much time as possible outdoors. The irreverent culture makes open source a perfect fit, Jenkins says. “Everyone is encouraged to come up with their own projects. The company can only benefit by the free, unfettered exchange of information and ideas, and we preserve that entrepreneurial culture by allowing everyone in the company to share ideas.”

Those ideas are tracked on a companywide knowledge management system called “The Goat,” which Bresee calls “the heart and lungs of the company.” The intranet, named after the company’s trademark, is actually a wiki—open-source software that lets any user create or edit content regardless of which browser they use (think Wikipedia). Backcountry’s wiki has already grown to more than 6,200 pages. “Every process, every piece of institutional knowledge shows up on The Goat,” says Jenkins, “and any employee can edit any page they choose. It’s our way of creating a true idea factory.” Nearly all the company’s initiatives spring from The Goat, Bresee says.

Case in point: SteepandCheap.com, a Web site the company originally set up as a means to flush out stale inventory (“the dusty stuff in the corner,” Jenkins says). Taking a cue from Woot.com—a site that sells just one discounted electronics product per day—SteepandCheap.com took just three weeks to build and launch after the concept was approved in February 2005. Now, it has 100,000 unique visitors each week, a figure that is growing 15 percent a month. Backcountry.com sells one item each day on the site—and it almost always sells out. “It’s great for us,” says Dustin Robertson, Backcountry’s director of marketing. “Our high-end suppliers don’t want to see their products out there on sale with discount retailers, so this is a great way for them to let us take unsold inventory and get rid of it all in one day.” It’s also a quick way to make a buck—on a good day, SteepandCheap.com rakes in as much as \$26,000 in sales.

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Open source also helps the company closely track its advertising spend. Backcountry.com uses Atlas Search (formerly Atlas OnePoint) from a Seattle-based company called aQuantive Inc. to oversee its keyword bid management—a crucial tool for online retailers reeling in shoppers through Web searches. Jenkins estimates that keyword-search marketing leads to 30 percent of the company's revenue. But it's not easy to manage. "Backcountry has close to 80,000 SKUs, with lots of keywords," Jenkins says. "If you're not careful, you'll pay for those keywords even if you don't have the product to sell anymore."

To keep that from happening, Jenkins' team created an open-source Perl script that monitors inventory so that keywords drop away from the bidding pool when stock supplies run out. The script saves the company hundreds of thousands of dollars each quarter out of an advertising budget of several million, says Jenkins, and is a prime ex-

ample of how open source creates value. Jenkins admits that Backcountry.com cedes lots of business to brick-and-mortar competitors—the company has only one retail store, at its warehouse in Salt Lake City. But Backcountry finds innovative ways to overcome that inherent limitation. Jenkins says the company has an open-door policy with customers. "We count on our customers to share their experiences with us and with each other," he says. The company pays close attention to customer service—in fact, every employee spends one day every eight weeks answering customer calls via telephone, e-mail and instant message. Backcountry also rewards loyal customers who

zia, an analyst at Bala Cynwyd, Pa.-based Susquehanna International Group LLP, agrees. "E-commerce isn't a real focal point for most sporting-goods businesses. Most of the big players—like Cabela's, Sports Authority and Dick's Sporting Goods—are focusing on branching out their physical retail operations."

write product reviews for the site with discount coupons.

Though still a tadpole compared with some of the brick-and-mortar bullfrogs (e.g., Sidney, Neb.-based Cabela's Inc., and Kent, Wash.-based cooperative Recreational Equipment Inc., both of which took in more than \$1 billion in sales in 2005), Backcountry.com is content to mine the online vein, and has even enjoyed some pretty healthy financial success of its own. In 2005, revenues nearly doubled, to \$52 million, from \$27 million in 2004. And the company just opened a new 210,000-square-foot warehouse in Salt Lake City, about a half hour drive from corporate headquarters. Last year, the company doubled its workforce, from 130 to 260—nearly 10 percent of whom are open-source engineers devoted to in-house programming.

"It's all about open source, open ideas, and an open marketplace where the best ideas win." —Dave Jenkins, CTO, Backcountry.com

ample of how open source creates value. "When we decided to do this, there was no off-the-shelf product that could handle it," Jenkins says. "It would have taken Accenture or IBM months to put something like this together for us."

Growth Spurt

"We want to become the Amazon of sporting goods," Jenkins says. Of course, selling books and CDs online is entirely different from selling clothing and outdoor gear—most people want to test out the equipment before they buy it. "I don't know if it's really possible for an online sporting-goods retailer to gain significant market share without some physical retail stores," says Edward Weller, a managing director with ThinkEquity Partners LLC, a San Francisco-based analyst firm. Christopher Sve-

write product reviews for the site with discount coupons.

Though still a tadpole compared with some of the brick-and-mortar bullfrogs (e.g., Sidney, Neb.-based Cabela's Inc., and Kent, Wash.-based cooperative Recreational Equipment Inc., both of which took in more than \$1 billion in sales in 2005), Backcountry.com is content to mine the online vein, and has even enjoyed some pretty healthy financial success of its own. In 2005, revenues nearly doubled, to \$52 million, from \$27 million in 2004. And the company just opened a new 210,000-square-foot warehouse in Salt Lake City, about a half hour drive from corporate headquarters. Last year, the company doubled its workforce, from 130 to 260—nearly 10 percent of whom are open-source engineers devoted to in-house programming.

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How cheap is free?

Contrary to popular belief, not all open-source software is free. But it is cheap. Here is Backcountry.com CTO Dave Jenkins' cost-comparison worksheet, estimating one year's expenses. Totals are based on 260 employees.

	OPEN SOURCE	TRADITIONAL SOFTWARE
e-Mail	Zimbra COST: Free, plus support at \$500/seat	Outlook, Lotus Notes COST: \$900/seat
Knowledge Management	Mediawiki COST: Free	PeopleSoft COST: \$100,000
e-Commerce Platform	Interchange COST: Free, plus \$150,000 for consulting	IBM WebSphere, Microsoft .NET COST: licensing \$500,000; consulting \$300,000
Relational Databases	MySQL COST: Free	Documentum COST: \$100,000
	PostgreSQL COST: Free, plus \$50,000 for consulting	Sybase, Oracle COST: \$600,000-\$2 million
Operating System	Red Hat Enterprise Linux COST: \$50,000	Microsoft, Solaris COST: \$130,000-\$200,000
TOTAL	\$380,000	\$2m-\$3.4m

SOURCE: BACKCOUNTRY.COM

often see the success of Google and assume they can do it, too,"

Driver says. "The difference is that Google hires every Ph.D. out of Berkeley, and can maintain a skills level that most IT shops can't."

Jenkins knows he can't compete with Google for developers. But what the company lacks in salary, it makes up for in lifestyle, he says. "On any given day, my guys can say they are taking off to go skiing or hiking, and it's no big deal. We want our people to spend time out of the office. It's our biggest sell, and frankly, if you don't love the gear, it's no fun working here." Because of the company's laid-back atmosphere, Jenkins says engineers are willing to work for far less than they'd be paid at Google Inc. or Amazon.com.

As a way of offsetting some of the costs of all the custom development, the company may consider selling some of its customized software. But Bresee says the company will remain steadfastly focused on the firm's primary objective—selling outdoor gear. "I didn't imagine we would have this many programmers," says Bresee. "We never set out to be a technology company, we always aimed to be a retailer. But we didn't have a choice. No one was making the products we needed." +

Please send questions and comments on this article to editors@cioinsight-ziffdavis.com.

Open source is a strategy that helps level the playing field, says Eric Von Hippel, a professor and head of the innovation and entrepreneurship group at the MIT Sloan School of Management. "Open source is a great way for a small, hungry company to build on a sophisticated platform and get a competitive edge—an edge that's precisely tailored to their specific needs—far more cheaply than it could with proprietary software," he says.

But along with any growth spurt comes the pain of maturity, and Backcountry.com is no exception. While it may be cheaper to create code in-house than to buy proprietary licenses, managing such a large team of in-house developers is a responsibility many companies hesitate to undertake—especially in an age when so many companies are outsourcing IT development, or opting for hosted software models. "To be honest," says Bresee, "we wouldn't be doing the development we do if someone had an offering that brought everything together as cost effectively."

One of the biggest risks of devoting so much of a company's resources to customizing software is that "you effectively become your own software company," says Mark Driver, an analyst at Gartner. "People

RESOURCES

Books

Open Sources 2.0:

The Continuing Evolution

By Chris DiBona, Mark Stone and Danese Cooper
O'Reilly Media, 2005

The Success of Open Source

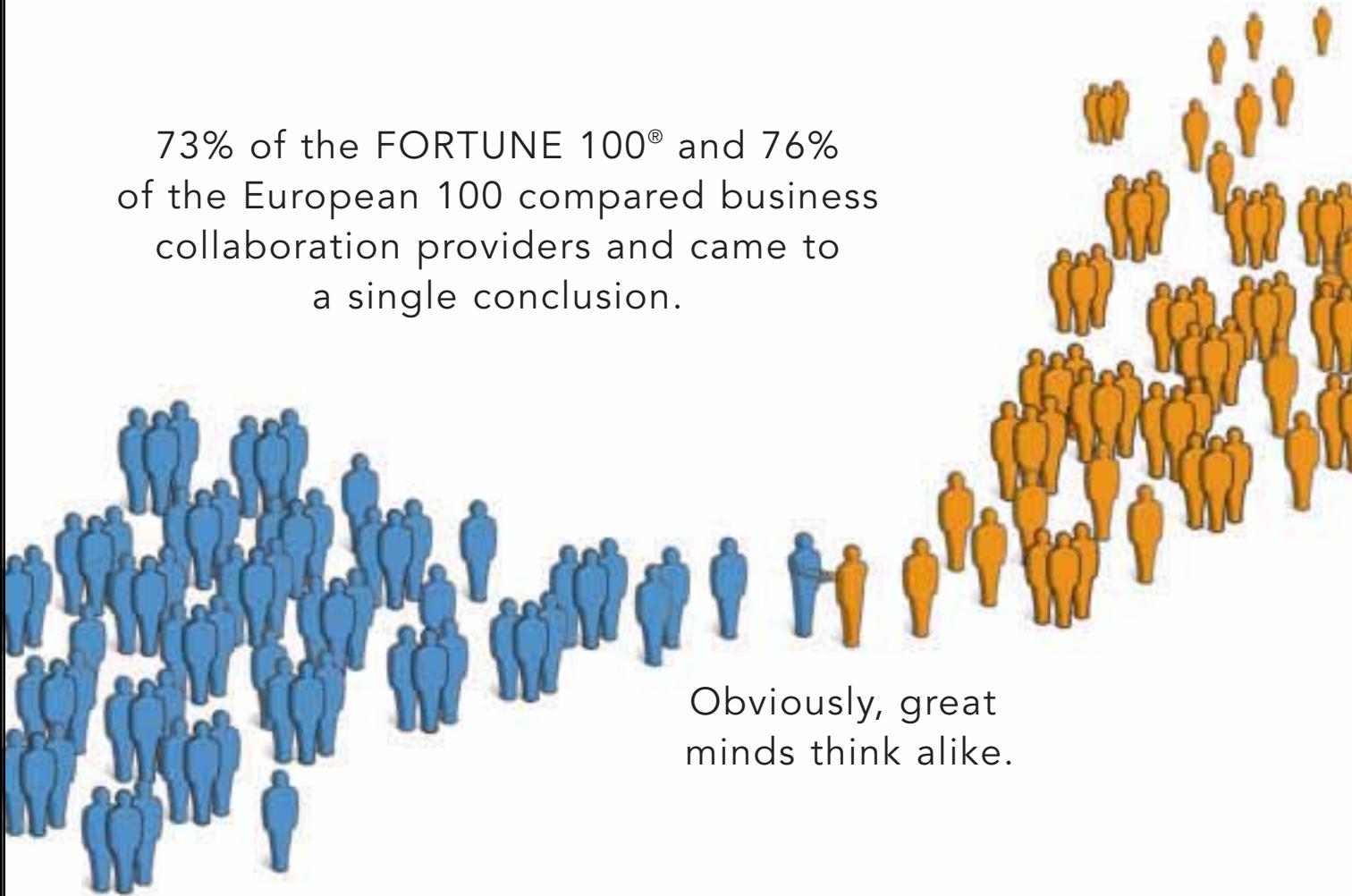
By Steven Weber
Harvard University Press, 2004

Web site

www.opensource.org

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MOTOROLA



THE MODERN-DAY

MBA

Business schools are finally beginning to integrate IT education into their traditional curricula in an attempt to mirror the real world. By Edward Cone

CONGRATULATIONS! YOUR NEW BUDGET HAS JUST BEEN APPROVED AND you can finally hire that newly minted MBA you've been clamoring for. So what, exactly, can your company expect in the way of technology management skills from this expensively pedigreed tyro? Good question.

Employers—whether they are looking to place fresh talent on the IT management track, or find business-line executives with technology savvy—need to understand that not all MBAs are created equal. Business schools vary widely when it comes to teaching about technology and

technology management in their master's degree programs, though all must provide a minimum level of exposure to technology-related subjects in order to receive accreditation. But while you can assume that any MBA graduate will possess a basic understanding of accounting, organizational behavior and business operations, there is no fixed standard on what graduates will know about IT when they enter the job market.

"Over the last decade, business schools have differentiated themselves," says Bill DeLone, senior associate dean at American University's Kogod School of Business, in Washington, D.C. "So it is hard to say how business schools, in a general sense, are preparing people to manage technology."

has its technology corollary integrated into the syllabus. Though few in number, these programs are mirroring the attempts of businesses to align IT with their strategic goals. In fact, they're trying to eliminate any distinction between business and IT right off the bat.

"Some universities are starting to understand the importance of making IT a part of the MBA agenda," says Dana Deasy, until recently the CIO of Tyco International Ltd., and before that, the CIO of Siemens Corp.'s Americas operations. However, only a few are at a substantive and meaningful level. A relatively "small number" of schools, he says, are offering meaningful "real-world programs." Deasy is now working with Columbia Uni-

"If someone comes out of school but doesn't know how to apply fundamental business disciplines to things like managing IT spend . . . then the school has not met your needs." —Mark Lutchen, partner, PricewaterhouseCoopers

That means employers have to know what they're looking for—beyond the degree itself—and they are not always happy with what they find. "If someone comes out of school but doesn't know how to apply fundamental business disciplines to things like managing IT spend, or dealing with the organizational and cultural changes in IT, then the school has not met your needs," says Mark Lutchen, a longtime partner (and former CIO) at PricewaterhouseCoopers. "Most schools don't provide a deep understanding of technology and how to use it."

But there is evidence that some of the leading MBA programs are starting to better understand the needs of the business world. These schools, rather than offering separate technology courses, or so-called "techno-MBA" programs, are embedding sophisticated technology education directly into their traditional business courses. Marketing, accounting, operations—each course

versity's Executive Master of Science in Technology Management program in its effort to leverage business technology leaders as an integral part of the school's curriculum.

The need to catch up to the business world has business schools scrambling to adapt their programs. And during the transition, it will be up to employers to keep in check any assumptions they might make regarding the IT skills of potential MBA hires. Companies will have to perform due diligence if they are to find people capable of stepping directly into technology and tech-heavy business management roles.

Kids These Days

Warren Bennis and James O'Toole called attention to some of the problems plaguing MBA programs in their much-discussed 2005 article, "How Business Schools Lost Their Way," published in the Harvard Business Review. The authors, both professors at

the University of Southern California, wrote that some top schools focus too much on a “scientific” model of business and on arcane research, and not enough on real-world practices that would help graduates perform in the marketplace.

That critique extends to spotty technology training. The focus on technology as a key component of business education at the master’s level has been inconsistent over the last several years. As the Internet bubble expanded, schools rushed to add technology to their MBA curricula, but in the aftermath of that irrational exuberance, many of the newly created “techno-MBA” degrees were deemphasized or scrapped altogether. “Defining the MBA became a huge challenge after the dot-com bubble burst,” says DeLone. “Interest among incoming students in information technology, either as a career track or as an academic concentration, went down.”

Those changes reflect the hard reality of the marketplace. “When the job market was terrific, you could get multiple offers if you had IT training,” says Michael J. Shaw, a professor of business administration in the College of Business at the University of Illinois at Urbana–Champaign, where he holds the Leonard C. and Mary Lou Hoelt Endowed Chair in Information Systems. “We see less of that now—these days, it is more about combining managerial and technical knowledge.”

For an employer, it can be difficult to glean, from a simple program description, just what students are learning at any given school. Some of the most prestigious names in academia, including the business schools at Harvard and Stanford, pride themselves on offering general management degrees—yet even the most broad-based curricula focus more on technology than they did in the past. Meanwhile, the specifics taught within a given program can change from one year to the next, and students can load up on technology electives, or get by with the minimum.

Some programs try to differentiate themselves from the competition—there are hundreds of MBA programs in the U.S.—by offering specialized instruction in technology management. And still others offer master’s degrees in business management aimed specifically at developing technology professionals (see sidebar this page). But there is a growing sentiment, both in the business world and academia, that separating IT from an otherwise well-rounded business education is a mistake.

Stanford University is located in the heart of technology country, and perhaps no institution is more closely identified with high-tech companies and entrepreneurs. But Stanford’s Graduate School of

Giving IT Managers the Business

While MBA schools look to blend technology into their business curricula, a parallel set of master’s degree programs aims to bring business skills to technology managers. At Northeastern University, in Boston, the High Technology MBA program works closely with area companies to enroll IT workers, who continue on the job while pursuing their degrees. “We are focused on mid-level technology managers, typically from 27 to 40 years old, drawn from the core industries in New England,” says Director Marc Meyer. “We don’t just use case studies, we focus on issues from within their own companies.”

At American University’s Kogod School of Business, in Washington, D.C., Jill Klein—herself a former CIO—runs a program that offers a Master of Science in Information Technology Management degree. “This is for people who are already working in IT, but who want to move more into management after being pigeonholed as, say, a database specialist. We blend IT with traditional business disciplines.” The idea, Klein says, is to create business leaders from the tech side of the business. “Some of the next generation of CIOs have to come from within IT.” —E.C.



Manager, Heal Thyself

Mark Lutchen has an idea for improving the technology component of business-school education, and it begins far from any MBA program. Curricula would be stronger if businesses did a better job of managing their own technology in the first place, says Lutchen, a longtime partner (and former CIO) of PricewaterhouseCoopers and author of *Managing IT as a Business: A Survival Guide for CEOs* (John Wiley & Sons, 2003).

It's easy to say that MBA programs need to better reflect the real world of business. And Lutchen does not disagree with that prescription. "One thing missing from a lot of business education is an understanding of what the real needs are," he says. "Schools need to project forward, to say, 'What kind of training will people really need in business?' IT is no longer an adjunct to anything in business; in many cases it *is* the business. So you can't have users on the business side who don't understand IT, or future CIOs who don't understand the business."

But it's hard to teach MBA students lessons that many companies have yet to learn, Lutchen says. "There is a huge void among CIOs and businesspeople in terms of understanding what the CIO role should be," he says. "The job should look more like a balanced CEO role, with an understanding of budget, culture, business, communications, marketing and so on."

In too many companies, business disciplines such as activity-based costing are only now becoming common practice within IT departments, Lutchen adds. "The problems in businesses occur at the handoff of technology issues, like spending, to the business-people. I'm not sure I see schools teaching that aspect of it, because people in business don't understand the handoff themselves. I'm not sure someone who has taught general IT, or finance, can magically come up with an IT-spending course without working in today's world."

As long as alignment of business and technology goals and disciplines remains a problem within businesses, it will likely remain a shortcoming in business schools, too. "The base of information schools can use is inadequate," Lutchen says. "Who advises the business schools on what they should teach? Schools are lacking because business practice is lacking." —E.C.

Business remains resolutely committed to providing a general management education. That doesn't mean Stanford doesn't teach its MBA students about technology. In fact, says professor Haim Mendelson, the school has a serious focus on tech, and one that is well-suited to the way businesses actually run today.

"Philosophically, we feel that the best way to make progress toward the goal of making technology a routine discipline is to embed it in other courses," says Mendelson. "Our approach is that these things are a part of business. All employers want students who are well-versed in information management. They see it as a critical skill."

Mendelson is the former director of a five-year research program at Stanford called the Center for Electronic Business and Culture, which was folded into the main course of study in August of 2005. The CEBC was founded in 1999 with its eventual demise already planned; the idea was to develop expertise in several IT disciplines and then incorporate that expertise into the business school curriculum as part of the new routine. "When we started the program there were a number of centers doing similar things at other schools, and people were saying that you needed specialization in IT as a separate discipline. But we don't need it as a separate entity anymore," Mendelson says.

One of the key accomplishments of the CEBC was the development of about 70 case studies on electronic commerce and business that are now used in the general MBA curriculum. "We have helped introduce IT into the study of marketing, operations management, and every functional area of business," says Mendelson. "We show how technology supports business in all these different areas, not just how the technology itself is used."

A strategy course that is part of Stanford's core curriculum, for example, looks at how Capital One Financial Corp. formulates its information-heavy marketing plan. "We look at the way Capital One outsourced IT



A close-up photograph of a man with short brown hair and glasses, wearing a white dress shirt and a dark red tie. He has a stressed or frustrated expression, with his eyes looking upwards and to the left, and his mouth slightly open. The background is a bright, out-of-focus office setting with window blinds.

_INFRASTRUCTURE LOG

_This has been the worst week of my life. Seriously.



_MONDAY, 9:59 a.m.: Things are out of control. Our system's just not secure, flexible or reliable enough.

_3:19 p.m.: Gil bought some "infrastructure bloodhounds" online. He says they can sniff out any problem.

_5:01: Bloodhounds aren't as good at sniffing out network problems as they are at chewing Ethernet cables.

IBM





The IBM logo is positioned in the top right corner of the image. The background is a grayscale office scene where a black hole on the floor is sucking up papers, a keyboard, a mouse, and a chair. A woman is peeking from behind a cubicle wall on the left. A computer monitor is on the desk to the right.

IBM®

_TUESDAY, 8:13 a.m.: Whoa! Came in today and found a black hole. Information goes in but doesn't come out. This is bad.

_4:46 p.m.: The black hole just sucked in three interns. HR is not pleased.

_WEDNESDAY, 9:45 a.m.: Arghh! We're so slow. It takes people forever to access...everything. No one can collaborate, no one can make smart decisions quickly enough. There's got to be a better way.

_12:22 p.m.: Gil says he's found one: aerodynamic bodysuits. He says everyone will be able to work faster and collaborate better now.



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_WEDNESDAY, 2:51 p.m.: This day has gone from bad to scary bad. Now the business is, uh, coming apart. I.T. isn't in sync with the suits. No one's sure what they need to do. It's totally out of control.

_4:57: Gil fell into the crack. Maintenance needed a GPS device and a hundred feet of rope to rescue him.



_THURSDAY, 11:02 a.m.: I give up. Our infrastructure is so inflexible. Our apps and processes don't work together. We can't respond quickly to change. It's out of control.

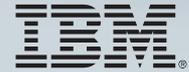
_11:42: Gil had an epiphany. Duct tape. A few dozen rolls later and he's integrated everything, and everyone, by hand.

_11:45: Duct tape can fix many things. Basketballs. Sofas. Doorknobs. But not widespread app and process inflexibility.





_FRIDAY, 9:12 a.m.: I am Ned. I have taken back control with IBM middleware.



Control infrastructure chaos with IBM Tivoli Express middleware. Backed by the unparalleled expertise of IBM's Business Partners, Tivoli Express is a customizable and innovative series of I.T. management solutions designed and priced for mid-sized businesses. It's secure, boosts uptime, and protects your data with automated backups.



Control untamed information with IBM Information Management middleware. Built on open standards, it's scalable, modular and seamlessly unites all your critical information, whatever the source. More than that, it gives you your information real business value, allowing you to use it in innovative ways to help spur growth.



Control slumping productivity with IBM WebSphere Portal, part of the Lotus collaboration family. It's a customizable interface that integrates the apps, processes and info your people need to collaborate and be productive. It works throughout your enterprise and with customers and suppliers. It's also a fast start to a service oriented architecture.



Control out-of-sync software development with IBM Rational. It can help manage all your offices' development teams, ensure your software's in compliance, and implement a service oriented architecture. With Rational, everyone knows their job and works together. And your development process is governed and aligned with your business goals.



Control business paralysis with IBM WebSphere middleware. It can help make your business more flexible by seamlessly integrating the apps you already have — even those from SAP and Oracle. Now you can change processes in a snap. And with IBM's industry-specific expertise, you can start enabling a service oriented architecture.

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and then brought it back in because it was core to what they needed to do,” says Mendelson. The case also considers the big credit-card company’s methods of testing its strategies and learning from the results. “The class learns how they put together a new project that combines IT, operations and marketing, and how to manage it,” says Mendelson.

IT is often discussed in core classes, and concepts from the technology world have entered the mainstream curriculum. A class on network effects, for example, looks at different ways to do online auctions, including business-to-business and consumer transactions. “The crux of the analysis is, what are the implications of network effect for strategy, and a significant part of the discussion is how technology is facilitating this,” he adds.

The Pace of Change

Given the rapid nature of technological change, there is no such thing as a fixed business-technology curriculum. Business programs have to find a balance between preparing students for the basics, without wasting their time on material that might be outdated by the time graduates enter the workforce. “It’s a given that what you learn today may not guarantee that you are prepared for what is needed tomorrow,” says Illinois’ Michael J. Shaw. “We have our students learn various perspectives of technology management, while being mindful of the next wave.”

The overall strategy at Illinois, Shaw says, is for graduates to understand “the connection and interplay between technology and management, so as general managers they manage with technology in mind. We want

“If you start out with the idea that the business comes first, there’s no need for alignment down the road.”

—Haim Mendelson, professor, Graduate School of Business, Stanford University

Like most B-schools, Stanford has an information-management requirement, which means each student must take at least one from among a handful of tech-specific courses in order to graduate. The courses vary in intensity and focus, from relatively basic offerings to extended studies of the strategic aspects of IT and the way it changes firms, value chains, and industries. Upper-level students line up for a class on IT industry strategy taught by former Intel Corp. chief Andy Grove and professor Robert Burgelman. But overall, says Mendelson, “The emphasis is less on how the technology works, and more on its impact and integration into the business.”

Interestingly, one buzzword Stanford avoids, he says, is alignment. “If you start out with the idea that the business comes first, there’s no need for alignment down the road.”

our students to be broadly focused, but to understand technology as a major corporate resource they can’t ignore.” A general introductory course in technology is required for what Shaw calls “the least interested student.” In the second year, they can choose among electives, including some sophisticated studies of data communications and other specific disciplines.

Within this broad context, Illinois has changed its curriculum with the times so as to remain current with employer needs. It has pulled back from courses it used to offer in areas such as Web programming and managing electronic commerce sites. “We consolidated a bit, not just because the bubble burst, but because the whole area became more mature, and we treat it as part of general business knowledge,” says Shaw. “Now we look more at using the information-based value chain of a company, and

Business Smarts, Tech Savvy

MBA programs are responding to demands for better technology management skills in different ways. Here are a few examples.

School	Type of program or career track	Notes
□ Stanford University, Graduate School of Business	□ general MBA	□ tech-centric case studies integrated into business courses, big-name tech industry professors
□ University of Illinois, College of Business	□ general MBA	□ focused courses driven by industry concerns, e.g., “trustworthy computing”
□ American University, The Kogod School of Business	□ concentration in technology	□ works closely with consulting industry and other local employers
□ Northeastern University, College of Business	□ techno-MBA	□ specific focus on producing technology-savvy MBAs

understanding the information assets in the same way we do a physical asset.

Another more recent focus is a program in “Trustworthy Computing” and information security, which is funded in part by a grant from Microsoft Corp. “Risk management and security are high on the list of corporate needs, and companies are still taking a reactive view, seeing it more as operational than strategic,” says Shaw. “This is one of those issues that need a multidisciplinary approach—it’s not just a technical issue. Managers need to be strategic in dealing with things like Sarbanes-Oxley and customer privacy.”

The real benefit of the trustworthy computing course to employers, says Shaw, comes from having the course taken not just by tech-oriented students but by marketing and finance majors as well. “This is a business story with a lot of technology dimensions,” he says. “Companies need this kind of training across the spectrum,

whether it’s technical or project-oriented. We’re trying to give our graduates that capability to make them more marketable.”

Working With the Customer

The disconnect between academia and the real world of business can be costly. Consider this story from a veteran executive (who asked not to be identified) about some young MBAs who took a leadership role on a technology-heavy project at a Fortune 500 company. “None of the MBAs had experience with this level of IT management,” he says. “While they were all focused on the big picture and growing top-line revenues, no one understood the need to apply tried-and-true IT management disciplines to ensure the success of their development and integration efforts. Clearly, they either missed the MBA class that covered these core disciplines, as applied to IT, or it wasn’t a class that was offered. The result was a \$40 million write-off by the parent company, and a major restructuring of the company’s MBA hiring and on-the-job training/apprenticeship programs.”

American University’s Bill DeLone has heard stories like this before. He says recent doubts about the value of an MBA are motivating educators, students and employers to ensure that students are learning what they need to succeed. “There is a concern about the relationship between theory and practice, and whether faculty are teaching topics that are actually productive for students and businesses.”

American University’s Kogod School of Business, like many B-schools, works with businesspeople to craft its curriculum for real-world value. At Kogod, that includes an IT Executive Council that consults on technology issues for the MBA program. “We use direct interaction with our clients, the major regional employers, to guide our curriculum and our research,” says DeLone. “We need to make sure what we do is applicable to IT management today, so we establish our goals and objectives collectively with the clients on our council.”

The IT council is an active group, says its co-chair, Joe DeTullio, CEO of Royalty Services LP, and former CIO of Universal Music Group. (Others on the council include Carl Wilson, CIO of Marriott International Inc.; Nicole Gardner, director of IBM Corp.'s Center for Innovation; and Mohammed Muhsin, the recently retired CIO of the World Bank.) "We generally agree on what is important, from an evolutionary perspective, in terms of teaching these people about the basics of IT management," DeTullio says. "The idea is to teach project management and business

tion-technology systems."

Kogod will roll out a new program focused along these lines in the fall of 2006, replacing its current concentration on management of global information technology. "The idea is help the MBA students understand that these are the kinds of initiatives they will be working on as business leaders," says Jill Klein, who, in addition to serving as director of Kogod's special master's program for technology professionals, also works with MBA students. "We are giving them course work to help them understand analytically

"The idea is to teach project management and business management with an IT slant, and to build business cases with an IT focus." —Joe DeTullio, CEO, Royalty Services LP

management with an IT slant, and to build business cases with an IT focus."

Executives like to be on the council because it gives them an inside track on talented grads. "It helps me with recruiting," says Leif Ulstrup, a principal at Deloitte & Touche and a member of the Kogod's IT panel. "The students that I've hired from this program have been very successful in bridging the gap between technology and other subject areas."

To stay on top of the needs of the marketplace, the Kogod School surveyed its IT executive council, as well as other non-IT executives, to determine what every MBA student needs to know about technology, and also what specialized instruction should be made available to those students who choose to concentrate in technology. The word came back to emphasize project management and enterprise systems management. "These are the jobs that cannot be outsourced," says DeLone. "They are the high-value jobs that mix understanding of a business environment and informa-

tion-technology systems."

how to use information to make decisions, so they have the additional skills needed to work in close alignment with IT." Though the teaching methods vary, one thing that is widely accepted is the inherent value of technology education. "An MBA is a general degree, so if you combine it with technology, it makes you more qualified in the workplace," says Marc Meyer, a professor of management at Northeastern University, in Boston. He runs the High Technology MBA program, a specialized program that teaches business skills to technology managers. MBA candidates aren't taking classes in how to write programs, he says, but in IT strategy and project management, so they can implement technology successfully. "If you understand how IT can provide value to a company,

maybe you will be able to justify your IT needs at budget time." And that's a skill that just about any CIO can appreciate. ☺



Article

"How Business Schools Lost Their Way"

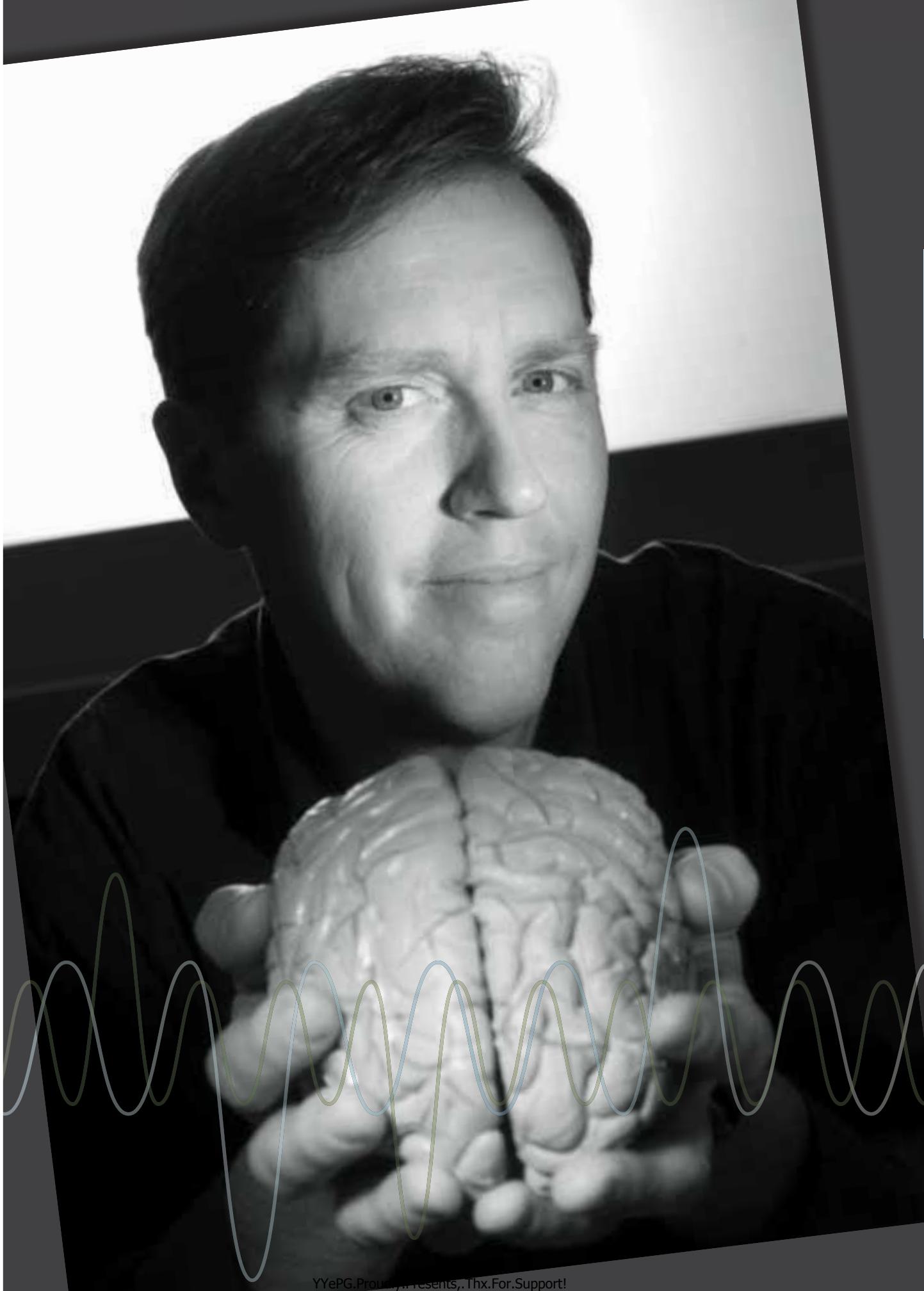
By Warren G. Bennis and James O'Toole
Harvard Business Review
May 1, 2005

Book

Managing IT as a Business: A Survival Guide for CEOs

by Mark Lutchen
John Wiley & Sons, 2003

Please send questions and comments on this article to editors@cioinsight-ziffdavis.com.



EXPERT VOICES | JEFF HAWKINS

MIND

Palm Computing founder Jeff Hawkins has developed a controversial theory of how the brain works, and he's using it to build a new race of computers.

OVER

JEFF HAWKINS HAS A LOT ON HIS MIND THESE DAYS—NOT LEAST, a new theory about how the brain works. And he's confident his theory will change the entire computing industry.

In Silicon Valley, Hawkins is best known as the founder of Palm Computing Inc. and Handspring Inc., and as the mastermind behind the Palm Pilot and Treo line of smartphones. But a second passion predates Hawkins' fondness for the wireless world: He's nuts about the brain. When he began his career at Intel Corp. in 1979, he made an unsuccessful bid to convince then-Chairman Gordon Moore to launch a research group on neurology and artificial intelligence. He's spent much of the past quarter century studying the physiology, philosophy and psychology of the brain, even entering a Ph.D. program in biophysics at the University of California at Berkeley in 1986.

In 2002, Hawkins founded the Redwood Neuroscience Institute to study the human neocortex. There, he developed a new theory: that the brain makes predictions about the world through pattern recognition and memory. Hawkins published his theory, which he calls the "memory-prediction framework," in his 2004 book, *On Intelligence*, coauthored with Sandra Blakeslee. In March 2005, Hawkins founded Menlo Park, Calif.-based Numenta Inc., where he is working to build intelligent machines based on the theories set forth in his book. Senior Reporter Debra D'Agostino and Editor Edward Baker spoke with Hawkins about the plausibility of his memory-prediction framework, how it might be translated into software and applied to complex problems—and what that could mean for business. An edited version of their conversation follows.

CIO INSIGHT: In your book, *On Intelligence*, you claim to have discovered a new understanding of how the brain works, and how machines can be built to model the brain. It's a powerful idea, but also a controversial one. Can you explain the essence of your theory?

HAWKINS: First of all, the theory explains how the neocortex works—not the entire brain. The neocortex makes up roughly half of a human brain; it's where all high-level thought and perception takes place. It's the place where you perceive the world. And it's a type of memory system, though it's different from that of a computer in that it is composed of a tree-shaped hierarchy of memory regions that store how patterns flow over time, like the notes in a melody. We call this Hierarchical Temporal Memory (HTM).

Computers must be programmed in order to solve problems, but HTM systems are self-learning. By exposing them to patterns from sensors (just like the human neocortex receives information from the eyes and ears), HTMs can automatically build a model of the world. With this model, an HTM can recognize familiar objects and use that data to predict the future.

So we're not claiming to build brains here. We are building things that we think can do what half of a human brain does.

How have people reacted to your hypothesis?

If you said to someone that you want to figure out how the brain works and then build machines that work the same way, most people would laugh at you. They'd say it's ridiculous, that people have been trying for decades and haven't made any progress. But it isn't ridiculous. Why shouldn't we be able to figure out how brains work? We understand how kidneys work, and how other organs work, so why not the brain? In fact, it ought to be pretty straightforward. It's only our ignorance that makes things look hard.

So the response to the book has been mixed. We've had a stream of business-oriented researchers who want to talk about it, and several prominent scientists who think it is a landmark book. Many other scientists have dismissed our theory. But a gentleman named Dileep George, who was working [as a graduate research fellow] at the Redwood Neuroscience Institute, actually came up with a mathematical formulation for the biological theory in the book. And he did a convincing enough job that we're certain it can be built to solve practical problems. So we started a company called Numenta. Its focus is essentially on building a platform—like an operating system, but different.

What do you expect this platform will be able to do?

We believe that we have come up with a new algorithm, a new way of computing—though it isn't a computer. It's a new way of processing information. HTMs essentially do three things. First, they discover how the world works by sensing and analyzing the world around them. Second, they recognize new inputs as part of its model, which we call pattern recognition. Finally, they make predictions of what will happen in the future. We think we can build machines that are in some sense smarter than humans, that have more memory, that are faster and can process data nonstop, because they use hierarchical and temporal data to predict outcomes—the same way the human brain works.

Now, what do we mean by hierarchical? Well, there's a hierarchical nature to many things—weather and markets and businesses and biological organisms are all structured hierarchically. When you're born, you know almost nothing. Then, over time, you get sensory inputs. Over a period of years, these inputs help you build a hierarchical model of the world. So you start to understand things like words and sentences, chairs and computers and ideas.

Businesses are hierarchical, too—not just in the way the peo-

IF YOU SAID TO SOMEONE you want to figure out how the brain works and then build machines that work the same way, most people would laugh at you."

ple's roles are structured, but in how the different parts of a business interact. Let's say I am looking at the manufacturing side of a business, and I want to know why a certain metric, such as yield, is going down. Chances are, it's correlated with something else going on nearby, maybe something going on in the supply chain or something like that. It's probably not going to be related, at that level, to something like the rate we pay for advertising. A human would look at that data and try to find the underlying causes, come to a conclusion, and then act upon it.

That's what our systems can do. If there's really an underlying cause to the problem, the goal of the HTM system is to find it. You take some data from some kind of system—visual or financial, it doesn't matter. You feed it into the system's hierarchical temporal memory, and over time it builds a model of underlying causes.

How is that different from a traditional computer?

It's very different. You have to tell a traditional computer what to look for. A big parallel computer that's modeling fluid dynamics—like the weather or a jet engine, for example—tries to model each element, each particle or cubic volume of air. That's just solving mathematical equations. Humans don't operate that way. We don't predict the future by looking at every molecule. We look at problems and seek out high-level causes. We say to ourselves, "I noticed that whenever a storm front comes, there's usually a cold day the next day." As a result, we have these concepts called storms and hur-

ricanes—high-level concepts we have been able to deduce by looking at low-level data.

That's what our HTM technology will try to do: discover the underlying causes in the world. If you hook the system up to the right data and expose that system to the data over



a long enough period of time, it can build a model of that environment, just like a human brain does. It will automatically come up with a way of representing the world just like humans do, and draw conclusions based on that model.

It's compelling, but how do you know it can be done?

If you go back 50 or 60 years, when they were building the very first computers, people knew that a computer could be built, even though they didn't have transistors or circuits or hard disks. It's the same thing in this case, though we hope to build it much faster.

We did a prototype before we launched Numenta. It wasn't designed to do anything really useful, but our HTM system solved the very

difficult problem of pattern recognition, which no one else has been able to solve.

What was the problem?

When you look at a picture of, say, a cat, there's almost an infinite number of variations of what a cat might look like. Humans have no problem recognizing any of them as a cat. Computers, on the other hand, can't do that. I know a scientist who proposed that the grand challenge of vision research is to be able to have a computer that can distinguish a picture of a cat from that of a dog. That tells you where the state of the art is in computer vision—it's gone nowhere.

We built a machine that solved that issue. They're not impressive-looking pictures, mind you, just silly little line drawings of cats and dogs. Nothing realistic like you'd recognize in a photograph. But our model shows these things can be done. Now we are in the process of building a sophisticated, large-scale tool set that will allow people to build systems that can deal with real-world data and the large volume of data that comes from real-world problems. The kind of systems we're building work just like a human brain—one that lives, breathes and eats manufacturing data or financial-market information 24 hours a day, and never gets tired.

What's the value of such machines?

That's kind of like asking what's the value of building a computer. They asked that question 50 years ago, and someone said, "Well, we can do military ballistic tables"—that's what they first did with computers—or "We might be able to tabulate the accounts of a business."

We have a lot of ideas as to how HTMs will be used. The obvious ones are things that humans do. Take vision. There's a crying need for machines that can look at things and know what they're looking at. Right now, when you search on Google for images, someone has written in the data about what those images are. Speech recognition is another problem people have been trying to solve for a long time, and they haven't done a very good job. You don't want to do speech recognition; you want to do speech understanding, which is closer to what we're doing.

**HUMANS
DON'T** predict the future by looking at every molecule. We look at problems and seek out high-level causes."

Automakers are building cars with lots of sensors. They want to know if a dangerous situation is occurring on the road around the car, and whether the car should warn the driver or slow down. It sounds easy, but it's actually very difficult to take this data and interpret it. Humans can do it, but no machine has the insight of a human being. It's sort of the difference between how a human plays chess and how a computer plays. The computer can beat the human by being fast, but it doesn't really understand what it's doing.

Meanwhile, some of our customers are looking at complex manufacturing processes. There's all this data, and people sit there and sort through the data to figure out pat-

terns and try to understand what causes the yield to rise and fall. This machine can do that. It can look at disparate data and build a model of how manufacturing lines work and how the yield is affected by various things.

Why has it taken this long to get to a point where we can start talking about actually making these intelligent predictions?

When people ask me about the success of the Palm Pilot, I always point out that there was nothing new in it. What was new was the understanding of how to put the ingredients together. That's what we're doing here. We have a deeper un-

derstanding of how the brain works, and we can take a little bit of this and a little bit of that, and model it.

But it's a hard problem. First, we had to collect lots of information about the brain so people could sit down and figure out a theory about how the brain works. Also, our platform requires lots of memory, and a lot of CPU horsepower. So ten years ago we probably couldn't have done it. But today, we can.

One of the reasons I started Numenta is because I want to bring the urgency of economic markets to this scientific problem. From that point of view, it's a bit like the human genome project. The sequencing of the human genome began purely as an academic thing, and it

was going to take a decade to complete—until someone turned it into a business. Then it ended up taking about 18 months, because suddenly there was profit involved. I'm consciously trying to promote this understanding of the brain, and I'm going to make it happen faster by providing economic incentives for people to work on it.

It's a daunting task, but I think the hardest part is behind us. That's when I was pursuing this without a name, without any money. Now, after years of working in this field, I have a lot of experience, and it's starting to come together. We understand it well enough that I can speak confidently that it will happen. And I am certain that over the years we will need to create a whole new set of programming tools and hardware. The earliest Numenta might release its first tool set is by the end of 2006. We know exactly what we need to do; it's just a matter of turning the crank.

Your theory presupposes that consciousness plays no part in the decision-making process, a notion to which many people object. What if your theory is wrong?

It's true that we haven't actually proven any of this stuff. We built a small model that shows it can work, and we understand the theory quite well, but we haven't actually built a system that does any of the things we're talking about. But I would be really, really surprised if the brain doesn't work like this. It's clear to me that what we are building will work. I am as certain about this as I can be about anything. +

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EMERGING TECHNOLOGIES

Which IT Breakthroughs Make Sense for Your Company?

In late 2005, Memorial Sloan-Kettering Cancer Center, in New York City, instituted a four-computer Linux grid, expecting its researchers to take advantage of the grid's speed. But few have, says Juany Jardines, manager of research computing at the center. The reason: Researchers don't want to invest the effort in redeveloping their applications for the grid.

CIO Insight has surveyed IT executives on emerging technologies since 2003. This year's survey covers 45 emerging technologies in five different categories. Some, such as Web services, open source, VoIP,

collaboration tools and, more recently, virtualization and SOA, are being widely and quickly adopted, while others, such as grid computing, have been slow to emerge. Why do some technologies—not just grid, but also utility computing, self-healing/autonomic computing, Semantic Web and MEMS (micro-electromechanical systems)—take so long?

IT executives say the cost and effort of deploying these technologies, the existence of reliable and less costly alternatives, the lack of a compelling business reason for adoption, and fear that they won't work as well as promised have kept them from pursu-

TECHNOLOGIES TO WATCH

The percentage of respondents who voted these emerging technologies "most likely to provide business value" in their respective technical categories.

TECHNOLOGY	TOTAL
Team collaboration tools	60%
Business process platforms/management suites	26
Server virtualization	21
Open-source databases, development tools and languages	20

SOURCE: CIO INSIGHT

ing these technologies. While Starwood Hotels & Resorts Worldwide Inc. is evaluating fingerprint readers to give some employees access to its systems, the \$6 billion, White Plains, N.Y.-based company has held off on grid and

self-healing computing, says Endre Jarraux Walls, area director of property technologies for Pennsylvania, Ohio and Kentucky. With security, "we'd rather be in front of our competitors," he says. Not so with grid and autonomic computing. While grid's speed is promising, the computing environment now in place "is effective and running for us, and we have a very good ROI." As for self-healing computing, he says, "I'd rather implement it after a lot of other people have done it. The lack of widespread deployment keeps us from seeing the possible negatives."

Walls and his colleagues at other companies ►

are right to be cautious, according to consultants we spoke with. One reason is conversion costs and technical limitations. Grids—which link separate computers into a virtual parallel-processing computer so they can tackle computing tasks that require enormous processing power and speed—have been deployed by Charles Schwab & Co. for portfolio analysis, and by GlaxoSmithKline plc for drug discovery. According to Carl Claunch, a research vice president for Gartner Inc., grids are appropriate on high-payoff projects that require a lot of computing muscle, such as oil exploration and automobile or aircraft design. But Claunch believes virtualization (which gives IT departments the ability to create virtual servers and storage when needed) is better suited for general-purpose business computing. With grids, software must be redesigned so that code can run in parallel—no easy task. Moreover, “the tools available for

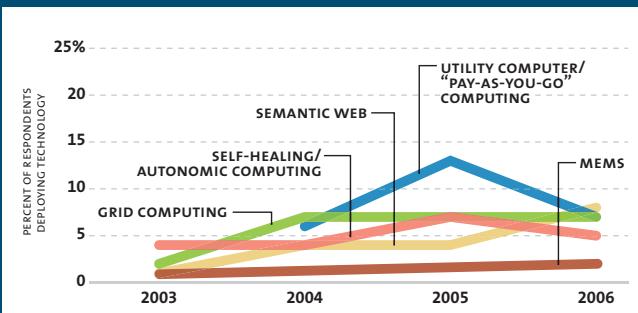
Forest, Ill., and longtime *CIO Insight* columnist. “It’s a great idea, but it would be nice if someone knew how to do it. It’s halfway to being commercially viable.” If software crashes, it doesn’t bring the machine down anymore,” Parkinson says. “That’s partly due to autonomous design.” But we don’t have a way, after detecting and removing a virus, “to figure out how to prevent the system from getting the virus again, check all the possible impacts the virus would have, and fix them.” Similarly, he adds that while “we have code that looks at how a system is performing, and judges whether preventive action needs to be taken, we don’t have the ability to repurpose spare capacity to take over from the not-yet-failed components.”

Utility computing, which provides IT resources as a plug-and-play, pay-as-you-go service, has another problem: “Nobody has quite figured out the economics yet,” Parkinson says. He notes that utility computing has a role to play in such industries as retail, where, for example, there are short-term surges in demand for computing power during the holiday shopping season. But for others, “it doesn’t make much financial sense, because providers don’t yet have enough data to figure out the right pricing model, and they can’t adjust the capacity they provide fast enough and in small enough units to be financially attractive yet.”

Still, confusion or ignorance probably plays a part in the adoption figures. Willi Chiu, IBM Corp. vice president for high-performance, on-demand solutions, believes that at least some of the people who say they are using virtualization are actually using grid technology. And we’re still a decade away from the Semantic Web, according to Charles Abrams, a research director at Gartner. (He defines the Semantic Web as a variety of technologies that, unlike today’s search engines, can understand the meaning of words rather than just find matches with words.) So how can 8 percent say they’ve adopted it? Abrams suggests that they may be using some XML-based specifications that involve semantics. Or maybe, says Parkinson, “They don’t know what they are talking about.” —*Allan Alter*

THESE DOGS RARELY HUNT

After four years, these emerging technologies still haven’t emerged.



SOURCE: CIO INSIGHT

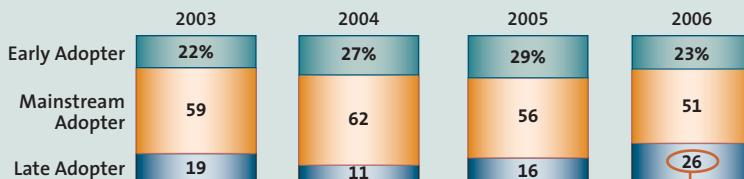
grid computing aren’t as good at achieving the availability you can easily deliver with current operating systems,” says Claunch. Today, when a grid moves work across to another computer, it does not consider what other programs run on that machine, the network connections of that machine, or whether it will be shut off for service in an hour.

Autonomic (i.e., self-managing and self-healing) computing won’t truly arrive until around 2012, says John Parkinson, chairman and managing director of Parkwood Advisors LLC in Lake

FINDING 1 Emerging technologies take a larger slice of the IT budget, even though fewer companies are seeing a payoff.

A worrisome trend we spotted in last year's survey is continuing: Fewer companies are claiming a payoff from emerging technologies. And as we feared, fewer companies are now early adopters and far more are late adopters. So why is emerging technology spending a larger share of the IT budget? Our February 2006 spending survey provides an explanation: Spending on many kinds of hardware and software is flat, while spending on select emerging technologies such as virtualization, RFID and other wireless/mobile technologies is up.

1.1 Which phrase best describes the information technology adoption style of your company? N=257



32% of companies with over \$1 billion in revenues are late adopters.

1.2 In the past three years, my company has received significant payoffs from our adoption of emerging information technologies. N=236



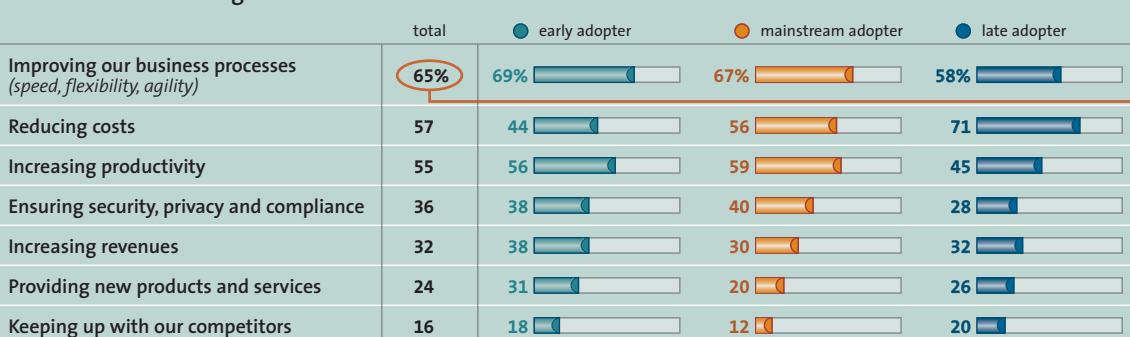
1.3 What percent of your company's total IT budget is spent on finding, evaluating and testing emerging information technologies? N=246

	2006	2005	2006		
			less than \$100 million	\$100 - \$999 million	\$1 billion or more
Mean	8.8%	6.8%	9.2%	8.4%	8.8%
Median	5.0	4.0	5.0	5.0	5.0

FINDING 2 Improving the bottom line rather than the top line is driving technology adoption.

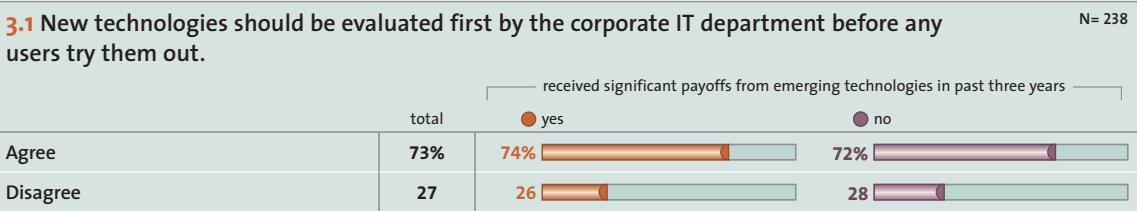
As we know from last year's survey on innovation, CIOs believe IT plays an especially important role in process innovation. It makes sense, then, that process improvement is the major reason companies adopt new technologies. Reducing costs and increasing productivity are a strong No. 2 and 3. Would the payoff from emerging technologies be higher if more companies found ways to use new kinds of IT to build revenues or create new products? Even among the early adopters, less than half are applying new technologies mainly for those purposes.

2.1 What are your company's top three business goals when adopting emerging information technologies? N=244

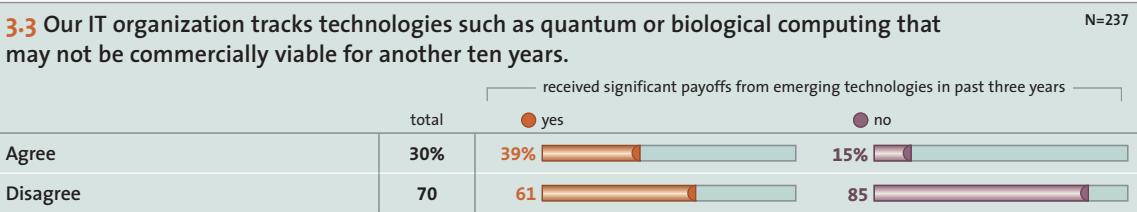


Large companies are more likely to cite reducing costs (59%) than improving business processes (55%) as a top business goal.

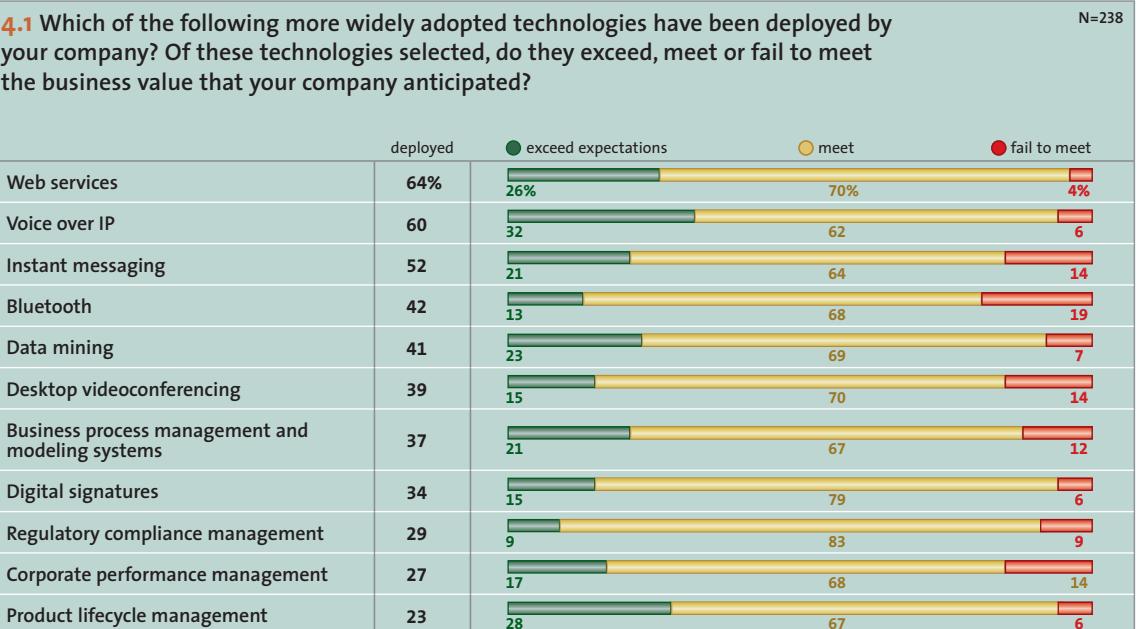
FINDING 3 IT executives are taking a proprietary, short-term view of emerging technologies. Is IT innovation just the privilege of IT organizations? That appears to be the attitude of most IT executives. Few encourage business users to experiment, even with free applications they can download from the Web. Might companies enjoy more innovation and higher payoffs from emerging technologies if users were given freer rein to try them out?



Only 35% of early adopters and mainstream adopters agree.



FINDING 4 Recently adopted technologies have been a success. When we look back at once-emerging technologies that have since been widely adopted, we find they have almost always provided the business value their users hoped for. In fact, nearly all technologies exceeded expectations more often than they failed to meet them. It's an encouraging track record, and it should embolden companies to pursue new technologies more aggressively.



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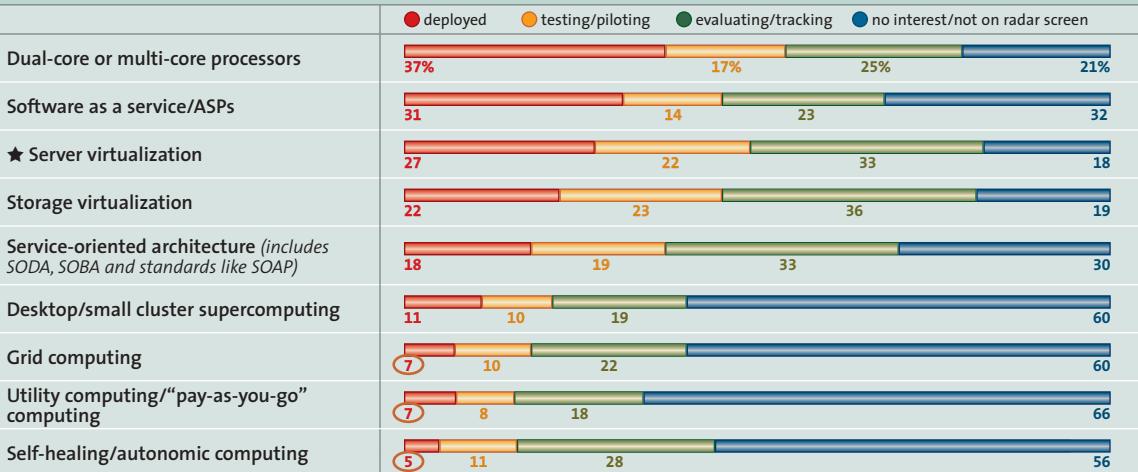
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FINDING 5 **What's driving new-technology adoption? Improving business processes and making better use of information.** The technologies companies are deploying and testing align closely with the top priorities for CIOs from our April 2006 "CIO Role" survey: improving IT architecture, infrastructure and data quality in order to achieve the business goals of improving processes and making better use of information. All four of the technologies considered "most likely to provide business value" support one or more of these priorities. However, the strong

5.1 Please indicate where your company stands with regard to the following new technologies. (★ indicates technology most likely to provide business value.)

COMPUTING TECHNOLOGIES AND STRATEGIES

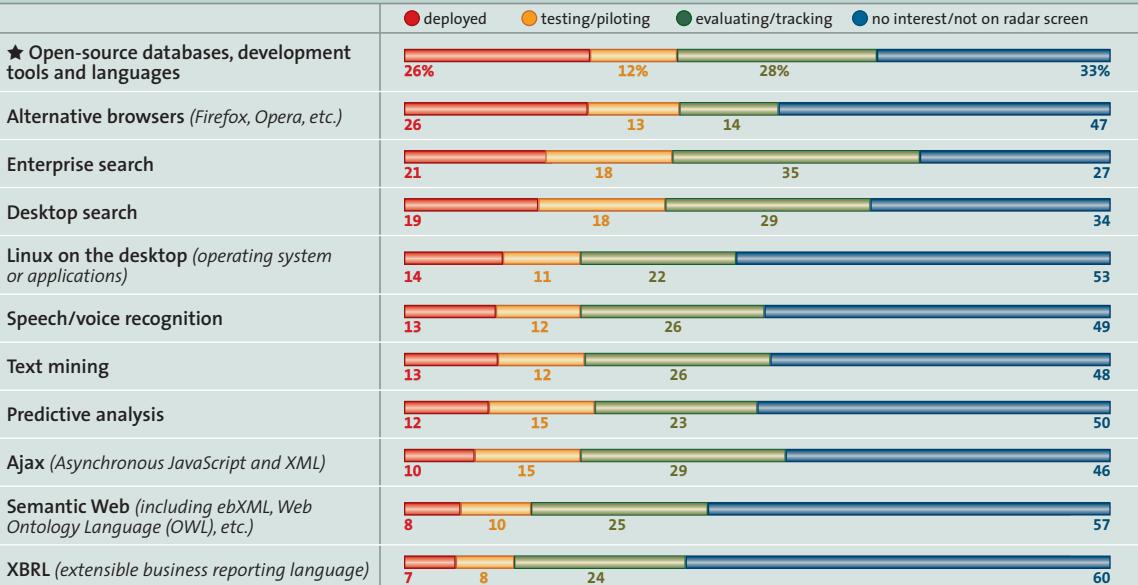
N≥238



The deployment rates for these technologies have remained below 10% ever since we started tracking them in 2003 and 2004.

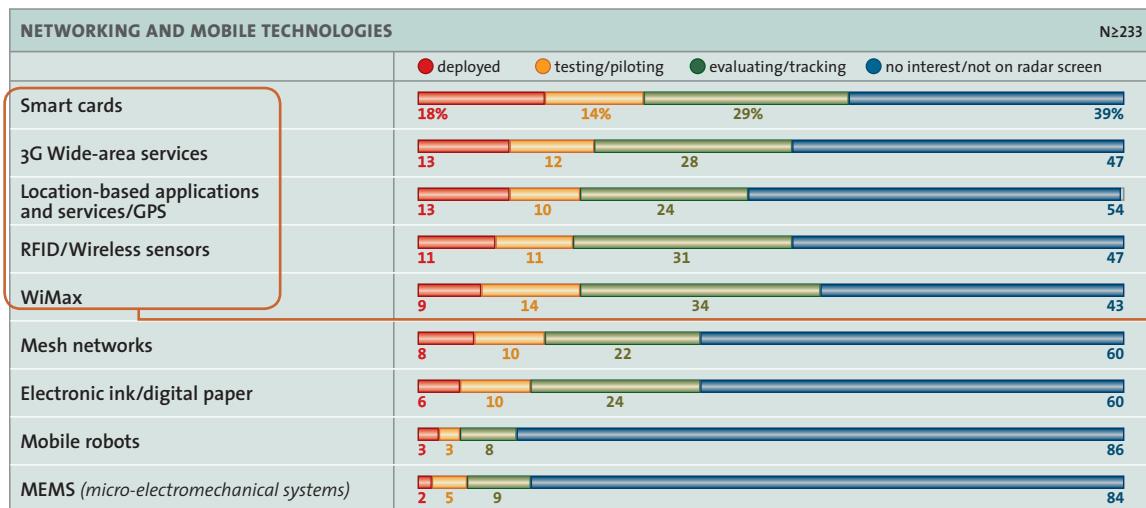
SOFTWARE TECHNOLOGIES

N≥240

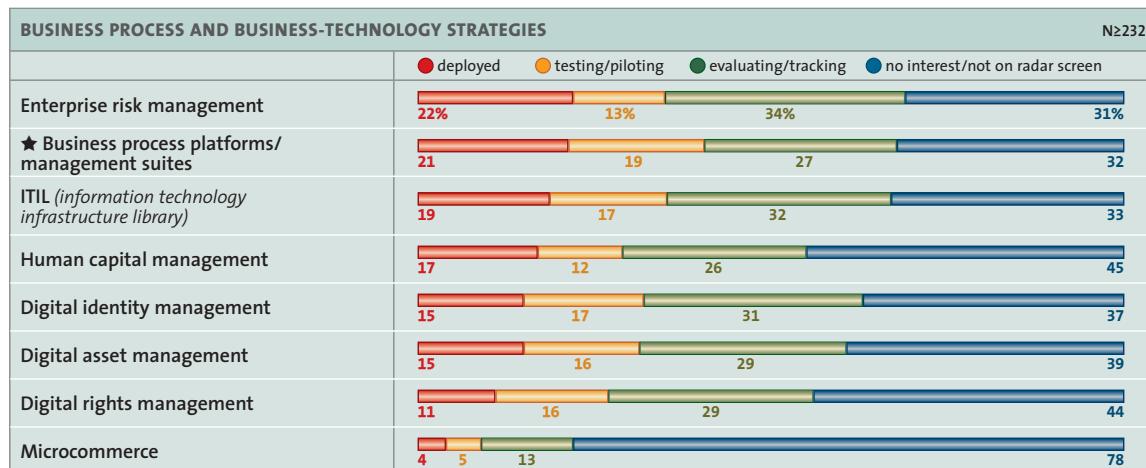
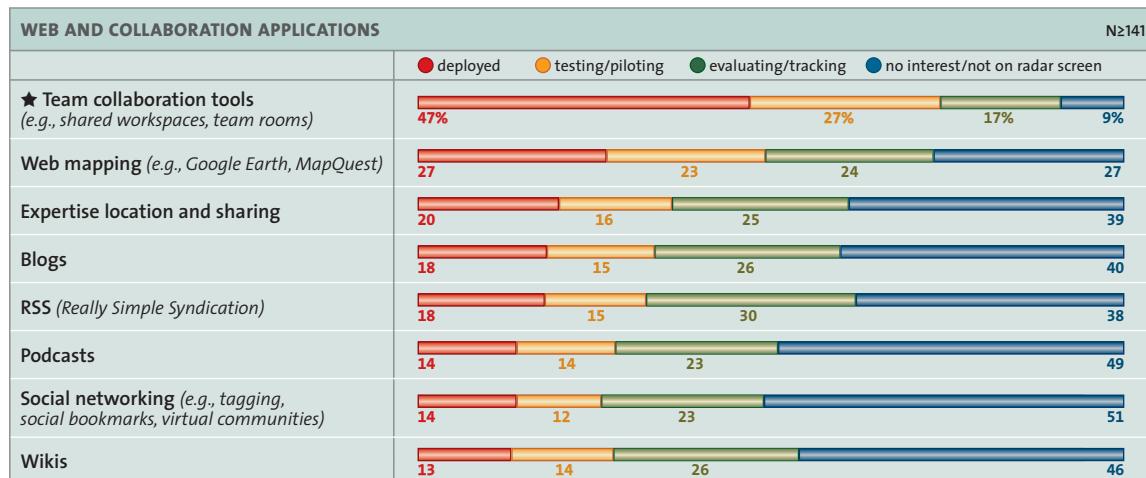


How the survey was done: CIO Insight editors designed the 2006 Emerging Technologies Survey together with Equation Research, LLC (www.equationresearch.com), an Estes Park, Colo.-based supplier of custom research services. IT executives gathered from Ziff Davis Media publication lists were invited to participate in the study by e-mail. The questions were posted on a password-protected Web site, and 257 qualified respondents (87 from companies with revenues in calendar 2005 below \$100 million, 110 from companies with revenues between \$100 million and \$999 million, and 60 from companies with revenues of \$1 billion or more) replied from February 28 to March 19, 2006. Of the respondents, 66% percent were CIOs or CTOs, and the rest held titles of vice president, senior vice president, executive vice president, or global or managing director of IT.

interest in team collaboration tools suggests these applications lie at the sweet spot where the two business goals converge. Some low-scoring technologies such as Ajax, microcommerce and social networking have only recently gained attention, but others have been “emerging” for years (see introduction). The bottom line: CIOs are focusing more on new infrastructure and tools than on new applications, unless they help users work with data. With only four emerging technologies being tested at more than 20 percent of companies, it’s not a time of rampant experimentation.



These five emerging technologies were a statistical tie for most likely to provide business value.



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STRATEGIC TECHNOLOGY

ENTERPRISE-RIGHTS MANAGEMENT

BILL OF RIGHTS

Enterprise-rights management is still in its early stages, but most CIOs acknowledge a need for better document security. **By Karen S. Henrie**

OPPORTUNITY

Industrial espionage and regulatory demands shine a spotlight on document security.

When executive search firm Sterling-Hoffman acquired two research facilities in India last year—thereby doubling its employee count, from 150 to 300—CEO Angel Mehta quickly ran into problems securing the company’s intellectual property. “Emerging markets are like the Wild West, times ten,” says Mehta. “In places like India and China, industrial espionage is commonplace.” Companies routinely bribe competitors’ employees for information, he says, or they have their own people pose as a competitor’s employees and steal it.

Sterling-Hoffman, based in Mountain View, Calif., specializes in recruiting sales and marketing executives for software companies in North America; the firm is training its India-based researchers to help track market trends, executive movements, mergers-and-acquisitions activity, and other events. That intelligence represents the company’s stock-in-trade, and most of it is stored in PowerPoint slides, PDF files and other standard document formats. Faced with the possible loss of information to competitors, Sterling-Hoffman’s ability to freely share critical documents was seriously hampered. “We couldn’t give researchers the documents necessary to train them, and

we found ourselves imposing impractical work-arounds,” Mehta says.

Sterling-Hoffman isn’t alone in its desire to tighten document security. According to a report by Provizio, a competitive-intelligence company based in Meridian, Idaho, U.S. companies lost \$133 billion as a result of proprietary information theft in 2005, up from \$59 billion in 2002.

To secure their information, a small but growing number of companies have borrowed a page from the digital-rights-management playbook and adopted many of the same tactics used by purveyors of videos, music, and other electronic content to protect their wares from commercial piracy and file sharers. According to a recent Gartner Inc. report, enterprises are now “applying DRM principles to enterprise messaging, documents and intellectual property,” using so-called enterprise-rights-management technologies to help control who can read, copy, print, export, save and edit documents, and when.

ASK YOUR IT SECURITY TEAM:

▶ **What measures do we currently take to protect individual documents?**

ASK YOUR COMPLIANCE OFFICER:

▶ **Does our compliance strategy adequately address document security requirements?**

STRATEGY

Enterprise-rights management controls who can do what with content, and when.

Most of the commonly used security technologies don't address document security head-on. The typical approach to document security involves the same old technologies that companies have always turned to in an effort to defend their networks, computers and data from attack. Among those who responded to a joint Federal Bureau of Investigation-Computer Security Institute survey and who had suffered a loss of proprietary information, 97 percent were using firewalls, 72 percent were using intrusion-detection systems, 70 percent were using server-based access-control lists, and 68 percent were using encryption for data in transit.

But none of these technologies really solves the specific problem posed by unstructured documents. Network controls—including firewalls, network proxies, content monitoring and filtering—limit network access but have little or no effect on individual documents. Encryption techniques, including PKI systems, help control who opens a document, but not what they do with it after it's been opened.

Information repositories such as online workspaces or content-management systems impose controls only while the documents are in those containers. Even document-level controls, like Microsoft Word password protections and read-only PDF files, leave plenty of room for miscreants to maneuver, and for regulatory requirements to fall through the cracks.

Safeguarding confidential content requires a different mindset. "IT people want to view this as a network problem or as a container problem, but it is really a data problem," says Ed Gaudet, vice president of product management and marketing for Liquid Machines Inc., a Waltham, Mass.-based provider of rights-management software. "The security needs to be persistent and travel with the document."

That's where ERM software comes in. ERM takes the same approach as DRM does, embedding controls directly into a document, and not simply on the network it travels over, the computer it's stored on, or the folder it's sitting in.

Two hundred Sterling-Hoffman employees

worldwide, including consultants, researchers, and managers, now use ERM software from Liquid Machines to protect critical information. Designated employees, including every client manager, determine which documents to protect by attaching specific rights to them. For example, a manager may create a training document using Microsoft PowerPoint or Word, for use by the India-based researchers, with limited, read-only "rights." Attempts to do anything else with the document, such as print it or forward it, will fail.

Rights are defined and managed within a dedicated policy server, and then applied to documents individually by their authors, who select the appropriate permissions from a drop-down menu accessible through a piece of software that runs on every user's machine. An author may reserve the strictest controls (e.g., read only) for confidential client information, while allowing a bit more latitude (e.g., read, print, forward) with less sensitive documents, such as a memo describing an administrative-training procedure.

Sterling-Hoffman says it has spent less than \$80,000 on hardware and software licenses, including both the pilot and deployment phases. Mehta views the investment as a bargain: "Previously, we couldn't comfortably engage certain employees on certain projects, or the pace of information sharing was significantly slower. We couldn't send a training document, so we'd dictate information to ten people over the phone. Training took a week or two instead of an hour, and took valuable time from the principal or vice president giving it. Now we send documents overseas and they don't get stolen."

Meanwhile, at Fairfield Greenwich Group, a New York City-based hedge fund with \$9 billion in assets, an annual security review highlighted document security as a concern. As at other hedge funds, FGG's client lists, internal accounting documents and fund information are highly proprietary. "We considered how bad it would be if our client list wound up on the front page of the *Wall Street Journal*," says Jason Elizaitis, FGG's director of information technology.

All 85 FGG employees now have ERM software installed on their desktops. In addition to safeguarding confidential fund and client information—"you can't trust sales people," says Elizaitis—ERM also helps FGG employees jointly

**\$133
BILLION**

The amount of money U.S. companies lost in 2005 as a result of proprietary information theft.

SOURCE: PROVIZIO

A KEY FOR EVERY LOCK

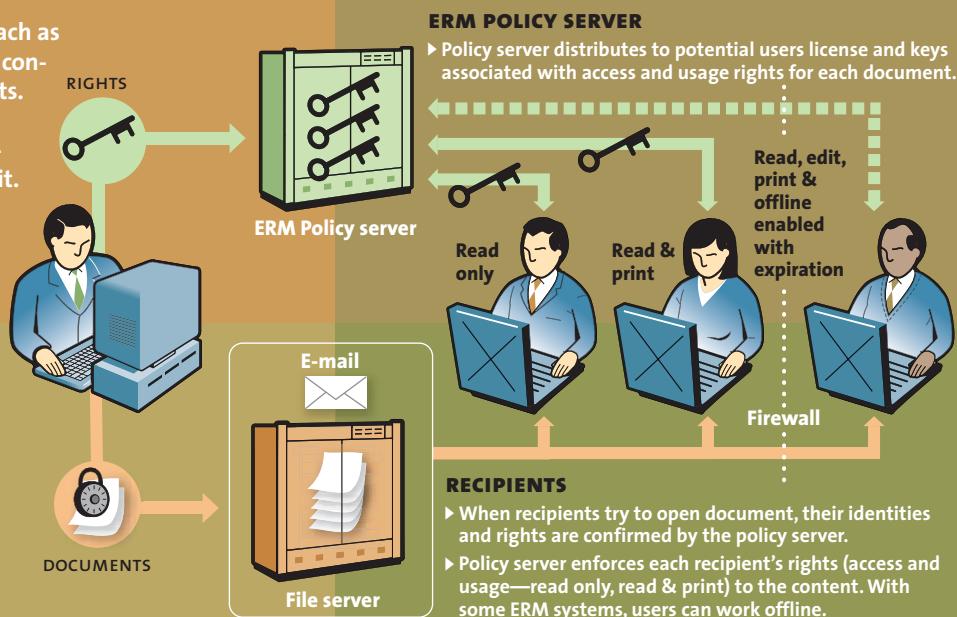
ERM takes the same approach as DRM software, embedding controls directly into documents. The controls are persistent: No matter where the document travels, they go with it.

AUTHOR

- ▶ Author creates document and assigns usage rights.
- ▶ Access rules are sent to policy server.
- ▶ Author distributes rights-protected document to other users.

DOCUMENTS

- ▶ Content is protected at rest (on file server) or in transit (e.g., e-mail).



SOURCE: LIQUID MACHINES INC.

prepare documents created in Microsoft Word, and housed in Microsoft SharePoint, for regulatory approval. It also prevents FGG employees from unwittingly (or not) releasing information to the public prematurely. Elizaitis especially likes the fact that rights “travel” with content, even as it moves from one document format (such as Word) to the next (such as Excel).

ASK YOUR IT ANALYST:

- ▶ **What technologies are available for securing content at the document level?**

ASK YOUR HEAD OF IT SECURITY:

- ▶ **What changes should we make to our security to accommodate document-level security?**

LIMITATIONS

ERM products remain poorly integrated with other IT processes and applications.

Despite its promise, ERM has yet to attract widespread interest, even among small workgroups, much less across entire corporations. For one thing, it adds complexity to a company's infrastructure at a time when IT departments are looking to consolidate and simplify. And according to Trent Henry, senior analyst with Burton Group, an IT research firm in Midvale, Utah, CIOs (especially at large companies) are also

concerned about integrating ERM software with numerous other IT processes, systems and applications, including backup and recovery systems and records-management systems.

Consider FGG. As a registered broker/dealer, the firm must archive documents for seven years. Documents with rights attached must either be opened on FGG's network, or unprotected before they are released to its third-party records-management provider, Boston-based Iron Mountain Inc. At Bern, Switzerland-based Swisscom AG, a telecommunications provider with \$7.6 billion in 2005 net revenues, documents must be archived for ten years. The firm plans to keep a copy of the policy server on hand for ten years, just in case it needs to access archived documents that inadvertently still have rights attached.

Burton Group's Henry also points out that many CIOs are suspicious of any security technology that places so much control, and responsibility, in the hands of individual users. That's why so many have settled for less invasive measures—such as network controls, or content sniffers—that can be managed by the IT team.

Companies that have deployed ERM usually cite ease of use and user acceptance as the most essential requirements for any ERM product. Says FGG's Elizaitis, “We're putting the onus on the authors to protect documents, so ease of use was the most important requirement.” He

46%

The percentage of large companies that worry about malicious attacks from employees.

SOURCE: CIO INSIGHT, SEPT. 2005

claims their current ERM setup is minimally disruptive. "Applying rights involves two or three extra clicks for the author, who simply has to pull down a droplet and assign a policy."

Technology aside, ERM assumes all users are clearly versed in company policy, and know which documents to protect. Swisscom implemented Microsoft RMS for all 16,000 full-time employees when it upgraded to Windows 2003 server and Office Professional. According to Markus Schütz, project manager for Swisscom IT Services AG, certain documents need to be classified, and users simply need to know when to do that—with or without RMS in place. "Those decisions are made at the group company level, not at corporate. We've just provided technology that makes it easier to comply."

Finally, preserving document rights once the documents travel outside the company is generally difficult, unless recipients have rights-management software running on their machines and are connected to the policy server that enforces those rights.

ASK YOUR BUSINESS MANAGERS:

- ▶ **What are the key document formats that would benefit from document-level security?**

ASK YOUR COO:

- ▶ **Are we sufficiently protecting the information we exchange with trading partners?**

FUTURE

Attaching rights to documents is poised to become easier, as vendors acknowledge that ERM is a feature, not a standalone market.

The ERM market today remains somewhat ill-defined and anemic, and it includes only a small list of vendors. A flurry of recent deals in the market has caused some prospective buyers to take pause, although it also signals a healthy new direction for ERM, according to Robert Markham, an analyst at Forrester Research Inc.

Storage giant EMC Corp. recently acquired Authentica Inc., a Lexington, Mass.-based provider of ERM software, and plans to embed ERM capabilities into its Documentum content-management platform. Gartner analyst Ray Wagner sees this move as potentially kick-starting

more interest in ERM among content-management vendors, who, he says, have generally been more preoccupied with beefing up their other capabilities, including workflow, version control, and backup. It also begins addressing concerns that ERM isn't sufficiently integrated with applications they use everyday to manage their documents.

In another recent acquisition, Adobe Systems Inc. acquired the digital-rights management division of Navisware, which will allow Adobe to expand the document formats it can support with its LifeCycle Policy Server to include not only PDF files but also Microsoft Office documents and CAD drawings.

Future versions of Microsoft Office SharePoint, which is steadily gaining in popularity among corporate users who need to collaborate on documents, will also include more rights-management features.

Microsoft Corp. is planning to integrate some rights-management capabilities into Vista, according to Suzanne Kalberer, product manager with Microsoft. This will eliminate the need for a separate, dedicated server, although it will still require companies to purchase separate licenses for the rights-management software running on client machines. It will also make it easier for application vendors to embed rights management into their applications as a matter of course, she says. Still, says Gartner's Wagner, "Until someone offers a standard OS with this capability at the lowest level, ERM won't become ubiquitous."

Meanwhile, a strong business case can quickly override the many valid concerns enterprises have about ERM today. As Sterling-Hoffman's Mehta puts it: "If we didn't have document security, we could not get the work done."

ASK YOUR IT TEAM:

- ▶ **Do any of our vendors plan to incorporate ERM in future product releases?**

ASK YOUR IT MARKET ANALYST:

- ▶ **What market events must occur before we would consider deploying ERM?**

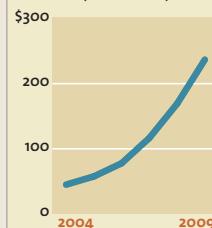
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FACT SHEET

ENTERPRISE-RIGHTS MANAGEMENT

Enterprise-rights management lets companies assign rights to individual documents. These rights control how documents can be used or changed, to protect against information loss or regulatory breaches. While some companies have already found value in ERM, the technology is still immature.

Enterprise-Rights Management Market Forecast (IN MILLIONS)



SOURCE: IDC

LOOK TO ERM TO HELP:	CAVEATS
<ul style="list-style-type: none"> Protect executive communications 	<ul style="list-style-type: none"> ERM requires additional infrastructure at a time when companies are looking to consolidate what they already have.
<ul style="list-style-type: none"> Comply with government regulations 	<ul style="list-style-type: none"> ERM puts a great deal of control and responsibility for document security in the hands of end users.
<ul style="list-style-type: none"> Protect intellectual property 	<ul style="list-style-type: none"> Market consolidation has prospective users worried about the future of individual products in an already small market.
<ul style="list-style-type: none"> Manage legal risks 	<ul style="list-style-type: none"> Maintaining rights once documents leave the corporate network is difficult.
<ul style="list-style-type: none"> Avoid exporting information that is prohibited by the government 	<ul style="list-style-type: none"> ERM can complicate backup and archive procedures.
<ul style="list-style-type: none"> Reduce competitive threats 	<ul style="list-style-type: none"> ERM is poorly integrated with widely used record, content and document management systems.

46%

THE PERCENTAGE OF LARGE COMPANIES THAT WORRY ABOUT MALICIOUS SECURITY ATTACKS FROM EMPLOYEES.

SOURCE: CIO INSIGHT, SEPT. 2005

ERM EVALUATION CRITERIA

- Ability to protect all file formats required by the enterprise (e.g., PDF, MS Word, CAD)
- Breadth of rights-management options
- Impact on business processes and user experience
- Persistence of rights as data moves among formats
- Ease of setup and administration of policy console
- Cost
- Compatibility with other infrastructure (e.g., content and document management systems, etc.)
- Vendor responsiveness and support

39.4%

THE PROJECTED COMPOUND ANNUAL GROWTH RATE FOR ERM SOFTWARE, 2004-2009.

SOURCE: IDC

MAJOR PLAYERS

- Adobe Systems Inc.**
www.adobe.com
- Authentica Inc.** (acquired by EMC Corp.)
www.authentica.com
- GigaMedia Access Corp.**
www.gigatrust.com
- Liquid Machines Inc.**
www.liquidmachines.com
- Microsoft Corp.**
www.microsoft.com
- SealedMedia Inc.**
www.sealedmedia.com
- Trusted Edge Inc.**
www.trustededge.com

Resources:

REPORT

“Trends in Proprietary Information Loss”
PricewaterhouseCoopers, U.S. Chamber of Commerce & ASIS Foundation, Sept. 2002

WEB SITES

- www.xrml.org**
Information on eXtensible rights Markup Language, or XrML, the emerging standard for digital rights management
- www.drmblog.com**
Digital Rights Management blog



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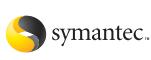
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EXECUTIVE BRIEFS

OPINION: THE LEGAL JUNGLE

They Can't Work it Out

By Larry Downes, page 41

The legal struggle that recently played out in a British court between Apple Computer and Apple Corps, the record company founded by the Beatles, isn't really about trademark issues, says columnist and University of California at Berkeley professor Larry Downes. If it were, then Apple Computer would win hands down. It's really about the dangers of turning over decisions about business strategy to lawyers, especially in industries where technology is rapidly changing the rules. And it sure looks like the first step in negotiating a deal to license the Beatles' music to the music industry's dominant distributor of digital music.

CASE STUDY: BACKCOUNTRY.COM

Great Wide Open

By Debra D'Agostino, page 44

Backcountry.com is a small player in the outdoor sporting-goods market. But thanks in part to an unconventional approach to IT—the company runs almost exclusively on open-source systems—it's experiencing eye-popping growth, nearly doubling its revenues in 2005. It's a compelling strategy, says Senior Reporter Debra D'Agostino, but not without risks: To realize the promise of open source, share source code freely, and customize software as needed at a fraction of the cost of proprietary software, Backcountry.com had to hire a massive IT staff that's responsible for writing all its own code.

ANALYSIS: MBA PROGRAMS

The Modern-day MBA

By Edward Cone, page 57

What does a newly minted MBA know about managing enterprise technology? Good question. When it comes to providing useful training in technology management, MBA programs are all over the map, and employers and academics alike complain that too many graduates are unprepared for life in the real world. Now, after a boom and bust in grad-school programs that mirrored the business cycle, a small but growing number of universities are taking a variety of approaches to address the technology gap in their curricula and focus on the real needs of IT managers.

EXPERT VOICES: JEFF HAWKINS

Mind Over Matter

With Debra D'Agostino and Edward Baker, page 78

You'd think that founding both Palm Computing and Handspring would be impressive enough. But another passion predates Jeff Hawkins's love of mobile computing: neuroscience. After decades of studying the human neocortex, Hawkins has developed a new theory: that the brain makes predictions about the world through pattern recognition and memory. Senior Reporter Debra D'Agostino and Editor Edward Baker spoke with Hawkins about his "memory-prediction framework," the future of intelligent machines, and what it means for corporate IT.

RESEARCH: EMERGING TECHNOLOGIES

Which IT Breakthroughs Make Sense for Your Company?

By Allan Alter, page 85

Spending on emerging technologies made up a larger share of IT budgets last year. And recently adopted technologies such as Web services and Voice over IP have met or exceeded the expectations of at least 80 percent of our respondents, according to this year's evaluation of 45 emerging technologies. So why are fewer companies claiming significant payoffs from emerging technologies? The likely reason: Companies are investing primarily to reduce costs, rather than to spur growth and innovation. The technologies considered most likely to provide business value? Team collaboration tools, business process platforms and management suites, server virtualization, and open source.

STRATEGIC TECHNOLOGY:

ENTERPRISE-RIGHTS MANAGEMENT

Bill of Rights

By Karen S. Henrie, page 93

Taking a page from purveyors of digital content, a small but growing number of companies are using so-called enterprise-rights management to protect proprietary and essentially unstructured information that exists in a wide variety of document, message and other formats. Document-level security can make a big difference in a world of growing compliance requirements and theft of corporate information, notes Contributing Editor Karen S. Henrie. But companies still struggle to integrate ERM technology with corporate infrastructure and other applications.



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