Greetings

Celebrating 30 Years of Growth

Information Heritage

Research Notes

Europe’s Data Security Laws

Cloudy, but Clear Sailing

The Trouble with Predictions

CIO Corner

Champy on Change

The Inforati Files

Ross Mayfield

CLOUD COMPUTING

What the early adopters say
FROM THE PAINTINGS of Georgia O’Keefe, to ancient Japanese folding screens, to Ansel Adams’ majestic photos of the American West, clouds hold a special place in our collective imagination. Now they have drifted into the technology landscape as well, providing the perfect metaphor for a new model of computing.

In this new model, an ever-growing share of the IT infrastructure resides in an ever-evolving “cloud,” managed internally by the IT organization (“private cloud”) or by third parties (“public cloud”). Resources and capacity can be accessed on demand, consumed as needed, and paid for based on usage—with huge implications for how organizations plan and manage their IT operations.

To paraphrase Joni Mitchell, this issue of ON looks at clouds from many sides now. Our lead article (page 25) recounts the lessons learned and benefits observed by three organizations that are implementing cloud computing to support their operations. On page 48, columnist Jim Champy reminds us that while the cloud promises to dramatically reduce computing costs, it also requires a strong governance process, especially where public clouds are concerned.

Elsewhere in this issue, EMC’s CIO, Sanjay Mirchandani, explains the benefits EMC and its customers gain from the seemingly risky practice of inserting new EMC products into the company’s active production IT environment well ahead of their general availability to the market. Author and researcher Jeanne Ross explains what sets IT-savvy companies apart from their peers. And Joseph Pelton discusses the perils of making definitive technology forecasts, using as an example the “Negroponte Flip,” which famously predicted that wired modes of communication (e.g., land-line telephones) and wireless modes (TV and radio) would flip to the opposite mode by 2010.

One thing it seems safe to predict is that cloud technology is here to stay, providing new opportunities for IT professionals to deliver value to their organizations.

Christine Kane
ONeditor@gmail.com
1979. A small software company, Microsoft, is just four years old and ends the year with 28 employees. Royal Philips Electronics in the Netherlands and Sony in Japan begin to jointly design the first Compact Discs. Then Sony, one of the superstars of the year, goes on to introduce the Walkman. Also in Japan, Nippon Telegraph and Telephone establishes the first commercial cellular network, and Voyager 1’s photos reveal Jupiter’s rings. On the lighter side, it is the year that sees the introduction of the modern fiberglass snowboard and Trivial Pursuit—two inventions that sparked the development of still-thriving subcultures.

And so it was, on August 23, 1979, that Dick Egan and Roger Marino filed the paperwork to incorporate an enterprise called EMC.
Celebrating 30 years of growth

WORLDWIDE IT SPENDING

The worldwide market for information technology products and services has grown by 431 percent in constant 2008 dollars, evolving from computer systems for large organizations to all aspects of the digital information lives of billions of people around the world.

1979: $116 billion

2008: $1,484 billion
In real terms, the U.S. economy doubled its size in 30 years.

1978: $2.6 trillion

2008: $14.4 trillion
Celebrating 30 years of growth

PIECES OF MAIL HANDLED BY THE USPS

The explosion in the amount of digital information has yet to arrest the growth in traditional information types.

1979: 99,828,883,000

2008: 202,702,900,000
Celebrating 30 years of growth

S&P 500 INDEX

1979: 107.94
2008: 903.25
"Customers' opinions drove us. Their problems were our inspiration."
—Dick Egan

"Companies afraid to disrupt themselves almost 100 percent of the time end up being disrupted. We're doing what competitors never thought we'd have the intestinal fortitude to do."
—Joe Tucci

EMC creates the storage software market with a disaster recovery application.

EMC employs 40,000 people and operates in more than 60 countries worldwide.

Under the stewardship of CEO Mike Ruettgers, EMC is named NYSE Stock of the Decade.

Virtual History:
Bringing archives into the digital age

By Sarah Jensen

Under the leadership of Head Archivist Joan Krizack, Boston’s Northeastern University Libraries, Archives, and Special Collections Department has developed a unified collecting policy around the theme “underrepresented groups.” The archive now contains nearly 100 collections of the most important and at-risk historical records of Boston’s African American, Chinese, gay and lesbian, and Latino communities. One of those collections — material from the Boston-based social justice group Freedom House — has been digitized and put online, along with a collection of photographs depicting Northeastern’s history. Krizack spoke with ON about Northeastern’s collection, the changing role of archivists, and her predictions about the future of digitization.
Why did you choose the Freedom House materials to launch your online collection?
The Freedom House photographs from 1950 to 1975 document citizen participation in school desegregation, urban renewal, and integration in Boston from 1950 to 1975. They give us a firsthand look at the political and racial struggles of people working to get their rights, and in that sense, characterize our “underrepresented groups” theme.

How has digitization changed your role as an archivist?
It’s added a whole new function to the archivist’s job. It’s not as if we didn’t have enough to do already—processing the materials, writing grants, and talking with individuals and organizations about collaborating with us to preserve their records. But today, an archivist has to be more technologically savvy than in the past. We create the website and web interface that provides access to the digital collection and work closely with information technologists to help them understand what we need in order to accomplish that.

What’s involved in digitizing these materials?
First, we determine whether an entire collection should be digitized or only a portion of it. After the most important material is selected, the items are scanned at a very high resolution, and we create three images, one at 600 dpi for our files, one at a lower resolution for the Web, and the thumbnail, the one you see when you do an online search.

For each image, we enter metadata into a template. Informational metadata helps in searching for specific images and includes the title of the image, who and what is in the picture, and when it was taken. Techni-
Virtual History
Bringing archives into the digital age

cal metadata describes what kind of scanner was used, the size of the original image, and other data that helps preserve the digital information. Administrative metadata is for our internal purposes. We might record information about who uses an image and for what purpose.

Is this material better preserved by digitizing it?
Digitizing damaged materials is great because the fragile originals then needn’t be handled, but at present—because no one’s sure how long the digital copy will last—digitization is not considered a means of preservation. It’s considered a means of access and of making this material available to researchers and the public. In the old days, researchers consulted indexes to find collections that might be of interest. The great benefit of having material online is people don’t have to travel to the archives, so the scope of research they can do is much less limited.

But isn’t something lost when the material isn’t in its original form, and researchers can’t get a tactile sense of it?
When you’re researching older materials, that’s sometimes important. For example, if you were writing about medieval manuscripts, you might want to visit the original documents to make sure what you’re saying about the medium is accurate. With more recent material such as ours, this might not be as important. We do preserve the originals so the researchers can come in any time and examine them.

How do archivists ensure that their specialized collections augment one another?
The New England Archivists Association
Virtual History
Bringing archives into the digital age

holds biannual meetings, and archivists learn about other collections. While Northeastern is known for collecting materials related to underrepresented communities, the Schlesinger Library at Harvard has a fine women’s studies archive, and Boston University has 20th-century cultural and nursing archives. We do direct people to other archives that might give them a broader context for their research.

What are the challenges of storing the digital material?
This is something we’re struggling with, because our digital collection contains about 4,000 images and continues to grow. We’ve just about filled our server. Our IS department automatically backs up everything daily, but the challenge is to maintain the quality of information as we add more and more.

Where do you see digitization going in the future?
Into the clouds, literally. I think as we acquire more and more digital material, cloud computing will be a cost-effective answer to the storage question.

I also see digitization opening up a way to link documents to related documents. Links on each item could connect to other items in the collection as a way to preserve context. In an archive, context is more important than a single piece of paper. The more we can interconnect our collections on Boston public school desegregation or the Chinese American community or services to the elderly, for example, the more well-rounded and complete research can be.

What’s next on your digitization schedule?
We have a fantastic collection on Carmen Pola, a Latina activist who lives in Boston’s
Virtual History
Bringing archives into the digital age

Mission Hill. She was involved in many local social justice organizations and advocated for the poor, particularly Latinas. She was also one of the early directors of the Puerto Rican Festival in Boston. We’re working on sorting and prioritizing her material in preparation for digitizing it.

Are fewer researchers coming on-site as digital collections go online?
I do worry that as our collections go online, researchers won’t come in to investigate our other materials. Yet, just last month, we had a 33 percent increase in foot traffic. I think the two approaches can work together, and however people find us, it’s very gratifying to see the collections being used.

Going digital

The Northeastern University Libraries, Archives, and Special Collections Department storage room contains items ranging from 16mm World War II newsreels to an impressive collection of Northeastern field hockey sticks. But of most significance to researchers—and slated for eventual digitization—are the records of organizations such as the Boys & Girls Clubs of Boston and the Boston YMCA, whose Evening Institute was the precursor to Northeastern University.

First on the digitization priority list are materials documenting both N.U.’s history and underrepresented Boston groups such as the Coalition of Black Women, Inc., and the Boston Bisexual
Resource Center. Two such collections have been digitized thus far, enabling access to anyone with an Internet connection:

- **The Freedom House Photographs:** Roxbury People, Places, and Events, 1950-1975, comprising more than 2,300 images chronicling the work of Freedom House, an organization founded in 1949 to promote economic self-sufficiency and social justice for residents in underserved Boston neighborhoods. Items include images of members of the Boston branch of the NAACP greeting the first African American Red Sox player, Pumpsie Green, at Fenway Park in 1959 and the construction of urban renewal projects in the 1960s that displaced minorities from their homes.

- **Northeastern’s Historical Photographs,** which relate to Northeastern academics, athletics, campus, and events from 1902 to the present. The collection includes images of visiting notables such as poet Maya Angelou and the Rev. Ralph Abernathy, early campus buildings, and N.U.’s 1933 football team battling Colby College on Huntington Field.
PULLING IT ALL TOGETHER: Jeanne Ross tells us how to become “IT Savvy”
Jeanne W. Ross, Ph.D., is director and principal research scientist at the MIT Sloan School of Management’s Center for Information Systems Research (CISR). Her research examines organizational and performance issues related to IT governance, outsourcing, and business agility. Her latest book, *IT Savvy: What Top Executives Must Know to Go from Pain to Gain*, co-authored with CISR Chairman Peter Weill, was published in 2009 by Harvard Business Press.

**How does your latest book fit in with your prior work?**
It’s a summary of research we’ve been doing since 1995. We’ve taken the key ideas and boiled them down for non-IT executives. We want to help them learn how to use and manage IT more effectively in their organizations.

**What does it mean to be an IT-savvy company?**
IT savvy is a characteristic of firms and their managers, which is reflected in their ability to use IT to consistently elevate the organization’s performance. IT-savvy firms distinguish themselves from others by building a digitized platform of business processes, IT systems, and data to help them execute their operating strategy. This platform not only utilizes IT capability to repeatedly execute business processes, but it also provides the information to identify where future profitable growth will come from. Then, with marginal investment, these firms create the new products and services that are faster to market because they reuse the platform.

**What is the business value of being IT savvy?**
Our research shows that IT-savvy firms are 20 percent more profitable than their competitors are. And they spend as little as 50 percent of their IT budgets on operating and maintaining their current systems, whereas the average company spends 71 percent, and many firms spend up to 80 percent. This leaves IT with more resources to fund new business initiatives.
You advocate for IT to play a larger role in business planning and operations. Absolutely. IT units have never struggled at delivering things. But not everything IT is asked to deliver is of value. It may be technically sound and potentially useful, but if IT doesn’t help the organization to change, all you’ve added is cost. IT-savvy organizations understand that how they spend their IT dollars is more important than how many IT dollars they spend. When they request IT tools or services, they need to first understand how these requests will add value to the organization.

How does it happen that IT-savvy companies know to do this?
It’s how they do everything. Before they invest in people, they ask, “How are we going to invest wisely so that we get good value for us and for our people?” Before they invest in new facilities or equipment, they ask, “Why are we doing this? What’s the desired impact on the organization?” You don’t see companies that are great at IT but terrible at everything else. And you don’t see companies that are great at everything except IT. We can go out to any top-performing organizations, and I’ll bet they’re doing a lot of things right with IT.

Where do you start with the non-IT-savvy company that knows it has a problem but doesn’t know the way forward?
There are two things to think about. The first is to ask, “How do we want to operate?” You can’t just build a little IT here and a little IT there because there’s this thing you want to do and that thing you want to do; that will just leave you with all these little siloed things you can do. Incredibly, many executives don’t answer that question. If they knew how they fundamentally wanted to operate, then they would better understand their IT priorities.

The other thing is to start thinking about how decisions are made around IT. You can’t let those who scream the loudest influence how IT dollars are spent.

You discuss decision-making in your chapter on IT governance.
That was the hardest chapter to write. It’s a difficult topic, and in most organizations, there’s not a lot of clarity. The concept of governance is that we’re going to be very clear about who gets to make IT decisions, how to assess the ultimate value gained from those decisions, and—that is really hard, so we often forget to do it—who’s going
Jeanne Ross tells us how to become “IT Savvy”

to be held accountable. All this needs to be very transparent in the organization.

**How does moving to a digitized platform help eliminate IT and process stovepipes?**
Often people want to have a different operating model for every process. But if you say, “I want to do marketing this way, and production this way, and logistics this way,” you haven’t told me what defines you. You haven’t told me how you fundamentally want to operate. You haven’t set priorities. Each process may be very good on its own, but without process integration, you don’t get the change or the value you need from your IT investments.

**How do you define priorities for creating a digitized platform?**
You first have to figure out which processes you’re going to integrate, depending on your operational priorities. These could be order-to-cash, make-to-ship, or problem-to-resolution. Companies that are focused on their people might identify hire-to-retire issues. And, you have to be strategic: Some processes are easily integrated but not very valuable. Others are hard to integrate, but offer the potential to inform decision makers at all levels of an organization. Typically, these latter opportunities will add the most value.

Once you identify your priorities, the hard part is to take these end-to-end processes—which invariably belong to multiple functions, or differ from one business unit to the next—and standardize them for the entire organization. That’s where technology can only do so much, and leadership has to take over.

**Who leads the effort to become IT savvy? The CEO, the CIO, or someone else?**
Effective leadership is critical. Someone has to be at the senior management table saying, “Technology is an important component,” but it doesn’t matter who is leading the charge so long as they can see it through. Anyone with the ability to think strategically, who understands what technology can and cannot do, who has good communication skills and a little charisma, can provide the leadership so long as he or she can rally management behind the effort to become more digital.

**How is value measured in an IT-savvy organization?**
What underlies real value is the ability to use your
information well. Just because you have better data doesn’t mean you will make better decisions. One company that does a great job in this area is Seven-Eleven Japan. They understand that to make money, they need to turn inventory quickly. So how do you do that at 11,000 stores? It’s not by having headquarters decide what’s in each store. It’s by helping people in the stores make good decisions about what should be stocked on the shelves.

Seven-Eleven Japan does that by feeding store managers information on what sold yesterday, what sold last year, and what’s selling at other stores. And twice a week, a consultant visits each store to go over what’s selling and what isn’t, and what to do about it. So it’s not just sending out data and expecting great results, it’s helping people use the data effectively.

Where does cultural change come in?
When firms recognize that they want to function in a digital economy, they also recognize that some things just ought to be automated, and they start making that connection. And it involves letting go of how things have been done in the past.

Proctor & Gamble (P&G) is an interesting example. This is a firm where brand managers are told to do whatever is needed to make money: Take that product, market it, develop a pipeline, do great things. But the company then said, “Oh, we also have to save money, so we’re going to grab some of the things you do, and we’re going to do them for you.”

The immediate reaction from all these autonomous brand managers was huge resistance. And it’s not just at P&G: It happens at every company we’ve watched. But after they get over it, they recognize, “My goodness. All this silly stuff is not my problem anymore.” And the next thing you know, they’re saying, “Yo, management. Take this, too. I don’t need this.” Over time, P&G created 70 shared services, and that number is growing.

To learn more about Professor Ross’s work and CISR, go to http://mitsloan.mit.edu/cISR/
Data protection laws in the U.K. and Europe are becoming “radicalized,” says attorney Stewart Room, one of the U.K.’s leading lawyers and authors in the field of data protection. Here’s why—and what it means for global organizations.

They’re changing faster than you can say “heavy civil penalties.”

BY CHRISTINE KANE
In retrospect, it was the proverbial straw that broke the camel’s back.

In November 2007, the U.K.’s HM Revenue & Customs (HMRC) service lost two unencrypted disks containing backup data. It wasn’t just any data: It was benefit data for 25 million children, including their names, birth dates, and bank details. The public response was swift and merciless, sparked by fears that children had been put at risk. Prime Minister Gordon Brown apologized to the British people, and legislators and regulators scrambled to outdo each other in strengthening data protection laws.

**UNLEASHING A TORRENT OF LAWS AND REGULATIONS**

Stewart Room—one of the U.K.’s top IT lawyers—calls the HMRC incident a watershed moment that has “radicalized” data security laws in the U.K. and led to a regulatory approach that he describes as activist and interventionist. “In the last two years, there has been a torrent of legal changes,” says
Room, “along with a willingness by regulators to enforce against the biggest, richest, and most powerful organizations in the country.”

Taking advantage of the political climate, the Information Commissioner won new powers: to impose jail sentences for certain kinds of data theft and severe fines for security breaches; to carry out spot checks on public sector organizations; and to require disclosure of data breaches.

“Regulators have also developed a legal framework that requires organizations to implement privacy-enhancing technologies (PETs),” says Room. “For example, failure to encrypt portable media will be regarded as a breach of the law. Regulators have already taken enforcement action in this area. The Financial Authority fined the Nationwide Building Society 980,000 pounds ($1.4 million USD) for loss of a laptop that was unencrypted.”

Another initiative, the Data Handling Review, compels public sector organizations to rebuild their data handling procedures, infrastructure, and technologies.

A CHANGE FROM OUT OF THE BLUE

This transformation has happened “at lightning speed,” says Room. “I’ve practiced law for 17 years. And if you said to me in early 2007 that we would build the legal framework we are seeing today, I’d say, ‘That’s ridiculous. It will take at least 10 years.’”

A similar acceleration is occurring in the European Union. For example, the proposed amendment to a 2002 privacy directive imposes a breach notification requirement on telecommunications service providers and ISPs and is expected to be in force in 2010.

PUTTING EXECUTIVES ON NOTICE

What does it all mean? “In the future, executives at the board level will have to seriously consider whether the budget they have allocated to security is adequate,” says Room. “They may face decisions about whether to spend resources on marketing, new staff, and bonuses versus increasing the security budget to bolster data protection. A board
member or CISO may be found to be personally negligent—and perhaps criminally negligent—for not taking adequate security precautions.”

Companies that do business in Europe are wrestling with how to respond to these changes. One area where they need to take action is in implementing privacy-enhancing technology that protects private information or helps an organization comply with data protection principles. “The dilemma for purchasers is that there is no legally accepted definition,” Room explains. “Vendors can say that any product is a PET, but there is no third-party verification regime.”

In March, Room and RSA Security President Art Coviello made a presentation to the European Union in Brussels, advocating for the PET agenda to be moved forward so organizations have more clarity in this area. Room notes that RSA, The Security Division of EMC, offers many products that are likely to meet whatever definition of PET is adopted. He cites solutions for encryption, strong user authentication, data discovery and data loss prevention (DLP), and security information and event management (SIEM).

**THE EVIDENCE IS THERE IN THE LOGS**

In fact, the emerging legal framework contains many provisions that point to the need for SIEM technology to manage IP event logs. “Every action that takes place in an enterprise network generates event log files, whether it’s turning on a PC, sending or receiving an e-mail, or an attempt to penetrate a firewall,” Room explains. “A large network can create billions of log files a week. Being able to sift through and analyze all that data can reveal a lot of interesting truths about security and compliance.”

He also believes that SIEM technology will play a growing role as evidentiary tools in civil and criminal litigation, helping to identify what happened when, and who was involved.

“There were plenty of court cases over the years where I wished we had some kind of technology that kept logs,” says Room. “In many instances, I
think prosecuting authorities would have had more success convicting data thieves and other cyber-criminals had SIEM technology been installed on the victims’ systems.”

**MAKING SECURITY RECESSION-PROOF**

In today’s faltering economy, Room advises client organizations to develop a security strategy that is recession-proof. Major areas of risk include:

- **Laid-off workers who take portable devices containing customer data, intellectual property, and other confidential information.**

- **Mergers, acquisitions, and restructurings, which create uncertainty and lead to gaps in security technologies, policies, and processes.**

- **The combination of increased fraud and reduced spending on security, which increases vulnerability to breaches and insider abuse.**

Another issue on the horizon is the U.S. Patriot Act, which effectively opens up all data to U.S. government scrutiny. “Government and regulatory bodies here are just starting to focus on it,” says Room. “One possible result is that European businesses will become reluctant to work with U.S. companies.”

Despite significant discrepancies between the legal and regulatory environments in the U.S., Europe, and other regions, the trend is toward convergence, says Room. “There are already many commonalities in the areas of intellectual property and cyber crime. Global organizations need to take advantage of these commonalities while heeding national nuances and differences.”

---

**EUROPE’S DATA SECURITY LAWS**

---
Three early adopters share how they’re building their futures on top of agile, resilient, on-demand cloud architectures.

By Beth Schultz
“A lot of our work will be about building more connectivity so the data that’s in the cloud can be shared, clinical care coordinated, errors reduced, and—because public health will be involved—detection automated.”

John Halamka
CIO, Beth Israel Deaconess Medical Center
“The performance improvements plus reliability are bringing [customers] to talk to us about consolidating rather than us having to go to them.”

Michele Neri  
Deputy Director and CTO,  
Hill Air Force Base

“A consolidation effort that doesn’t standardize the process, systems, and tools used to support service delivery will have a difficult time reducing total cost of ownership.”

Douglas Babb  
Chief IT Systems Architect,  
Hill Air Force Base
“We can hardly keep up with the agency inquiries asking us to meet with technical folks about cloud capabilities.”

Douglas Bourgeois
Director, The National Business Center
In April, as news trickled out of Mexico about the rise of a potentially deadly influenza strain, the world went into a panic that has yet to subside. The H1N1 virus continues afflicting folks as flu seasons ebb and flow around the globe.

Top of mind for local authorities is how to contain the virus should an outbreak occur in their jurisdictions. Meanwhile, clinicians hope that technology advances will one day make such worries obsolete by enabling early, automated detection of outbreaks.

One such advancement is cloud computing, a new style of computing in which highly scalable, dynamic, and usually virtual pools of IT resources are available as needed by an application, on demand. This computing model—made possible by the advent of sophisticated automation, provisioning, and virtualization technologies—differs drastically from traditional methods that force strict ties between an application and the underlying servers and storage systems on which it runs.

CLOUDS THAT COME IN MANY SHAPES
Ultimately, cloud-based infrastructures will come in many different shapes and forms, from those built specifically for an enterprise’s own long-term use (private clouds) to those available to anybody who has Internet access and needs some compute or storage resources for as little as a few minutes at a time (public clouds).*

With the rise of cloud computing, John Halamka, a well-respected and widely known healthcare and IT professional, thinks clinicians’ hope of quick virus detection is warranted. “Imagine the day when H1N1 detection is automated because it’s passively discovered in the cloud,” he says.

What Halamka envisions is healthcare information from myriad sources living on such a highly interconnected and massively scalable set of shared compute and storage resources that specialized applications running on them can automatically detect potential health emergencies in their initial stages. But these are early days for cloud comput-

* For the National Institute of Standards and Technologies’ definitions of cloud computing and its different types, go to http://csrc.nist.gov/groups/SNS/cloud-computing/cloud-def-v15.doc.
ing, and much work must be done before such is possible. That is a common theme sounded by pioneering IT leaders at Beth Israel Deaconess Medical Center (BIDMC), the National Business Center (NBC), and Hill Air Force Base (AFB), who shared with ON their experiences planning, building, and managing next-generation, cloud-based infrastructures.

A CLOUD FOR BETTER HEALTH
In Boston, cloud computing is helping BIDMC address local insurance payers’ and federal electronic health record (EHR) mandates, says Halamka, who is CIO for the healthcare provider. Local payers expect the medical center’s 1,500 doctors, roughly one-third of whom have offsite offices, to function as a single, integrated clinical entity. The Obama administration wants 90 percent of all clinicians and 70 percent of hospitals off of paper by 2011—and has designated $44 billion in stimulus dollars as a bit of encouragement.

“Do you think that running, say, an Oracle database instance on a storage area network under your doctor’s desk is going to work very well?” Halamka asks rhetorically. “Probably not. Oracle administrators are a different breed than doctors. The only way we’re going to be able to achieve these goals is to provide a cloud of software functionality and storage that makes the electronic health record as easy as opening a browser.”

Although one day a medical center might be able to turn to large commercial providers for such a cloud, it doesn’t have that option today—and certainly did not two years ago when BIDMC began investigating the idea, Halamka says. “So we built our own cloud.”

As a first step, BIDMC selected integrated practice management and EHR software from eClinicalWorks. BIDMC could host the application at a central location and build out an infrastructure to support physician access via secure web connections. Physicians would not need to manage their own application and database servers—those database instances to which Halamka referred.

IF YOU BUILD IT, WILL THEY COME?
Trouble was, Halamka’s IT team had no idea how many of the 400 physicians who were affiliated with BIDMC but not residing on the campus would jump on board. “We didn’t want to spend $1 million building an infrastructure to support 400 physicians but only have 100 show up,” says Bill Gillis,
manager of clinical application services at BIDMC. BIDMC required an IT infrastructure that would make it possible to start small and easily scale as needed, and virtualization provided the answer, Gillis says. Using VMware’s server virtualization and EMC’s storage area network (SAN) technologies as a foundation, BIDMC built a software-as-a-service (SaaS) cloud. Physicians simply open their web-connected tablet PCs and launch eClinicalWorks. Behind the scenes—meaning in the cloud—their application requests flow over a dynamic, flexible architecture with virtual machines spinning up and down and tapping into storage as needed.

SAN scalability has proven particularly beneficial, Gillis says. “A year into the infrastructure build, the application vendor came out with a major change that required double the amount of memory and storage for certain aspects of the application. Had we gone with a cluster, upgrading the infrastructure would have cost us about another $300,000. But with our VMware licenses and EMC disk arrays, it only cost $30,000,” he recounts.

**STORAGE THAT SCALES**

Even with just a few physician practices tapping into the BIDMC cloud, storage growth is trending higher than anticipated. “We initially planned for six terabytes of storage total, but now we’re projecting eight terabytes, and we’ll probably end up needing more like 10 terabytes if everybody signs up,” Gillis says.

BIDMC is bringing the physicians into the cloud in a phased plan that aims to have everybody on board by Dec. 31, 2010. In the meantime, Halamka says, BIDMC is reaching out to extend connectivity from the cloud to other healthcare organizations.

“One of the things you’ll see coming out of the Obama administration is a real sense of urgency for sharing data—with patient consent, of course—doctor to doctor, doctor to public health agencies, to immunization agencies, to quality measurement organizations. So a lot of our work will be about building more connectivity so the
data that’s in the cloud can be shared, clinical care coordinated, errors reduced, and—because public health will be involved—detection automated,” he says.

CLOUDS OVER WASHINGTON, D.C.
Washington policymakers certainly recognize the cloud’s power in helping meet government objectives, and not just in healthcare. President Obama’s fiscal year 2010 budget calls out the technology’s potential for optimizing the federal data infrastructure and enabling a services orientation for any agency. Lower costs, of course, are the aim, with the federal IT budget for 2009 at a mind-boggling $74.2 billion, according to figures from 28 departments providing data for the new federal IT Dashboard. That presidential nod has federal agencies scrambling to figure out what cloud computing means for them. “The market would have gradually migrated over to accepting the cloud, but this is forcing that to happen more quickly,” says Doug Bourgeois, director of the NBC, a business management systems and services provider across the Department of the Interior, to all Cabinet-level agencies, and the Department of Defense. The NBC’s four biggest services lines are contract acquisitions, financial management, human resources, and IT, with a mission of better serving federal agencies through economies of scale.

“We can hardly keep up with the agency inquiries asking us to meet with technical folks about cloud capabilities,” Bourgeois says. Fortuitously, the NBC had its cloud strategy in place before the administration opened the floodgates.

BEING IN THE RIGHT PLACE AT THE RIGHT TIME
Several years ago, the organization had implemented a highly scalable services-oriented architecture that allowed the loose coupling of applications to a virtualized server infrastructure. When talk of cloud computing bubbled up, the NBC quickly realized that with a few more building blocks, it could transform itself from a typical host-
ing provider to a cloud-based infrastructure-as-a-service (IaaS) provider.

Cloud services, which are scheduled to be available this year, will transform the NBC’s hosting business model. The NBC and its clients will no longer need to hash out application requirements, speeds and feeds, and memory. And clients will not need to make large upfront investments and then wait weeks for delivery and deployment of hardware and software. Rather, when clients are comfortable with how cloud computing operates, they will simply head to the NBC’s cloud portal, work through a checklist of resources and capabilities, and the servers and storage needed for a particular application will be available as desired. Once clients no longer need access to that capacity, they return to the portal to spin down—and stop paying for—those resources.

Like BIDMC, the NBC is building out its cloud infrastructure on top of VMware virtual machines and tiered EMC storage. To support the cloud infrastructure, it currently has about 350 physical x86 servers, 300 Unix servers, and dual mainframes, Bourgeois says.

The NBC is offering private and hybrid cloud services for its federal agency customers. Besides the IaaS offering, called NBCGrid, plans include a metered, pay-per-gigabyte cloud storage service named NBCFiles. With the hybrid cloud service, clients will be able to tap into NBCGrid or NBCFiles to handle processing bursts. While the new model of cloud-based services is being carefully studied by the NBC’s customers, they’re keen on the idea of flexible, immediate, pay-as-you-go IT, Bourgeois says.

**TAKING OFF WITH CLOUD**

Agile, quick, on demand—those are indeed the hallmarks, and much-desired characteristics, of a cloud infrastructure, agrees Douglas Babb, chief IT systems architect at Hill Air Force Base (AFB) in Utah and contractor with Systems Implementers, Inc. Babb is overseeing a five-year, five-tiered plan, called Project Bonfire, that has seen Hill AFB migrate from a monolithic, proprietary, static, and costly mainframe environment to a state-of-the-art, open, dynamic, and cost-effective cloud architecture.

This internal cloud provides not only software and infrastructure as a service but also platform-as-a-service (PaaS), primarily intended for developers who need capacity but not much else, Babb
says. “All these are to provide very quickly a return on investment, a return on information, to the customers. We’re trying to reduce the time to value,” he adds.

As a first step, Hill AFB re-hosted all of its mainframe applications on a computing grid built on new x86 servers running the open-systems-based Red Hat Linux. Babb is careful to explain the difference between grid and cloud computing, which many often confuse.

“A cloud is far more than just a grid,” he says. “A cloud typically has a self-service or automation aspect to it. It’s scalable. In a cloud, applications are contained, and you have programmatic control and hardware abstraction with multiple applications inside the same grid. And you have some way of determining what an application is actually consuming. That’s where the real difference between cloud computing and grid—and the time to value—lies.”

ENSURING A METHODICAL MIGRATION

Hill AFB’s migration to the cloud has been purposefully methodical. The idea of cloud computing is great, Babb says, but “you can’t build a roof if you don’t have walls. You can’t build walls if you don’t have a foundation. So we had to build from the ground floor by consolidating data centers, applications, and servers from across the base.”

For Project Bonfire, then, Babb and his team initially focused on implementing the SANs and the server infrastructure for the move to cloud computing. “Then we went on to the Oracle environments, virtualization, cloud storage, and information lifecycle management, which combines all of those,” he explains.

“What’s really interesting is the new storage includes replication, versioning, compression, deduplication, and even spin down, all inside the cloud itself. The cloud will route information to the right tier and what’s closest to the customer and most cost-effective for that purpose—based on business policies or on how many copies are needed for business continuity and disaster recovery.

“All of this is inside the cloud, transparent to the application,” says Babb, noting that an equivalent scenario is taking place on the server side.

Hill AFB uses EMC storage across its four tiers, including the new Atmos cloud-optimized storage, Babb says. For server virtualization, it uses the latest VMware technology. Hill AFB currently hosts
390 applications running on 192 vSphere virtual machines, adds Babb, noting that the number of virtual servers in this infrastructure grew at one percent per day last year.

STANDARDIZE, STREAMLINE, SIMPLIFY
The overriding goal is to standardize, streamline, and simplify. “We didn’t want to take a lot of little messes and create one big mess,” Babb says. “A consolidation effort that doesn’t standardize the process, systems, and tools used to support service delivery will have a difficult time reducing total cost of ownership and improving quality of services.”

And Hill AFB customers have been pleased, notes Michele Neri, deputy director and CTO at the base. “They have seen a 300 to 400 percent improvement in response rates on some applications as they go through this process,” he says. “The performance improvements plus reliability are bringing them to talk to us about consolidating rather than us having to go to them.”

Cool technology or not, that’s really what Project Bonfire has been all about—improving the business experience, Babb says. “Bottom line, we needed quicker business results, reliable service, and efficient use of our resources.”

WHAT SETS THE CLOUD APART
The experiences of early adopters of cloud computing such as BIDMC, the NBC, and Hill AFB highlight the important differences between where IT has been and where it is going:

- A cloud is built differently from traditional IT environments—it uses flexible pools of resources, rather than fixed allocations.
- A cloud is operated differently from traditional IT environments—users are put in charge of IT resources using low- or zero-touch operational models.
- A cloud is consumed differently—usually, there’s a chargeback model that’s convenient for the end users, such as metered billing.

These early adopters also prove that the compelling benefits of cloud computing guarantee that it will become the dominant model of IT deployment in the future.

Beth Schultz is a freelance technology writer in Chicago. She can be reached at bschultz5824@gmail.com.
THE TROUBLE WITH PREDICTIONS

The

“Negroponte Flip”

20 Years Later
As a futurist, I have respected the fact that the future is not only not what it used to be, but that specific predictions as to dates and market size can certainly come back to bite you. Accordingly, I have often tried to use what I call the Pelton Laws of Prediction:

“Never make a five-year prediction—because new and unanticipated technology can and probably will ruin your prognosis.”

“Never make a 10-year prediction—because regulatory processes will slow innovations in ways that you had not anticipated.”

“Always make a 25- to 50-year prediction—because no one will be around to check up on your forecasts.”
In 1991, Nicholas Negroponte came forth with a widely read and often accepted concept that became known as the “Negroponte Flip.” This was a technologically rigid and deterministic forecast that suggested that the overwhelming majority of all of the “wired telephone” communications would essentially shift to “wireless” or cellular voice services to support mobile services. He further predicted that this would happen by the rather precise date of 2010. He also suggested that the great bulk of all of the “wireless broadcasts” of the day, namely television and radio, would shift to fiber optic and coaxial cable transmission to the home. The main technical premise of Negroponte’s forecast was that the rising volume of television and Internet services was simply too large to be sustained via wireless systems. In short, the “Negroponte Flip” prediction was premised on the idea that we would run out of available spectrum to support broadband wireless communications (Figure 1).

The problem with technology-driven predictions (as opposed to market-driven predictions) is that scientists, engineers, and/or regulators often come up with new solutions to problems such as spec-
THE TROUBLE WITH PREDICTIONS

In 1993, I wrote an article for *Telecommunications Magazine* while I was still director of the Interdisciplinary Telecommunications Program at the University of Colorado-Boulder. I wrote a dissenting prediction that suggested we would see a “Merge” rather than a tsunami-like “Flip.” I suggested that while a good deal of the predicted shift would take place, there would also be new broadband satellites, intensive frequency reuse terrestrial systems (such as CDMA or spread spectrum), and new allocations (or reallocations of spectrum). This would result in a “Merge.” This is to say that there would be a powerful combination of “wireless technology” (i.e., satellites, terrestrial wireless, and even high-altitude platform systems/UAVs), which would merge within an “invisible digital cloud” with fiber and coax joining with wireless systems to provide a seamless network of transmission and processing systems. This merger of wireless and wired systems would not only provide “fixed broadband communications” to the home and office, but also increasingly provide broadband services to support mobile users (Figure 2).

The Pelton Merge, first and foremost, noted that patterns...
The Trouble with Predictions

Any purported “expert” or futurist should be required to register their predictions.

would differ around the world. Countries with jungles, deserts, mountains, or numerous islands would, in particular, remain more dependent on wireless systems. It also predicted that the “road warriors” and today’s increasingly mobile Generations X and Y would demand not only voice service, but also increasingly on-the-move broadband video and data services. Today, there are more than 12,000 video channels being beamed via satellite around the world. There are also services like movies and TV shows provided on demand to mobile users via 3G and soon 4G “smart” cell phones. Although fiber today is key to services to the home and office, there are myriad broadband wireless networked services around the world as well. There is a torrent of broadband Internet services to Bluetooth and BlackBerry devices using unlicensed spectra plus a huge surge of broadband on iPhones, the Palm Pre, and other smart phones.

Today, DISH and DIRECTV satellite networks deliver more HD television channels via wireless systems than the cable multi-service providers. In the first two weeks of July 2009, Sirius and XM satellites downloaded more than one million large-scale on-demand programs.

The sophisticated Hughes Spacenet satellites are being used today by DIRECTV to provide local television channels across the U.S. The TerreStar satellite, the Inmarsat 4 BGAN services, Thuraya, New Iridium, and Globalstar space-based networks are supporting an amazing array of 3G wireless broadband mobile services in the U.S. and around the world in tandem with increasingly broadband and higher-powered wireless terrestrial mobile networks. Surveillance satellites and UAV platforms supporting security and defense-related optical sensing and radar applications will, in coming years, migrate from gigabits per second transmission speeds to terabits per
second. The “Merge” today seems quite real, even though my original predictions still have another decade to run.

The point of looking back at future predictions almost two decades later is to learn what makes forecasting difficult. In this case, new market forces (e.g., increasing demand for video and data services, new allocations of spectrum) and new technologies (e.g., broadband wireless, broadband satellites) combined to change the landscape of telecommunications in ways that were difficult, but not impossible, to foresee.

In my opinion, any purported “expert” or futurist should be required to register his or her predictions with an independent group with yearly reports on their success and failure. UC Berkeley’s Philip Tetlock,* who mapped more than 82,000 forecasts against real-world outcomes, found that the “Hedgehogs,” i.e., the photogenic and most articulate prognosticators, the ones with the one big, beautiful idea that they loved to stretch, were noticeably less accurate in their forecasts than the “Foxes.” These were the more obscure forecasters, less attractive and more stumbling in their media appearances, self-critical, eclectic thinkers who were doubtful of grand schemes, and modest about their predictive ability.

Here’s one more Pelton Law of Prediction: Modesty always wins in the long run. ■

---

A program that seems counterintuitive, even risky: inserting not-ready products into an active production IT environment of a multibillion-dollar corporation.
During the more than 20 years that I sold information technology, the top question prospective customers asked me when I went to them with a product idea or solution wasn’t, “Is the product ready?” It was, “Does your company’s own internal IT organization run it?”

Sometimes, I had to tell them “no.” But when my answer was “yes,” it made the value proposition credible and the discussion totally relevant.

As CIO, I no longer sell, and the people in my organization certainly avoid it, too. Yet, we are frequently pulled into the sales process. To help, we’ve been formalizing a program to use EMC products in-house, including placing products into our IT environment well before they are finished.

Using your own gear is a long-standing practice in the IT world, of course. Paul Maritz, now VMware CEO, coined the famous phrase “eating one’s own dog-food” back in 1988 at Microsoft. Still, at EMC, we are now formally instituting a program that seems counterintuitive, even risky: inserting not-ready products into an active production IT environment of a multibillion-dollar corporation.

We accept the risk with good reason. We want to help EMC build better products, and real-life use cases are important. Developers can observe how their product runs in a live data center. Our IT people, our customers, and our field organization can touch and feel the
product before it ships.

That ability tends to get people pretty passionate about what EMC is building. It gives a salesperson, for example, a better perspective on what a customer scenario might be before meeting with a CIO to say, “Hey, this new product of ours could solve the issues you’re having.”

I know the method works. Whenever we investigate bringing a significant non-EMC technology into our data center, my leadership team and I tend to talk to the CIO of the company selling that product. We ask for a use case to establish its value. We tell them, “As long as we don’t make the same mistakes you made, you’ve added value to our process.” And that’s what we’re hoping to do for our own customers.

INTRODUCING RISK, BUT SENSIBLY
EMC’s IT team was part of the development of EMC SourceOne Email Management for Microsoft Exchange—a product that was at least six months away from being ready when we got involved. The developers needed to test SourceOne in iterations, in a scalable environment, and we had 40,000 e-mail users. So we deliberately inserted into our mission-critical Exchange environment a product not fully baked.

By definition, we brought in risk. But our team did it sensibly, starting with small, isolated user groups. As the product became more stable, they went broader, without negatively affecting the business.

A product’s roadmap shouldn’t change because of us unless we find something really wrong, but, in fact, Rick Devenuti, chief operating officer for the EMC division that built SourceOne, told us, “We won’t ship until EMC IT tells us it’s ready.”

That was a bold, confident statement to make about the collective capabilities of a combined product-development and internal IT team that worked shoulder to shoulder, day and night—sometimes all night—rolling out builds to another 10,000 users and remaining until everything worked.

GIVING DEVELOPERS A FIRSTHAND LOOK
SourceOne shipped on time and is an exemplary product, I think, not only because of the rigorous in-house testing, but because of the information its developers absorbed in the process. Engineers who wanted a firsthand look at their product running in a data center merely swiped a badge, walked in, talked to our people, and studied the product as it operated. I can’t put a dollar value on how much
added quality resulted from EMC’s early adoption of SourceOne, but I know it is huge.

We’re not doing this for every EMC product, and not all early-adoption ventures are months-long events. For example, when we incorporate a pre-GA point solution, it may simply involve a team of four people working, albeit hard, for a couple of weeks.

But in every instance, the use case must apply to us. We are a big enterprise IT shop, so EMC’s consumer-focused storage and backup offerings don’t suit us. Large-scale virtualization, on the other hand, can bring obvious cost benefits to our environment. That’s why we are using, and are looking forward to using, just about every VMware virtualization product. Proofs of concept, lab tests, controlled user-environment tests—we’re doing it all.

Our goal is to have our x86-based environment 100 percent virtualized by early 2010. In parallel, we’ll serve up desktops in a virtual environment, dramatically changing our cost-of-ownership equation. We’re on the cusp of some big strides.

HELPING PRODUCTS “WALK BEFORE THEY RUN”
I don’t have a large organization to devote to testing products. We opt out sometimes. But if a development group is having trouble finding a ready-made install-base of customers, or if EMC needs very early input from (or for) its sales organization, or if the product is a game-changing, business transformational technology, we help if asked. We did it for Enterprise Flash drives; we’re an early adopter of RSA Security technologies, too.

Among RSA, Ionix, Documentum, VMware, EMC storage, and beyond, we already have plans to engage ourselves with many unreleased, pre-beta products that fit our use case. We want to help these products walk before they run.

THE VALUE OF TOUCHING CUSTOMERS
Having spoken to many CIOs of large enterprises, I’m fairly sure that our data center closely resembles what a lot of them are dealing with every day.

We showcase our in-house environment as an embodiment of how EMC, the information infrastructure vendor, wants to transform the larger landscape.
With our ambitious timetable for virtualizing our x86 IT infrastructure, we showcase our in-house environment as an embodiment of how EMC, the information infrastructure vendor, wants to transform the larger landscape.

It’s what my leadership team and I affectionately call “IT for IT,” and it is what we consider to be a central responsibility of the IT organization of an IT company. The bar is set high for us, to respectfully and humbly add value beyond, obviously, keeping EMC’s IT infrastructure running nicely.

We have a good day when we’ve touched a customer and shared something with them. I’m proud to say that every member of my leadership team touches one or two customers daily. It’s VP of Infrastructure to VP of Infrastructure. VP of Applications to VP of Applications.

They simply share what they do. Sales reps aren’t in the room. Again, I don’t make sales pitches anymore, and neither does my team. We are strictly about how we run IT and about helping other IT organizations be more efficient. We use EMC products because we have actual, valid use cases for having them in our shop, not because we “must” use them as EMC’s IT organization. (In fact, we pay for all of our products, including our storage platforms.)

**DRIVING THE CAR FOR 100,000 MILES**

Folding an unproven technology into a production environment is much like assembling and test-driving a car. It is another job entirely to drive that car for 100,000 miles and watch how it holds up, or to stress the car by switching to a different motor oil or gasoline. Doing the IT equivalent, we don’t just test products pre-GA; we continue to use them and collect long-term observations that might help EMC’s product groups.

The SourceOne product family went GA almost six months ago, but we’re still using our internal use case to give developers feedback regarding upgrade paths, migrations from legacy systems, the effects of adding something else to the Exchange environment, and so on.

The mission we’re on has three components. Our “test IT” component looks at a product before it’s generally available. Our “show IT” component shows partners, customers, and developers how the product runs in our data center and how it interoperates with other products. And our “run IT” component is where, over time, we harness intellectual property that may be of value to our customers and find ways (through our field organization) to bring that value to them.
Most good IT companies test and use their products internally when appropriate. We’re not boasting or selling. We’re saying to customers and our own product groups that if our use case might be insightful to them, then we’re happy to share.

The level of support we’re getting from senior executive leadership for this work really is gratifying. Everyone from the top down knows putting unfinished products into production involves risk, but we in IT are in no way swimming upstream on this effort.

Nothing is perfect, including us. But if a product is not good enough for our environment, it’s not good enough for our customers. That’s being “IT for IT.”

Sanjay Mirchandani is SVP and CIO at EMC, where he drives technological innovations to meet the current and future needs of the business. Recently, as SVP of the EMC Office of Globalization, Mirchandani was in charge of identifying global growth opportunities and building EMC’s processes and infrastructure required for global expansion. Prior to joining EMC, he held leadership positions at Microsoft.

CANDOR

JUST FOLKS TALKING ABOUT HOW THEY DO THEIR JOBS
EMC is one of the world’s largest Oracle business suite users. Recently, EMC hosted a two-day event in partnership with Oracle for close to 100 joint customers, all of whom deploy Oracle on EMC.

Together, we assembled an agenda of deeply technical break-out sessions centered on how EMC IT runs EMC’s ERP, CRM, and Data Warehouse infrastructures. We shared with the joint customers how we handle deduplication, how we do data management, how we ensure security, and how we do every Oracle business suite operation.

Our words didn’t come from Oracle’s mouth. They came from our mouths—from IT professionals sharing information about how they run mission-critical Oracle technology on an EMC information infrastructure. Our storage administrators talked about storage with Oracle; our security experts talked about security with Oracle; our virtualization people talked about virtualization with Oracle, and so on.

The event succeeded because an IT team simply shared. Afterward, we received some pretty positive comments from the attendees, including a message from a very senior person at one of the world’s largest companies, who told us it was the single best event he had ever attended in the IT industry.

And it was just folks talking about how they do their jobs.
The idea of a large-scale compute utility has been around for a long while. In 1963, as a young instructor and research assistant at MIT, I used one of the first versions of such a utility through DARPA’s Project MAC (Multiple Access Computer). At the time, the defense agency was supporting early work in artificial intelligence. A single large processor was available to multiple researchers through hard-wired, remote terminals. The terminals were actually teletype machines, the same devices that Western Union used to send telegrams. The setup was primitive, but it worked.

For the last 46 years, the information technology industry has been trying to update the MAC model and create a viable commercial compute utility. That utility has finally arrived in the form of the “public cloud”—a seemingly endless array of networked servers providing on-
SEEING THROUGH THE CLOUD

demand computing to multiple customers. What makes the cloud viable today is the low cost of compute power, the ubiquitous network provided by the Internet, the abundance of bandwidth, and recently developed sophisticated means for managing data. The technology world has been waiting nearly half a century for the convergence of these capabilities.

Some cloud service providers will simply offer this compute power as a raw, low-cost service, with unlimited scalability. Other providers will use the cloud as a platform to offer applications on a “software-as-a-service” basis.

Over time, public clouds will dramatically alter the information technology service business. For cloud customers, the benefits are significant: faster implementation of systems and processes at dramatically lower costs. By some estimates, the cost of cloud computing will be one-tenth that of traditional computing. And for customers, the capital costs of compute power will be converted to a variable expense. But the Nirvana that technologists see in the cloud masks the challenges it presents to customers who must change how they think and act toward computing. Here’s some advice for those eager to enter this brave new world.

Don't be afraid to enter the cloud.

Customers may be initially concerned about the security and reliability of public clouds. The term “cloud”—which refers to how the Internet is graphically portrayed—doesn’t help. No company wants to think of its valuable information evaporating into the mist. I would have preferred to use the term IBM coined to describe its last vision of a compute utility, “on-demand computing.”

But test the cloud initially with noncritical operations. Several large universities, for example, have already standardized on Gmail, which effectively runs on Google’s cloud. Some companies will want to test critical applications on private clouds—clouds that they manage and control directly. Healthcare providers are doing just that: adopting cloud architecture to address the challenge of providing secure access to health records by multiple clinicians.

Standard business processes will be embedded in cloud software services. But to use these capabilities, companies will have to overcome their inclination to think of their processes as unique.
**Be prepared to adopt standardized processes.**
Standard business processes will be embedded in cloud software services. But to use these capabilities, companies will have to overcome their inclination to think of their processes as unique. The truth is that most business processes from company to company are the same, or could be made to be the same without any competitive loss. The good news is that in many applications areas—like finance, supply chain management, and even customer relations management—companies are increasingly prepared to accept standard processes from service providers. Public clouds will take this development one step further and offer the opportunity to buy these processes based on usage. Over time, this will dramatically change the business model for applications services.

**Establish a strong governance process.**
Public clouds raise the risk of anarchy, a condition that arose in many companies when decentralized computing was first introduced 30 years ago. At that time, every department and function started to buy its own processor and applications software. Noncommunicating systems proliferated within companies. The central IT function lost control, and costs escalated. Public clouds will make it even easier for anyone inside a company to buy not only compute power, but applications. All kinds of compute services will proliferate from which to pick and choose.

Companies must adopt a governance model to manage the capabilities of public clouds and ensure the interoperability of cloud-based processes and systems. Standardization of processes inside a company has become increasingly important as companies work to become more operationally integrated and efficient—so this is not a time to risk anarchy.

**Act like a systems integrator.**
IT functions should now begin to operate more like a systems integrator than a factory. IT must take the cloud’s compute power, applications, and processes and put these together to work intelligently for the company. Cloud computing is, in fact, a “disruptive technology.” The challenge for companies is to make that disruption pay.

Jim Champy is the chairman of consulting for Perot Systems. His most recent book is **INSPIRE! Why Customers Come Back.**
THE INFORATI FILES
Ross Mayfield on the social nature of information, why he doesn’t have to read *The New York Times* every day, and his interest in knowing “the unknown unknowns.”

*By Tim Devaney and Tom Stein*

Ross Mayfield is a pioneer in the field of social software. He co-founded Socialtext, the first wiki company for the enterprise. Like Wikipedia, social software is “group editable,” Mayfield says. “It adapts to its environment rather than the environment being required to adapt to it.”
You seem to be saying information is different from other commodities, that it becomes more valuable as it becomes more widely available. Information gains value from decisions. A bit of information that may be utterly worthless for the top decision makers in a company could be discovered by somebody at the bottom of the company and inform a decision that saves the company.

People talk about the information economy as if we’re already there. Do you think we have room to grow?
The first part of the information economy was data commodities driving down the cost of storing, processing, and distributing information. The second part will be when information becomes more people-centric than machine-centric. The difference between information and knowledge is social. Some of the most valuable information available is a byproduct of people having conversations. This is a big jump for most companies, which try to treat information as an asset and are still stuck in frameworks of control.

But more and more, we’re moving from models where we treat information as an asset to treating it as conversations. When you make this shift, there are things you need to do organizationally or socially, like lowering the threshold for what is quality information. We’ve seen this as a trend with blogging. There’s no formal editorial process to publishing a blog; the editorial process happens in an open and emergent way. And the full story on a topic isn’t just one blog post, but the collection of blog posts that string together, through links, to form conversations.

Do organizations understand the value of groups?
Group-forming is not something that’s inherent in most organizational structures today. There is one easy group-forming tool broadly available: e-mail. I can form a group with my cc line. But there are all kinds of issues with e-mail, including the information overload you get with a push model of attention management. I have no control over what comes into my inbox. With blogs, wikis, and RSS, I choose what I want to pay attention to and pull it to me at the intervals I determine.
**THE INFORATI FILES**

**Is there a solution to information overload?**
I used to think information overload would be solved by tools and fancy algorithms. But you find a lot of the decisions that are baked into algorithms result in significant false positives. My primary method for coping with information overload is my social network. That’s my filter. I don’t have to read *The New York Times* every day because if something is really important, it’ll bubble up to my attention. When people are playing active roles in the network and passing on information, those interactions sift through and find stuff that’s of value.

**Do you have any information heroes?**
Joi Ito (CEO of Creative Commons) is a good role model, somebody who works across all kinds of new modalities, discovers new modalities earlier than other people, is constantly experimenting, and tries to live and work in what he calls P-time, which is very unscheduled, ad hoc.

**Will the ability to handle information impose a new sort of class structure?**
There is already a digital divide. There are people who are simply not connected, many who are connected, and some who are really connected. Part of how folks who are really connected cope is to think it’s okay to not deal with everything. You lower the formality of communication, the obligation to respond, and you recognize everybody is at a certain level of attention overload anyway.

**Is there information you’d really like to know right now?**
Remember that Donald Rumsfeld quote? “There are the known knowns. There are the known unknowns. And there are the unknown unknowns.” If there’s an unknown unknown that’s of value to me, sure, that’d be interesting.

For other Inforati profiles, go to [www.emc.com/inforati](http://www.emc.com/inforati).
Editor in Chief & Publisher
GIL PRESS
http://onlifeininformation.com

Editor
CHRISTINE KANE

Managing Editor
JENNIFER BEES

Design Director
RONN CAMPISI

Marketing Manager
RITA GILDEA-BRYANT
GildeaBryant_rita@emc.com

Contributing Writers
JIM CHAMPY
TIM DEVANEY
SARAH JENSEN
CHRISTINE KANE
MONYA KEANE
SANJAY MIRCHANDANI
JOSEPH PELTON
JASON M. RUBIN
BETH SCHULTZ
TOM STEIN

Copyright © 2009 EMC Corporation. All rights reserved. No part of this publication may be reproduced in any form, or by any means, without prior permission from EMC Corporation. EMC and EMC® are registered trademarks of EMC Corporation and its subsidiaries. All other trademarks mentioned in this publication are the property of their respective owners.

TO SUBSCRIBE: www.EMC.com/on

H6453