Electronic Health Records Come of Age
Perspectives on a Pervasive Downturn

Throughout this issue of ON, readers will hear the background noise of the global economic downturn like the steady drone of highway traffic heard through the trees. The effects of the recession are all around us, touching every industry, every government, and every individual in some way.

So, not surprisingly, the economy influenced the selection and writing of most articles in this issue.

A thought-provoking interview with Dan Ariely—a behavioral economist and best-selling author—provides insight into some of the forces that created the current crisis.

But understanding what we can do right now to emerge from the downturn in a stronger position than before is no less important. Here Sanjay Mirchandani, EMC’s CIO, offers practical guidance on how to use this period to focus and align better with the business; Glenn Mangurian writes about bouncing back from adversity; and a panel of leading information security executives provides advice on how to prioritize security investments when resources are scarce: both to address the heightened threats that occur during an economic slump and to help their organizations innovate their way out of difficulty.

One of the ironies of the downturn is that critical infrastructure initiatives that were not treated with urgency in a seemingly healthy market may now be put on a fast track, thanks to government-sponsored stimulus packages such as the one the U.S. passed in mid-February. The implementation of electronic health records (EHRs) is one such initiative. Our cover story documents the state of EHR deployment in the U.S., which might best be described as “patchwork.” In his regular column, Jim Champy reminds readers that the tremendous efficiencies EHR promises can only be fully achieved if processes are re-engineered and people are properly trained to take advantage of technology.

It is a cliché to say that crisis creates opportunity, but—like most clichés—there is a sizable grain of truth in this one. Organizations that make smart use of technology both to weather the downturn and prepare themselves for the next upturn will emerge stronger, wiser, and more successful.

Christine Kane
ONeditor@gmail.com
Individuals’ utilization of electronic Personal Health Records (PHRs) remains low

Only 2.7% of U.S. adults have an electronic PHR today, representing about 6.1 million persons.

Interest in a free online PHR system

**QUESTION:** Some Internet technology companies and healthcare organizations are inviting individuals to join free online electronic PHR services. You could obtain, store, and update your health information on a secure website. You could control which healthcare providers can see or update your PHR, and you could automatically receive valuable information from the Internet related to the medical and health conditions and interests you indicated in your PHR. How interested would you be in enrolling in such a free online PHR system?
Electronic Health Records: A CHECKUP

Percent of primary care physicians using Electronic Health Records (EHRs)

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<th>Canada</th>
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<td>Percent</td>
<td>23%</td>
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<td>79%</td>
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The United States lags behind other developed countries in the use of health information technology.

Reasons for lack of interest in Personal Health Records:

- Worried about privacy/confidentiality: 57%
- Don’t need it to handle my health needs satisfactorily: 46%
- Not that comfortable with computers/e-records: 28%
- Would take too much time to transfer data from paper: 15%
Most commonly used EHR functions in the U.S., 2008

- **Physician charting/documentation**: 75%
- **Physician order entry with clinical support for all orders**: 61%
- **Nursing order entry with full clinical decision support**: 54%
- **Nursing charting/documentation**: 74%
- **Nursing orders—meds and refills only**: 58%
- **Imaging connectivity for studies, results, PACS viewing**: 52%
- **Appointment/patient scheduling**: 66%
- **Reference lab connectivity for orders/results**: 55%
- **Online consultation**: 21%
- **Patient self-reporting and messaging**: 31%
Philharmoniana

Preserving “repertoire politics” at the St. Petersburg Philharmonic | By Dr. Ludmilla Leibman

Having been raised in St. Petersburg and becoming a professional musician there, I have entered the historic St. Petersburg Philharmonic Hall hundreds of times as a listener. Often I stayed after the concert with my conservatory classmates, waiting at the exit door used by the performers. Our hope was to catch a glimpse of a famous soloist or conductor and to offer a last round of applause as the performers left the Hall on their

THE READING ROOM at the St. Petersburg Philharmonic Library
Philharmoniana

way to the grand “Europe” hotel across the street.

In all those years, I never visited the St. Petersburg Philharmonic Library. But my first visit, last November, was a memorable one.

“I will show you our main treasure, ‘Philharmoniana,’” were the first words from Galina Leonidovna Retrovskaya, director of the library, after she ushered me through the heavy front door. Like a student who has forgotten her lessons, my heart dropped because I had no idea what the word “Philharmoniana” meant, and I was afraid to let her know that. Hardly allowing me time to take

AN EMC CLARIION AX4, supported by a grant from the EMC Heritage Trust Project, stores the digitized content of the Philharmoniana card catalogue.
Philharmoniana

off my coat, while nonetheless reminding me to change from my boots to clean, dry shoes, Galina Leonidovna led me into the reading room, which resembled a private study, with a grand piano in one corner and beautiful antique bookcases along each wall. These ornate redwood cases have held musical scores—rare editions of historic value—since the day the library was established in 1882. We stormed through this room into another which housed row upon row of open shelves, also filled with musical scores and folders containing printed concert programs.

An old-fashioned but highly effective information system
The director proceeded to a window overlooking Mikhailovskaya Street, stopped in front of a large card cata-

Philharmoniana

logue case, and, pointing to its numbered drawers, pronounced, “That’s what we call ‘Philharmoniana.’” As she then explained, the reference catalogue—consisting of 250,000 cards stored in 155 small drawers—captures detailed information on every concert performance at the Philharmonic Hall since the State Petrograd Philharmonic was established in June 1921. (Petrograd and Leningrad were other names of St. Petersburg.) After each concert, information from the printed program was carefully entered into the Philharmoniana catalogue including the composer, the orchestra performing, the conductor and soloists, the titles and performance time of each piece, and the name of the musicologist who gave the pre-concert lecture.

“One can find anything about

THE OPERA The score of “Acis et Galatee” composed by Jean Baptiste Lully, court composer for France’s Louis XIV, was among the first acquisitions of the Library. Above, the score is propped up by three other Lully scores, including “Armida” and “Persée.”
the Philharmonic concert life in these 155 drawers, all cross-referenced,” said Galina Leonidovna. Then, looking at me inquisitively, she asked, “Have you been in the Philharmonic before?” Flustered, I explained that I had earned a cum laude degree in musicology from the St. Petersburg Conservatory and had given pre-concert lectures in the city’s main venues, including the Philharmonic. “And what was your name back then, young lady?” was the next question. When I answered, Galina Leonidovna pulled out one of the small drawers, removed a card, and triumphantly announced, “Here you are, dear! On March 30th 1984, you did, indeed, lecture at the Leningrad Philharmonic!” I felt that I had passed an important authenticity test. I was also impressed by how quickly...
the director was able to retrieve this small piece of information, which was nearly a quarter of a century old and buried among a quarter of a million cards.

A brief history of a long-lived cultural treasure
The St. Petersburg Philharmonic and the Philharmonic Library were born in 1882, when the Court Musicians’ Choir—a wind-instrument orchestra—was established on the orders of Emperor Alexander the Third. A passionate music lover and an accomplished cornet and three-valve saxhorn player, Alexander created the group so he could continue to make music after becoming Emperor.

The first director of the Court Musicians’ Choir, Baron Carl Carolovich Shtackelberg, immediately began acquiring musical scores for use by the wind-instrument orchestra. But shortly afterwards, he added a string section to form a full symphony orchestra, and the library’s holdings were expanded to reflect that change. By 1917, which marked the final collapse of Imperial rule, the library had grown to almost 12,000 items—the largest collection of symphonic music in Russia—and included rare editions of old masters as well as contemporary composers. At present, the library holds more than 150,000 items, including original manuscripts of compositions by Stravinsky, Scriabin, and Prokofiev.

Writing in the margins
During my visit, I noticed a stark difference between the Philharmonic Library—whose purpose has always been to provide orchestra musicians...
with musical scores to prepare for upcoming performances—and the library at my alma mater, the St. Petersburg Conservatory, which is devoted to research and study. At the Conservatory, students were warned not to write on the musical scores they checked out for a week or two before an exam. In contrast, at the Philharmonic Library, musicians were encouraged to write down instructions given by the conductor during rehearsals to assist them in following the conductor’s interpretation during the actual performance. Some scores have written comments made by the conductors themselves, including for performances conducted by composers Johannes Strauss and Claude Debussy.

My visit to the library also made me realize how important it is to preserve the performance history of this prominent cultural institution. An initiative now under way will digitize information collected in the Philharmoniana and make it accessible via the Internet, opening enormous possibilities for research. For example, the concert information scrupulously entered into the catalogues will allow scholars to analyze the shifts in musical preferences, trends, and tendencies—known as “repertoire politics” in the world of classical concerts—from season to season and over the course of nearly a century.

**Timing is everything**
This unique knowledge base will also satisfy the curiosity of music lovers who seek to know who was conducting what and when, who were the famous foreign soloists invited to Russia, and what music was performed during the 900-day siege of Leningrad in World War II.

As I explained to Galina Leonidovna and her colleague, library bibliographer Nadezhda Alekseevna Stepanova, my personal interest is in the area of musical timing: how the duration of a performance of the same composition differs from one conductor to another. Once again demonstrating the value of Philharmoniana, Nadezhda Alekseevna opened drawer number 3, titled “Chronograph,” and pulled out cards from three different concerts spanning from 1938 to 1948. The music was the same—Glinka’s “Waltz-Phantasy”—but it took 8 minutes and 14 seconds (8:14) for the orchestra to perform under the baton of
conductor Grikurov, 7:22 under conductor Golovanov, and 9:17 under conductor Gauk. Same music, same orchestra, but the timing was different. Why? The explanation lies hidden in the mysteries of one’s personal and intuitive artistic approach to the written text.

The progress of preservation
The library’s preservation initiative is moving ahead, but faces financial obstacles. A CLARi-ION storage system, donated by EMC Corporation’s Heritage Trust Project, provides enough capacity to store the entire library collection. However, additional funding is needed to support the labor-intensive process of preparing and scanning individual pieces so they can be digitally stored. With funds provided by the St. Petersburg Cultural Committee, Galina Leonidovna Retrovskaya and her colleagues have chosen to digitize Philharmoniana first. To date, 17 of 155 drawers and 10,000 out of 250,000 catalogue cards have been entered into the system.

“We applied to the Ministry of Culture for a grant to complete digitizing of the Philharmoniana,” said Natalia Drozdetskaya, Chief of the Philharmonic Department of Special Projects, at the end of our interview. “Wish us luck!”

Dr. Leibman is the Executive Director of the Educational Bridge Project. http://educationalbridgeproject.org

MARKING TIME: The Library’s collection includes concert programs dating back more than 120 years, well before the Soviet era.
Dan Ariely is the James B. Duke Professor of Behavioral Economics at Duke University. He is also affiliated with MIT’s Media Lab. In his best-selling book, *Predictably Irrational*, Ariely argues that forces that are ignored by traditional economics, such as emotions and social norms, are important influencers of our economic behavior. Ariely describes in the book his numerous experiments, which highlight our natural tendency to vastly underestimate or completely ignore the influence of these forces.

**Can you give us an example of irrational economic behavior that can be predicted?**

I did an experiment in which I asked students to write the last two digits of their Social Security number at the top of a piece of paper. Then I

“Unless we understand that a big part of what is going on in the market has to do with the loss of trust, it’s not going to get better. The bailout alone is not enough.”
showed them a range of products, such as chocolates, books, wines, and computer accessories, and asked them if they would pay that amount for these things. So whether their number was 27 or 87, they had to decide whether any of these items were worth that amount. The students made their decisions and then we held an auction for the products. What we found is that those with higher numbers ended up bidding more for the items than those with lower numbers. Why did they do this? We found that if you consider a higher number like 87 for awhile, it sticks with you, and you end up being more willing to pay more money. What this tells us is that we don’t actually know how much things are worth. We use the context in our previous thoughts to try to determine value, rather than some more objective criteria.

**Is there a connection between this kind of behavior and our current economic troubles?**
What I think happened on Wall Street is that we gave people very bad incentive structures. They were paid a lot of money to see reality in a certain way—chiefly, a way that was more advantageous to them than to investors. Imagine I’m your stockbroker. You’re behind for the year in terms of how much money you’ve made. Your losses don’t interest me because I’m only getting paid when you make money. You’ve told me to maintain a certain risk approach, but I would prefer if you took more risk because unless you do, you’ll never make up your losses—and therefore I won’t make any money.

Or think about your doctor. You have some illness for which there is Treatment A and Treatment B. A is slightly better for you in terms of your health, but B is slightly better for them in terms of how much they can charge insurance providers. Are they really going to be able to see reality in a way that is good for you? I don’t think so. You would never imagine judges getting a cut of what sentences they give—I order you to pay a $50,000 fine, and I get to keep $5,000 of that for myself—yet this is the kind of ridiculous incentives system in which your stockbroker and your physician work.

**So what can be done about it?**
The tricky thing is that there is only one way to be rational, but many ways to be irrational. One thing that tends to suffer when things are irrational is the concept of trust. We played an experimental
trust game that I think has a lot to say about what is going on currently. The trust game works as follows. Player 1 gets $10, and Player 2 gets $10. Player 1 goes first and has two choices. He can either keep the $10 and go home, or give his $10 to Player 2. If Player 2 gets the money, she can either go home with the money she has, or give half the money back to Player 1.

There is one more trick here, which is that the money that Player 1 sends to Player 2 quadruples, so Player 1 will send $10, and by the time it gets to Player 2, it is $40. Now Player 2 has $50, the original $10 and the $40 from Player 1, and can decide to split it $25/$25, or go home with $50. The rational perspective says that Player 2 will never give money back to Player 1 and as a consequence, the prediction is that Player 1 will never send the money in the first place because Player 2 is not expected to send anything back.

As it turns out, people are too nice, too trusting, and too reciprocating relative to rational economic theory. Based on our observations, there is in fact a good chance that Player 1 will give the money to Player 2 and that Player 2 will reciprocate and split the money with Player 1. What is even more interesting are those times when Player 2 decides to walk away with the $50. Then we say to Player 1, “Look, you just lost $10, but for every dollar you give me, I will take $2 away from Player 2. If you give me $3, I’ll take $6. If you give me $11, I’ll take $22, etc.” Again, rationally why would somebody who just lost money want to lose even more money just to punish somebody else? The reality is that people often do. They spend the money to express revenge, even though revenge is irrational in the sense that it’s not something a rational person should do.

Now let’s go back to Wall Street. I think in many ways this trust game is the kind of game we as investors and people with 401(k) accounts and mortgages have played with Wall Street. We gave them our retirement funds. We gave them our mortgages, and they walked away with our $50. As a consequence, we feel betrayed, and I think...
that unless we understand that a big part of what is going on in the market has to do with the loss of trust, it’s not going to get better. The bailout alone is not enough; people need a reason to trust again, and that could be done with new regulations, policies that create more transparency and remove conflicts of interest, and maybe some real consequences for the people who betrayed our trust.

How do you anticipate that the economic crisis will affect our behavior in the long term? Will our buying, selling, and saving behaviors become more or less predictable or irrational? Will we forget all about this pain in time and go back to our usual patterns?

We are largely creatures of habit. We assume that what we’ve done before is sensible and we keep on doing it. The times when we attempt to revise those decision strategies are times of incredible pain and frustration, like now. But whatever new habits we come up with right now, we’ll probably stay with them for a while.

Are these going to be good habits or bad habits? It’s hard to know. I’ve seen people who are deciding to save more, saying, “What we’ve done before is not viable. We don’t want to have such a big mortgage. We don’t want to carry such big credit card debt.” But I’ve also seen the opposite. I got a letter from someone who said, “I’ve been saving for years. I’ve deprived myself. I didn’t buy myself a new bike, I didn’t buy a new car, and I managed to save $40,000. Now half of it is gone. If I hadn’t saved anything, at least I would have had the things I wanted.” That sentiment may not work for everyone, but it’s true that the economy won’t improve until people start spending more.

So I think it’s a very crucial time to see what happens, to see if people are going to change as a reaction to this meltdown.

“Why would somebody who just lost money want to lose even more money just to punish somebody else? The reality is that people often do.”

Professor Ariely blogs at www.predictablyirrational.com.
In the current economic climate, enterprises are taking a hard look at their spending, including investments in information security. As budgets tighten, many security programs will be expected to achieve more with less.

But even in the best of times, every security team should be continuously striving to run a tight ship. Enabling business innovation requires building the business case for security expenditures, using resources wisely, and

“**A key job of a CISO is security capability management: getting the right person in the right job.**”

**Dr. Paul Dorey, CSO Confidential**
achieving efficiencies so you have more to invest in strategic endeavors. The following recommendations are based on a recent report from the Security for Business Innovation Council, a roundtable of leading information security executives that is sponsored by RSA, The Security Division of EMC.

WEIGH RISKS, REWARDS

The demands on security programs are not letting up. In an environment where budgetary and staffing pressures are coupled with heightened regulatory requirements and threats, knowing how to prioritize is key. By focusing on both the potential risk and reward, security teams can align resources to business needs. Making good risk/reward decisions takes an understanding of business objectives and the ability to quantify risks and rewards. Says Andreas Wuchner, Head of IT Risk Management, Security, and Compliance at Novartis, “If you have a good risk overview and know which business processes are critical, which roles, data assets, or systems are important, then you can say, for example, ‘Okay, I have my top 10 priority business processes, and these are the IT systems supporting them.’ And if you have this full picture, when you are under budget pressures, you can prioritize the list of projects to reduce the risks to the business.”

MATCH THE RIGHT PERSON TO THE RIGHT JOB

“A key job of a Chief Information Security Officer (CISO) is security capability management: getting the right person in the right job,” says Dr. Paul Dorey, Director, CSO Confidential, and former Vice President of Digital Security and Chief Information Security Officer at BP. “A mature program balances self-assessment and self-help, support from full-time security specialists and contractors, and also uses third-party consultants. And a CISO needs to do that in a proportion appropriate to the workload and fixed plus variable cost requirements. The reason that you use the security specialists, in my view, is to focus on those assignments with the greatest risk and also the greatest innovation.”

A company that augments its internal team with contractors and/or consultants should not assign those individuals to major new projects. The inside team is probably a better choice, as they have enough knowledge about the business to make well-informed decisions and will be less likely to make costly mistakes or slow things down. Also
remember that consultants who work on a new project will take any project or business knowledge with them when they leave, resulting in a costly loss for your team.

A potentially cost-effective way of resourcing security is to distribute and decentralize security capabilities. Make sure that key personnel (such as network administrators, application developers, and system architects) are trained in security. Then find others in the organization who, although not full-time security practitioners, have an aptitude and an interest in security. You may be able to work with HR to provide them with incentives, such as recognition or bonuses. Some tasks may even be managed by line-of-business personnel, supported by the right tools, training, and standards.

BUILD IN REPEATABILITY
By driving efforts to rationalize processes and tool sets, the security team can help the enterprise become much more productive. There are areas that are considered “low-hanging fruit” for easily gaining efficiencies, such as identity and access management. Does every division really need, for example, a different ID Admin Request mechanism or a different Privilege Access Management System?

Another key strategy is to leverage resources that are already available in the enterprise, such as security information and event management or change management systems. Often tools like these are acquired as a point solution, but their use can be extended more broadly and provide value beyond the original purpose. Says Roland Cloutier, Vice President and Chief Security Officer at EMC, “You need to take a productivity angle to information security, rather than a pure controls angle. Then the trick is to take what you save and throw it into further investments to help you get even more efficient in other places. A key point is, don’t reinvent the wheel. There are incredible opportunities throughout a company to leverage assets from other groups to reduce the cost of ensuring
the protection of information. That may be from IT, Audit, or the Finance group. Spend the time looking at what’s already been done rather than just going and doing it again. Then trust and use the information from your internal partners.”

**CREATE AN OPTIMAL SHARED-COST STRATEGY**

Costs for security are often shared between the centralized enterprise security organization and the business units and departments that need to protect their information assets. The cost-sharing formula varies from one enterprise to the next, but the objective is to make sure that spending aligns with objectives and needs, and that there is accountability and transparency. It is important to have a standardized method—both for determining risk and budgeting for the necessary controls—that works within your organization’s cost-accounting structure and collaboration model.

In the experience of Dr. Claudia Natanson, Chief Information Security Officer at Diageo, “The groundwork is getting people to come to the table to agree on a common problem and how each area would benefit from a common solution. And that is often very challenging, but it’s worth the time up-front.” Continues Natanson, “Before you even tackle the problem, have a cross-functional forum where you get together your main stakeholders and get buy-in, so that going forward you have a common understanding and an agreement about how to leverage things like economies of scale, which clearly is going to help you in discussions about pricing and resourcing.”

Security can enable everything from advanced supply chains to collaborative workspaces, through expertly managing the risks to information. So even against the backdrop of an economic downturn, security organizations need to drive fast and forward in making security more strategic to business innovation. Central to this mission will be the ability to identify the right priorities and make every investment count. Otherwise, the wrong projects will be funded while business-critical efforts languish. Top security professionals recommend a laser-like focus on the risk-reward equation in order to build the most efficient and cost-effective security programs possible.

*For the full report and for more information on the Security for Business Innovation Council, go to [www.rsa.com/innovation](http://www.rsa.com/innovation).*
Imagine that wherever you are across the United States, your complete health records are instantly available to any healthcare provider you authorize to see them. Your hospitalizations, radiology images, surgeries, lab results, allergies, medications, even your advanced directives are stored electronically and available via a secure nationwide network.
Your own doctor’s office no longer has row upon row of patient records lined up on shelves; they’ve all been digitized. In every examining room, doctors enter their notes and view radiology images on laptops or PCs. If you need a prescription or a lab test, the doctor orders it online. When you’re at home and have a question for your doctor, you e-mail her.

A nirvana of better care at lower cost? Or a security nightmare? It depends whom you ask. But with the cost of healthcare in the United States now at about $2.5 trillion a year, the pressure for a nationwide system of electronic health records (EHRs) is building. Because properly used computerized records can be a powerful tool to measure, track, and improve patient care, advocates say they could not only reduce the cost of care, but also improve its quality.

**PROGRESS VARIES FROM COUNTRY TO COUNTRY**

In Europe and elsewhere, health record digitization is well underway. Canada, England, France, South Africa, Australia, Hong Kong, and Taiwan all either have nationwide EHR systems or are developing them. In Scandinavia, more than 90% of primary care practices have EHRs.

“For many of our patients, the ER is their doctor. ... So that is where we now have laptops and workstations on wheels. ... It’s much easier for the physicians to treat patients with chronic illnesses like diabetes when they have their records at their fingertips.”

**MICHAEL DAY**
IT DIRECTOR, DAUGHTERS OF CHARITY HEALTH SYSTEM
In the U.S., the Veterans Administration has had electronic records for years. All of its 155 hospitals and 800 clinics—one of the largest integrated healthcare delivery systems in the world—use an EHR system called Vista. Individuals can opt to create their own available-from-anywhere electronic medical records using such online services as Indivo, Google’s Health system, or Microsoft’s Healthvault. EMC and some other companies offer employees the option of setting up private health records as an employee benefit. [See sidebar on p. 16.]

But not only is there no nationwide EHR system in the United States, fewer than 10% of America’s 5,000 hospitals and 17% of its 800,000 doctors have digitized their own patients’ records.

Within the last few years, large urban medical centers in the U.S. have begun to set up EHRs. Cancer Treatment Centers of America, Daughters of Charity Health System, Kaiser Permanente, Palo Alto Medical Foundation in California, and Beth Israel Deaconess Medical Center in Boston are examples. But these systems can’t communicate with one another.

“We can achieve substantial improvement in care quality and coordination by implementing the systems available now and not waiting until we have the perfect system.”

JOHN HALAMKA
CIO, CAREGROUP
ALIGNING INCENTIVES WITH NEEDS
John Halamka, CIO of Boston’s CareGroup and himself a physician, believes the major impediment to implementing EHR in the U.S. is that “incentives are not aligned with needs. EHR benefits medicine at large, but not necessarily the individual physician. Medicare and private payers will have to provide doctors with incentives for them to invest in it.”

Under the Bush Administration, former U.S. Health and Human Services Secretary Michael Leavitt proposed a “Medicare demonstration system” to reward physicians adopting electronic records in the small- to medium-sized practices where Americans receive most of their care.

President Obama is going much further, making healthcare information technology a major component of his economic stimulus package. He has proposed that within five years all medical records in the U.S. be electronic and that health information be shared across a nationwide network.

What would it take for that to happen? And what could be the benefits?

THE COST/BENEFIT EQUATION
Ignoring politics and looking solely at cost, estimates are that setting up a nationwide EHR system could cost $100 billion or more over the 10 years it would take hospitals to effect the conversion. Much of that amount would be needed to train and pay technicians to create the network, and right now there is an acute shortage of such talent.

Once those problems were solved, however, the payoff could be great. The RAND Corp. has estimated that once widely adopted, EHRs could save $81 billion each year,
largely by reducing the number of redundant tests, procedures, and treatment errors. Dr. David Brailer, who was President Bush’s health information czar from 2004 to 2006, has estimated that a fully computerized health record system could save the healthcare industry $200 to $300 billion a year.

Furthermore, say advocates, when the costs of healthcare are reduced, healthcare insurance premiums could be stabilized or even lowered.

In the meanwhile, the story of EHR adoption at two large American hospital systems illustrates what is involved when individual systems make the conversion.

**WHEN THE ER IS A HOSPITAL’S FRONT DOOR**

California-based Daughters of Charity Health System comprises six hospitals and medical centers from San Francisco to Los Angeles. It has 1,400 beds and 7,500 associates, not including doctors, and primarily serves the poor.

Says IT Director Michael Day, “We began putting clinical data online five years ago, starting with our emergency rooms. For many of our patients, the ER is their doctor, so in effect, our ERs are our front doors. So that’s where we now have laptops

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**Safeguarding Patient Privacy**

*How private are your medical records? If they’re on paper, the answer is, not very.*

Paper and film records are available to everyone from office clerks, to porters wheeling wheelchairs, to technicians, to nurses and doctors. They’re lost, squirreled away, fraudulently requested, stolen, misfiled, left open on desks, dropped between pieces of furniture or the seats of vans, and damaged by fire, flood, and time. In the aftermath of Hurricane Katrina, nearly a million peoples’ records were lost. Further, records on paper and other media take up huge amounts of space, and the long-term storage required by law presents enormous difficulties.

Electronic medical records, by contrast, are typically more accurate and have strict security measures in place to prevent misuse and unauthorized access. Securing the privacy of digitized medical records on a nationwide scale, say experts, would indeed be a technical challenge—but not an insoluble one.

An additional benefit of a nationwide system of digitized medical records: It could facilitate clinical drug trials by making it easier to find potential participants, which in turn would make it faster and less expensive to bring new drugs to market.
and workstations on wheels, affectionately called WOWs. Some of them have touch screens or voice recognition systems for physicians who don’t type. It’s much easier for doctors to treat patients with chronic illnesses like diabetes when they have their records at their fingertips.”

Although the hospital system’s conversion to EHR is still in progress, core clinical and surgical applications have been completed, so that radiology images and lab results are now available to clinicians virtually instantly. Day says the benefits of the system were obvious immediately, and that other hospitals frequently visit to observe it at work.

Cancer Treatment Centers of America, which focuses on patients with advanced and complex cancer, is based in Schaumburg, Illinois, and encompasses hospitals and oncology programs in Arizona, Illinois, Oklahoma, Pennsylvania, and Washington. Drawn by the CTCA unique treatment approach, patients travel an average of 500 miles to visit CTCA hospitals, which combine leading-edge traditional treatments with an array of complementary therapies, including stress management, nutritional counseling, and spiritual support.

Explains CIO Chad A. Eckes, “We address the way in which cancer attacks the body, integrating the best traditional treatments available with therapies to strengthen the immune system and alleviate the stress and side effects of the disease. Our goal is to treat the whole patient.”

**SETTING UP AN EHR WAR ROOM**

CTCA began considering EHR in 2005, says Eckes, because in treating advanced cancer, speed is critical.

“This was not an IT project,” says Eckes, “it was a
clinical project. We actually set up a war room, and we had a team of 60 operations and IT people at each site. I talked to the chief medical officer five to 10 times a day during the 18 months we were implementing the system. We involved everyone from nurses and pharmacists to doctors and administrators."

The system went into effect not in stages, but in what Eckes calls “one Big Bang on March 28, 2008.” It went live with 128 interfaces in operation. Eckes says CTCA saw benefits immediately:

“This was not an IT project. It was a clinical project. ... I talked to the chief medical officer 5 to 10 times a day during the 18 months we were implementing the system. We involved everyone from nurses and pharmacists to doctors and administrators.”

CHAD ECKES
CIO, CANCER TREATMENT CENTERS OF AMERICA
“Everything was faster, accuracy improved, and everything was at clinicians’ fingertips. Our doctors could hardly believe what an improvement it made in their ability to treat patients quickly and effectively.”

THE CHALLENGE OF DIGITIZING PHYSICIAN RECORDS
Converting individual doctors’ records to electronic form presents different problems, because doctors must make a large up-front investment and learn to use new software.

In Massachusetts, Beth Israel Deaconess Medical Center, which is part of CareGroup, has established a cloud computing center in Marlborough, hosting EHRs for Massachusetts community doctors using a software-as-a-service model. Instead of paying the $40,000 to $46,000 it would cost to set up an EHR system of their own, physicians’ groups pay $15,000 to buy into the cloud center service plus $300 per month per doctor.

Called the Beth Israel Deaconess Medical Center/Beth Israel Deaconess Physicians Organization EHR Hosting Center, its goal is to add six new medical practices per month throughout

EMC Leads in Private Health Records
As the first employer in Massachusetts to provide employees with an electronic Personal Health Record (PHR), EMC Corporation was awarded in 2007 a Massachusetts Technology Leadership Award from the Massachusetts Technology Leadership Council. Since 2002, EMC has provided employees with an online tool that allows them to store and maintain health information in a centralized, secure location. EMC does not have access to individual information. Employees and their dependents can access their medical information at any time and do not have to rely on their medical professionals to provide their health information. This is particularly helpful if a person has a medical emergency over the weekend or after hours when traditional medical offices are closed. EMC’s PHR is automatically populated with utilization information, but it also allows for manual entry by the employee. For 2009, EMC’s next-generation PHR will incorporate even more useful information, including lab results, health alerts and reminders, portability, biometrics, and remote patient monitoring as well as provider access. It is also EMC’s vision to have providers incorporate their physician notes within the employee’s PHR.
2009 and 2010. So far, four practices have fully implemented the service.

But John Halamka wants to go much further. In a January 2009 blog post [www.geekdoctor.blogspot.com], he wrote, “Let’s not wait until we have perfect systems [to roll out EHR].

“We can achieve substantial improvement in care quality and coordination by implementing the systems available now and not waiting until we have the perfect system. ... With some state and local variations, we already have a nationwide framework for EHR and public health record exchange.”

Noting that it will take a combination of technological advances, new policies, and new funding to accelerate such a big change in healthcare IT, Halamka believes the current burst of activity shows that “EHR is on the radar screen of just about every state, and the pace of change is enabling interoperability.”

PUTTING STANDARDS IN PLACE
Will the United States eventually evolve a nationwide standardized EHR system? If so, it will happen in stages.

The recently passed economic stimulus package includes $17.2 billion for “incentives to Medicaid and Medicare providers to adopt health information technology” and $2 billion to “provide additional financing for the Office of the National Coordinator for Health Information Technology.” The package also expands HIPAA privacy standards to address concerns about patient confidentiality.

Shannon Kellogg, a Director in EMC’s Office of Government Relations, says, “The health IT provisions in the new law are intended to increase adoption of electronic health records by doctors and hospitals significantly over the next several years—and the funding in the American Recovery and Reinvestment Act is a major down payment on that objective.”

“We’ve wasted a lot of time waiting for government to solve this issue,” says Chad Eckes of Cancer Treatment Centers of America.

“I think industry will have to solve the interoperability problems. But it will take some big event to make patients push the providers for [a nationwide electronic health records system]. I don’t know what that might be. In the meanwhile, though, I think President Obama is getting the right brain trust together to tackle the problem.”
What’s better than “whack-a-mole” cost cutting? A nice dose of agility and alignment.

By Sanjay Mirchandani
I was your classic business guy 120 days ago. Nothing made me happier than uncovering a new growth opportunity, cultivating an international strategic partnership, or watching over EMC’s technology delivery centers in India, China, Russia, and Israel.

Now I’m a CIO overseeing an IT organization during a worldwide economic slump.

I actually received condolence notes when I took this job. Those notes made me laugh because, although it sounds counter-intuitive, I think this is the best time to be a CIO.

In down times, life comes into sharp focus. The objectives of the business become clear. I am, at the moment, very close to the business of EMC. Read any study on CIO priorities, and you’ll see

**SANJAY MIRCHANDANI:**
“Instead of one-sided cutting, I’m spending to save. For example, to reduce energy costs and raise the productivity of hardware, I’m investing actively in virtualization.”
advice to “align with the business.” I could not possibly be more aligned right now. If I’m not driving revenue and efficiency, then I’m not doing this job satisfactorily.

Over the years as business unit leader—that is, as a customer and a seller of information technology—I interacted with CIOs across the globe. I used to notice that in bad times, the tendency was to cut IT costs unilaterally either as a top-down adjustment or to plan for the worst. I always likened that approach to the carnival game “whack-a-mole.” You slam one cost into a hole; it pops up elsewhere.

Instead of one-sided cutting, I’m spending to save. For example, to reduce energy costs and raise the productivity of hardware, I’m investing actively in virtualization.

Prioritizing IT investments like this boils down to balancing supply and demand. As a business, we’re in this together, which is why, early on, I asked EMC’s business division heads to help me ramp up the right things. From those meetings, I created a spending criteria list.

My spending centers on aligning with the business. It’s a simple litmus test. My team and I ask: Would this IT investment get EMC closer to its

**FIVE DIRECTIONS FOR IT**

These days at EMC, initiatives receive IT spending priority if they:

1. **INCREASE REVENUE AND MARKET SHARE AND IMPROVE THE TOTAL CUSTOMER EXPERIENCE**—for example, really raising the bar on tools for our sales/field organization, such as world-class CRM tools.

2. **ARE ARCHITECTURES FOR THE FUTURE**—for example, deduplication technologies such as EMC Avamar software; flash-based storage; cloud infrastructure; or projects focused on application rationalization, globalization, or scalability.

3. **IMPROVE THE SPEED TO MARKET**—for example, business intelligence tools, iterative approaches to deliverables and solutions, and tools that expedite business/IT investment decisions.

4. **DELIVER MEASURABLE VALUE TO THE BUSINESS**—for example, virtualization.

5. **INCREASE EMPLOYEE PRODUCTIVITY**—for example, rollouts of internal instant messaging to facilitate fast and efficient communication, or investments in videoconferencing.
external customers from a revenue, time-to-market, or service point of view? Would it (as with virtualization) make EMC more efficient? Would it reduce freight costs, improve vendor management, support globalization? Would it make salespeople on the road more productive? Would it support an entry into a new market?

These clearly include core infrastructure investments. You always keep those going, making sure that demand and supply for infrastructure is in balance with business requirements. For all new spending, I apply that litmus test. Projects that increase efficiency, productivity, and customer service are gold. Everything else must work hard to get funding.

In a different time, I might have spent four or five months working with my leadership team to create a perfect strategy for IT. Not now. I’m reluctant to take on big, multi-year projects because frankly, this is not the right environment. Agility is the watchword now. If EMC’s priorities shift tomorrow, we must be ready to help and adjust immediately.

There are no shades of grey. Some projects are non-discretionary; others are things that would be okay for strong economic times, but not okay now. When the world emerges from where it is today, I suspect very little tolerance for inefficiency will exist. Organizations will want productivity and profit to grow fast. If my IT organization isn’t ready to bounce back like a spring, I’ve failed as a CIO.

**TALK TO YOUR CUSTOMERS, INSIDE AND OUT**

EMC is a $15 billion company with a world-class IT shop. Daily, my team and I describe to EMC’s external customers how we run our data centers, how we govern IT globally, how we integrate technologies, how we structure our division. These are candid conversations. I want to have more of them, with more customers.

So I’m putting a program into place called “being EMC’s first and best customer.” We’re capturing our in-house IT best practices, taking them to

“For all new spending, I apply that litmus test. Projects that increase efficiency, productivity, and customer service are gold. Everything else must work hard to get funding.”
EMC’s field organization, and, ultimately, to EMC’s customers. We’ve done this for years, but now is a great time to really formalize the program. We have so many good processes; we know how to get the most from EMC technology. And we want to get closer to customers during this downturn.

Opening our kimono of best practices to EMC’s customers also forces those of us in IT to take a hard look at how we need to be organized and how we should go to market with our internal customers. Could we be more agile? What are the three or four things that we could get really better at?

Such introspection is both top-down and bottom-up. My organization built (in six weeks) and now hosts an active social networking community at EMC that captures ideas from EMC employees across the globe about, for example, how we can be more efficient as a company and what we in IT could do better.

We are running with those ideas in real time. For instance, we recently announced a modified U.S. wireless-phone policy. Immediately, people started posting ideas on the forum about how to tweak it. We were able to issue an improved policy revision in two days. A few years ago, this might have required weeks or even months.

I realize I’m not unique as a CIO in what I’m trying to do. No CIO right now has the luxury to sit back and say, “It’s going to get worse economically, so I’d better not do anything because I don’t know when the bottom will hit.” The fact is, there could be a spring effect, an economic bounce-back. If you’re in IT lock-down mode, you’ll miss it. Then you have a bigger problem on your hands.

Look inward, and look forward. Invest in your architecture, get close to your customers, focus on speed, be ruthless about efficiency in the business. Those are the fundamentals that will hold you in good stead. And they may just help you help your company emerge from this downturn in a position of strength.

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 was Microsoft’s Regional VP, Enterprise Services, Asia.
Adversity happens. It happened to me, and some form of adversity will happen to you. Do you have the strength and will to bounce back? 

BY GLENN E. MANGURIAN

IN SEARCH OF RESILIENT LEADERS
On May 26, 2001, I suffered an unprovoked disk rupture that pressed against my spinal cord, leaving the lower half of my body permanently paralyzed. At the prime of my life as a successful business executive and father, it was the last thing I ever expected. Since then, I’ve come to realize it’s very likely that we will each experience some form of adversity: a career crisis, financial disaster, devastating relationship breakup, or frightening diagnosis.

In business, we are trained to examine various scenarios and prepare responses in advance, but life-altering experiences like these are not something we can anticipate. Who has a contingency plan for living life from a wheelchair?

For me, becoming paralyzed is, without question, the worst thing that has ever happened. At the same time, the experience has allowed me to come back, not just changed but stronger. I’ve learned that our innate ability to survive and adapt is greater than we imagine.

Resilience is one of the key qualities desired in business leaders today, but many people confuse it with toughness. Toughness is an aspect of resilience, but it is not the same thing. Toughness enables people to separate emotion from the negative consequences of difficult choices. In most situations, we expect leaders to be tough. It can be an advantage in business, but only to a point. Toughness is like an armor that deflects emotion. I’ve discovered some of the toughest people are the most vulnerable without their armor. Resilience, by contrast, is not about deflecting challenges but about absorbing them and rebounding stronger than before.

If toughness is not enough, what are the other characteristics of resilient leaders?

I have discovered five character traits that help define resilient leaders:

- **Courage** to venture where you have never been and to admit that you don’t know it all.
- **Ingenuity** to find a way to succeed in spite of overwhelming obstacles.
- **Compassion** for the frailties of others.
- **Authenticity** to build lasting relationships.
- **Faith** in the human spirit to prevail against the odds.

These are not skills we acquire by taking a course, but rather elements of our character that are developed through perseverance, over the course of a lifetime.

After my injury, I spent two months in the hospital learning how to live my “new normal” life. I had many hours to reflect on my past life and envision...
a new and different future. I had questions about my identity. I came to realize that I was no longer the person I had been and not yet the one I was becoming. I am a work in process. Being self-aware is an important part of bouncing back from adversity. We are defined by the choices we make, not by the adversity or the failures we experience.

Somehow I found the will to accept that my old life was gone and decided that I would create a new and equally meaningful one, drawing on all my experiences and a caring community of family and friends. I resumed my work as a consultant and now combine my personal experiences and business background to advise leaders who are facing adversity. I’ve contributed my time and expertise to causes I value, such as the Christopher Reeve Paralysis Foundation, which supports research on paralysis caused by spinal cord injury. And I’m executive-in-residence at my alma mater, the University of Massachusetts. In my new life, I am able to use all my assets, including my paralysis, to be a new kind of leader.

Adversity has a way of cutting through the clutter and fog of everyday life. Although many things are important, few things really matter. Resilient leaders know how to distinguish what really matters.

Some people emerge from adversity with a larger view of what is possible. I asked, “If I can survive this, what else can I do?” I’ve learned to challenge many of the assumptions I have held about what I was able to do or achieve. While these assumptions may have been appropriate at one point in my life, they had been unexamined for years. A personal crisis forces you to confront many past assumptions about yourself and your life. In doing so, many past constraints will fall away as no longer appropriate.

Resilient leaders know how to reset their ambitions to new levels after adversity. Oftentimes, it takes an ambition beyond reach to surface and challenge your constraining assumptions. There is an old adage: Surviving a steep fall gives confidence to climb a taller mountain. People won’t remember how far you fall, but rather how high you bounce back. How high will you bounce?

Glenn Mangurian was with CSC Index for 21 years, where he was Senior Vice President of a 600-person international consultancy. He is a co-founder of FrontierWorks, a management consulting firm. For more information, visit www.frontierworks.com.
THE HEALTHCARE CONUNDRUM
The Challenge and Opportunity of Change
By Jim Champy

Healthcare is a business filled with so many smart and dedicated people, yet change has come slowly. Maybe change is difficult because healthcare is not “just a business” in the traditional sense. It is also a profession with an admirably high sense of purpose: improving the wellbeing of the human condition. And it’s a craft in which strong beliefs prevail about how care should be delivered. In such an undertaking, the risk of change is not easily tolerated.

At the same time, I have seen so many opportunities for improving the delivery of quality care while reducing costs. My own work with hospitals, doctors, HMOs, and insurers has revealed that:

- As much as 40% to
50% of every healthcare dollar is spent on antiquated, paper-based processes such as approvals, claims, and collections. Some hospitals have up to 40% of their initial claims rejected by insurers because of errors, requiring expensive rework and creating cash flow problems.

In hospitals—where prescribing errors are often caused by unintelligible hand-written prescriptions—patients experience an average error rate of 2% in the proper prescription or dosage of drugs, and a near-miss error rate of 11%!

When I asked one major hospital how they were able to consistently reduce an astounding “near-miss” rate to a much lower prescription error rate, they responded that the quick action of competent, observant nurses allowed them to close the gap. Fortunately, a trained nurse knows when a drug or dosage is wrong for a patient. But patients should not be exposed to that risk. For these reasons, many hospitals already require all prescriptions to be entered electronically.
But in hospitals that have moved to electronic medical records, the transition from paper has been challenging. Not enough attention has been paid to how digitized records enable and drive changes in clinical work. Sometimes paper systems are left in place, and nurses complain that they must maintain both paper and digital records. And sometimes systems and processes are not well designed, causing doctors to complain that the technology is distracting—not helpful—to their mission of care.

The answer to these challenges is not to dismiss or blame technology. Information technology can help transform the delivery of healthcare. And the lives of patients and clinicians can be improved in the process. Besides, the current administration in Washington is committed to spending billions to digitize healthcare records, and we must not squander the opportunity to benefit from this investment. However, to do the job right, we need to keep two principles front-of-mind.

The digitization of the healthcare record is about both technology and process. As records are digitized, almost everything that happens in a hospital will change, from registering a patient to collecting on a claim, from what happens on a doctor’s visit to how the operating suite runs. I have even seen hospitals go through long debates about how phones would be answered once records are digitized: Should the process now be centralized? Or should every clinician answer his or her own phone?

These are not foolish debates. Clinicians must be intimately engaged in the implementation of systems that move toward electronic records. And although it’s the administrative processes of a hospital or doctor’s office that will initially be improved by electronic records, it’s the patient experience and clinical outcomes that will be the most significant beneficiaries of technology. Doctors, nurses, and pharmacists must lead in thinking how their work will be done.

Patient experience and clinical outcomes will be the most significant beneficiaries of technology. Doctors, nurses, and pharmacists must lead in rethinking how their work will be done.
nurses, and pharmacists must lead in rethinking how their work will be done.

The delivery of healthcare is a system whose improvement requires the collaboration of several players. This system will not be transformed until many interests are recognized and harmonized: the patient experience and outcome, the work of clinicians, the efficiency of insurers, the interests of government regulators, and the wallets of those employers who still pay the bills. Electronic records enable these interested players to be networked so that care, information, and money move more efficiently and effectively. The intelligent implementation of information technology will dramatically reduce the administrative—and sometimes wasteful—costs of healthcare that I described earlier, but an inclusive systems view is important. Systems and processes must be designed collaboratively, not imposed by one party on the other.

The challenges of healthcare delivery—accessibility, costs, and quality—will only be met if all parties in the system experience the benefits of change. Information technology and the electronic healthcare record are the great enablers of change. But it will also take the hands, minds, and hearts of clinicians to deliver on technology’s promise.
THE INFORATI FILES
Gaurav Dhillon on indie films, unhhooking from his BlackBerry, and “endless adventures in drilling”
By Tim Devaney and Tom Stein

WHEN GAURAV DHILLON was in his mid-20s, he founded the data integration software company Informatica, which has grown into a billion-dollar enterprise. After leaving Informatica in 2004, Dhillon took a year off to travel and figure out what he wanted to do next. That turned out to be Jaman, a movie-download site that specializes in independent and foreign films and documentaries. “There are beautiful films that need to be seen that just don’t fit into the traditional way theatrical distribution is done,” he says.

When did you first understand the power of information?
The moment that changed my life happened in 1982 when Scientific American devoted a seminal issue to software. Alan Kay wrote that to be successful in the future, people would need to be able to operate computers as easily and skillfully as they drive a car. At the time, the only people who knew anything about computers were glow-in-the-dark guys like me, who were studying engineering.
Looking back now, it’s amazing how accurate his prediction was.

**What led you to start Jaman?**

Somewhere in my travels I realized there is an amazing amount of quality content—独立的电影和纪录片—being produced everywhere, yet less than one percent of films get traditional distribution. At first, I had some righteous indignation about it, thinking, “How can this be? How come nobody’s done anything about it?” And then I thought, “Maybe I should do something.”

So I decided to create a business that provides an alternative distribution channel. Jaman’s focus is to serve this under-served area: providing high-definition quality, making it work on Macs and PCs and set-top boxes. With that foundation, we believe we’ll be able to add on more and more content.

**What role do independent and foreign films play in our culture?**

Quite an important one. Films are a way of opening up people’s lives to other cultures and countries and reminding us that we’re all human. Once we understand the similar ways we behave with each other and with our families, when we see there are a few bad people and many good people everywhere, hopefully this will reduce the tendency to paint a whole nation as evil or to stereotype various cultures.

**How has information management changed in the 15 years since you started Informatica, and where are things headed?**

Companies that came out of that generation were post-mainframe companies but pre-Internet companies. The Internet didn’t exist, and the way information flowed was very much in rows and columns; a database is nothing more than the biggest spreadsheet you ever saw. Today, information...
takes on many more forms; it’s richer, and it no longer lines up in orderly rows and columns.

With the Web being this connector that hooks anything to anything, we’re now trying to understand the implications of interconnectedness. I think that will be the next quantum leap. If you look at Alan Kay’s statement in 1982 about computer skills being necessary in the future, having social information and connectedness skills in the future will be as important as computer skills are today.

**What tools do you use to manage your personal data?**

Actually, I’m trying to unhook myself from Blackberry. It was getting to be a problem. It was always with me. I wasn’t thinking enough about the big picture because I was always in interrupt mode. So I unplugged it in the middle of last year. Any withdrawal symptoms have been outweighed by the positive reinforcement in my personal life. When I’m home, I’m a better father because I’m focused on my kid. And at Jaman we have developed interrupt protocols—based on the immediacy of communication—that make everyone more productive.

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**Do you ever feel overwhelmed by too much information?**

In the early days of business intelligence, we had this joke about “endless adventures in drilling.” You can keep drilling into the data. But if you think about the hierarchy of information, knowledge, and wisdom, experience teaches you not to seek information but knowledge. So the question is how do you “go meta”? And how do you follow the Einsteinian notion of rising above the observation level to get insight into what’s causing something to happen?

When I’m swimming in a sea of information, I look for a rock to climb up on so I can look out and see “What’s the pattern? Which way are the waves going? Is a storm coming?” That kind of insight and knowledge is an antidote to too much information.

For other Inforati profiles, go to [www.emc.com/inforati](http://www.emc.com/inforati).

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