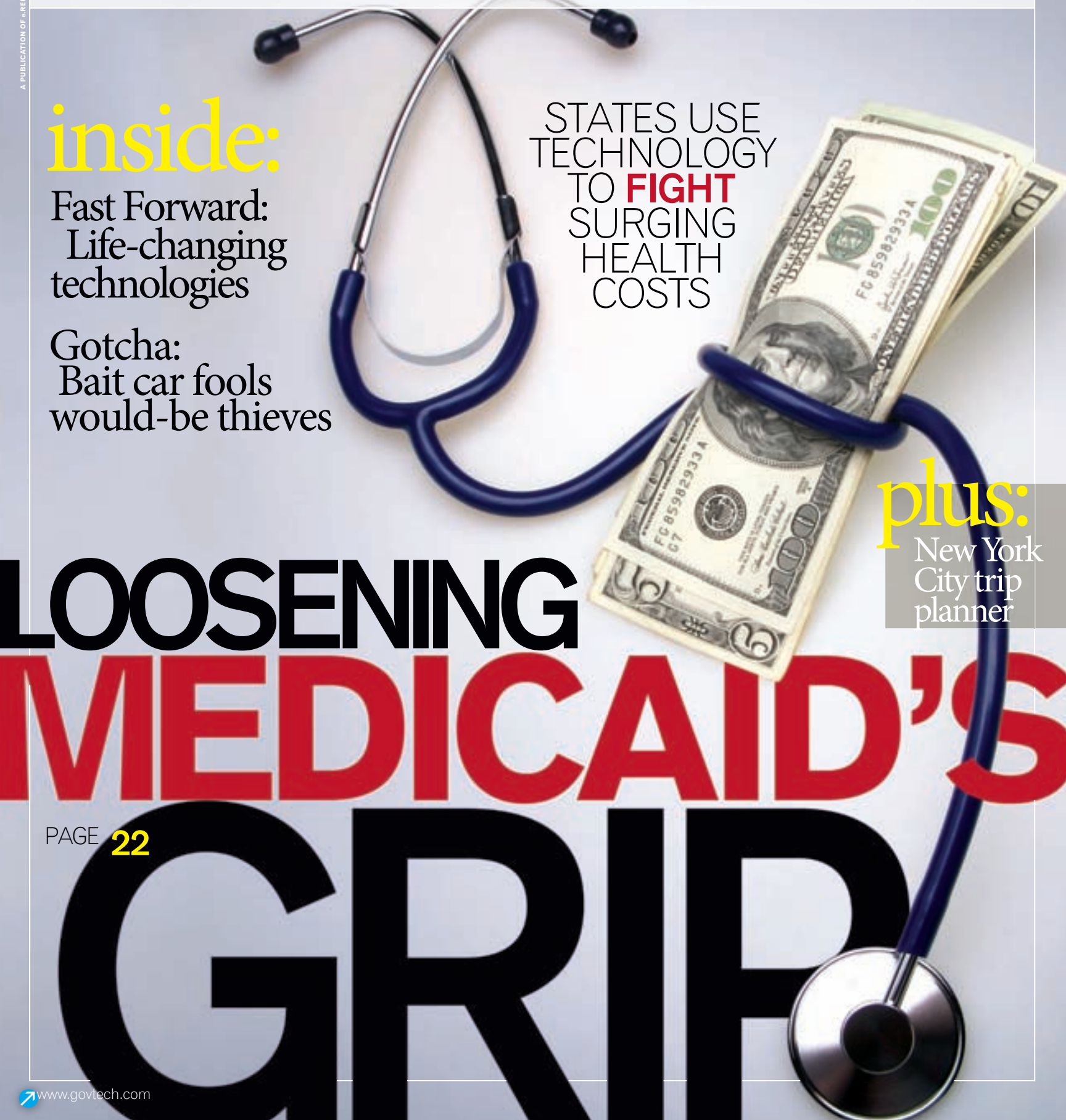
GOVERNMENT TECHNOLOGY®

A PUBLICATION OF e.REPUBLIC

VOL21 ISSUE06 SOLUTIONS FOR STATE AND LOCAL GOVERNMENT IN THE INFORMATION AGE JUNE 2008



inside:

STATES USE TECHNOLOGY TO FIGHT SURGING HEALTH COSTS

plus: New York City trip planner

LOOSENING MEDICAID'S GRIP

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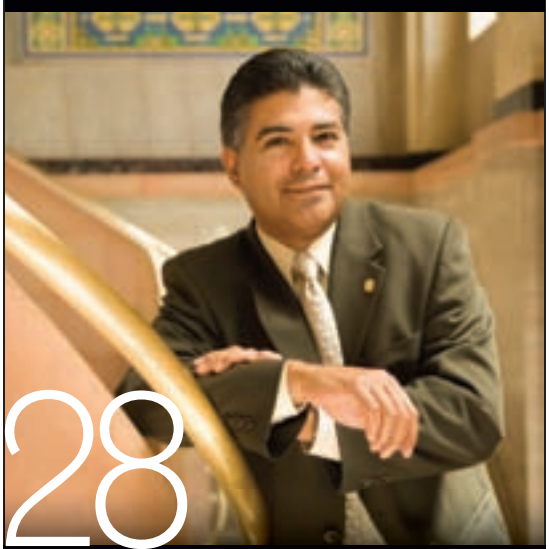

The inside pages of this publication are printed on 80 percent de-inked recycled fiber.

Government Technology (ISSN# 1043-9668) is published monthly by *Government Technology*, 100 Blue Ravine Road, Folsom, CA 95630. Periodicals Postage Paid at Folsom, Calif., and additional offices. POSTMASTER: Send address changes to: *Government Technology*, 100 Blue Ravine Road, Folsom, CA 95630 Copyright 2008 by e.Republic, Inc. All Rights Reserved. SUBSCRIPTIONS: Subscription inquiries should be directed to *Government Technology*, Attn: Circulation Director. 100 Blue Ravine Road, Folsom, CA 95630, 916/932-1300. Canada Post Publication Agreement #41578525, undeliverables 27496 Bath Road, Mississauga, Ontario L4T 1L2 or e-mail subscriptions@erepublic.com.

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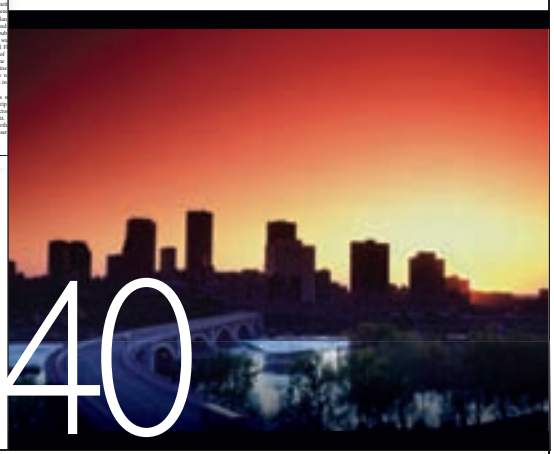

columns

next month:

Millennials Go to Work
Get ready CIOs. They're coming. They have gadgets and doohickeys galore! They like their music downloadable and portable, and they grew up with the Internet, not before it. They're the millennials — those tech-savvy, 20-somethings-and-under bound to warm up scores of office chairs left cold by retiring baby boomers. But their digital literacy could prove worrisome for security-conscious bosses.

ALTERNATIVE THINKING ABOUT POWER AND COOLING:

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point of view

Tiny Little Rip-Offs

Raise Your Voice
Your opinions matter to us. Send comments about this issue to the editors editorial@govtech.com. Please list your telephone number for confirmation. Publication is solely at the discretion of the editors. *Government Technology* reserves the right to edit submissions for length.

Correction:
May's *Spectrum* item, *Back to School*, should have listed ESI International's Web site as www.esi-intl.com.

I suspect one of my relatives is being taken advantage of by her doctor. In fact, I think most Americans are being taken advantage of by this relative's doctor.

After sticking to a healthy lifestyle for most of her life, she doesn't worry anymore about certain aspects of her health. Her doctor tells her she should take cholesterol medication, but she refuses. In fact, she stubbornly turns down medication for almost everything. Even so, her doctor administers costly in-office tests at every monthly check up — even when my relative has already refused to take action based on the same tests at previous visits.

After accompanying her to see this doctor and hearing from other family members who have accompanied her, it seems the doctor — who specializes in care for the elderly — cares as little about these test results as my relative. I can only assume the tests are being ordered simply as a mechanism for regular billing. Unfortunately a few extra dollars in the doctor's pocket — and other pockets like his — is costing us all a lot of money.

For the most part, my relative never sees a bill for these tests. The government pays the majority of the costs, and a secondary insurance provider picks up the rest. When an explanation of benefits arrives in her mailbox, she often doesn't remember what it's for.

As more people begin to see government programs, such as Medicare and Medicaid, as opportunities to increase their own wealth, these tiny little rip-offs add up to a big drain on the health-care system, state budgets and our economy as a whole.

Because fraud and abuse often go undetected, it is hard to determine exactly how much public money is paid out to unscrupulous billers and undeserving recipients. The National Health Care Anti-Fraud Association estimates that more than $60 billion per year is wasted on fraudulent claims across the health-care industry. And as the federal government tightens Medicaid spending, it's incumbent on states to make the most of the remaining dollars.

In this issue, Features Editor Andy Opsahl shows how some state governments use IT to ease the cost challenges associated with government health programs.

One particularly interesting case comes from California, where the state uses technology to spot Medicaid abusers and stay ahead of the fraud game. While automation reduces costs of billing processes for government programs, it also opens the door to a new breed of crooks who repeatedly bill for services they know will be automatically approved. Using predictive analytics, California not only identifies fraudulent Medicaid billers, but also discovers new fraud patterns as crooks learn how to avoid the old pitfalls.

> "More than **$60 billion per year** is wasted on **fraudulent claims** across the health-care industry."

With numerous other economic woes beating down on the economy, the spotlight on health care has dimmed slightly in the public eye. But long-term, everyone knows the health-care crisis must be addressed, and states are looking to technology to reduce its impact now and in the future. GT

EMILY MONTANDON
ASSOCIATE EDITOR

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BY CHAD VANDER VEEN
ASSOCIATE EDITOR

A Vote for Sensible Elections

The other day I was going through my morning ritual of visiting certain news sites — in a certain order — to get a quick sense of what's going on in the world. One *Washington Times* headline, in particular, caught my attention: "Michigan primary revote chances diminish." How is it that in 2008 this nation still can't cobble together a decent, sensible system for electing people to office?

Though the race for the White House is certainly historic, it's also giving more Americans a good look at how dysfunctional our election process has become. The Democrats have gone out of their way to illustrate how cockamamie their system is. Florida, for example, moved up its primary to an earlier date, despite the Democratic National Committee's (DNC) threat to strip the state of its delegates if it did so. Florida did anyway, and as of press time, the delegates haven't been awarded to either candidate, leading some party officials to call for a "do over."

But the DNC's problem speaks to a larger issue in American elections. Now, I'm as pro-states' rights as any person you'll meet, but it's high time this country seriously considers nationwide standards for electing candidates to national office. It doesn't matter whether it's a nationwide system of electronic voting or paper balloting — just that we design a simple process for casting a vote.

Much of this year's caucuses and primaries have proven themselves totally archaic, so too is the U.S. Electoral College. The time when representative democracy was needed has long since passed. Today direct democracy is socially, technically and logistically feasible, even with punch cards or paper ballots. Think about it this way: The Nielsen system for rating TV shows — in which viewers write down what shows they watch and send that data back to Nielsen — is outdated, inefficient and just plain sucks. But it still works better than the way we vote for president.

Now I know we don't technically live in a democracy. We live in a republic. And those who defend the Electoral College say it's the republic's way of making sure less populous states don't get left out of the process. Under a strictly popular vote system, Electoral College defenders claim large population centers, like Los Angeles and New York, would unfairly skew the state voting results in their favor. The solution, then, is to ignore state lines altogether. Let every eligible American cast a vote, then tally 'em up. The person who receives the most votes wins. Who cares about awarding states? States aren't voting, Americans are.

Sounds simple. But seeing as the DNC can't even hold a simple election for itself, your vote for president may never actually count. GT

"Today **direct democracy** is **socially, technically and logistically feasible**, even with punch cards or paper ballots."

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BREAKING NEWS

Cell-phone systems vulnerable in disasters
Associated Press, May 2007

Why cell phone networks are a weak link in a crisis
CNN, August 2007

Rescue efforts were hampered by the lack of cell phone service in the area
National Public Radio, January 2008

Cell-phone networks fail residents in disaster recovery
Washington Post, August 2007

In the first real-world disaster test of local cellular networks, thousands of mobile phone users were unable to connect calls in the hour following the 5.6 earthquake that struck the Bay Area shortly after 8 p.m. Wireless carriers said traffic spiked up to 10 times higher than normal, primarily with calls to family and friends, news outlets and emergency services. The sudden jump in calls overloaded local networks for up to an hour, with service sporadic thereafter.
San Francisco Chronicle, November 2007

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An array of SunCatcher solar power systems sits beneath a brilliant New Mexico sky. Each SunCatcher automatically tracks the sun, converting intense heat into grid-quality electricity. The 38-foot diameter dish is made of 82 curved glass mirrors, which focus solar energy onto the heater head of a four-cylinder reciprocating engine. Each engine generates as much as 25 kilowatts of electricity. This group of six SunCatchers — developed by Sandia National Laboratories and Stirling Energy Systems — recently set a solar-to-grid conversion efficiency record by reaching a 31.25 percent net efficiency rate.

on the Scene

FEMA Funding Priorities Shift

TACOMA, WASH. — Federal emergency management grants will require state and local agencies to spend more money on planning, and less on acquiring resources and attending exercises, said the Federal Emergency Management Agency's (FEMA) preparedness coordinator for the Pacific Northwest.

FEMA believes states and localities have reached a point of exercise overload, according to Patrick Massey, division director and federal preparedness coordinator of FEMA's Region 10. Therefore, more emphasis will be given to emergency response planning and citizen preparation when FEMA awards funds.

Massey spoke April 2 at the Partners in Emergency Preparedness Conference in Tacoma. He outlined some other philosophical shifts under way at FEMA:

- changing the agency's approach from "wait-and-see" to "deploy-and-hold";
- evolving from centralization to decentralization;
- shifting grant priorities from resources to intelligence;
- emphasizing homogeneity instead of heterogeneity; and
- focusing on strengthening citizen preparedness.

Massey also warned against concentrating homeland security efforts solely on external threats. Pointing to the Roman Empire's fall, he said societies ignore internal risks at their own peril. Indeed, the message that homeland security encompasses internal threats — such as the national debt, trade deficits, unfunded pensions and global warming — was a popular theme at the conference. — JIM McKAY, JUSTICE AND PUBLIC SAFETY EDITOR

Mobile Command Center Helps Air Show Soar

SACRAMENTO, CALIF. — In March, Sacramento skies were torn asunder by mighty flying machines. The third annual California Capital Airshow drew nearly 80,000 people to Mather Field (formerly Mather Air Force Base). Onlookers marveled at the technological achievements and performers' piloting skills.

Government Technology got a look inside the mobile command center deployed for the show. Operated by the Folsom, Calif., Police Department (PD), the mobile command center facilitated communication between local police, sheriff, fire and the National Guard.

"The COM 7401 was built for command and communications. We have 32 radio resources we can bring in — radios, phones, satellite phones. Major command staff, fire captains, police lieutenants would sit in here and make decisions on a major disaster,"

said Chuck Schuler, Folsom PD's telecommunications engineer.

The vehicle resembles a motor home and includes a rack of radio technology that lets all responders communicate with disparate types of radios.

"This is the brain of our communication system," Schuler explained. "We have 800 MHz radios, UHF, VHF, marine, aircraft, amateur radio. We can talk to any personnel — public safety, amateur or otherwise — in the region."

— CHAD VANDER VEEN, ASSOCIATE EDITOR

Govtech.com Hot List

govtech.com

Here are the 10 most popular stories on Govtech.com from March 14, 2008 to April 14, 2008.

1. **Calif. State Workers Protest Salary Database Publication** Sacramento newspaper comes under fire for publishing salary information on California state workers. www.govtech.com/gt/275170
2. **4.2 Million Credit, Debit Card Numbers Exposed** Supermarket chain says hackers accessed customer card numbers. www.govtech.com/gt/articles/275456
3. **Funding: Winning Homeland Security Dollars From Your State** Nearly $4 billion is available for fiscal 2008. Here are strategies for getting your fair share. www.govtech.com/em/articles/279634
4. **Telework Helps Virginia and Arizona Recruit and Retain Employees** Telework strategies strengthen continuity of operations. www.govtech.com/pcio/articles/265781
5. **Virtual Worlds Help Public Safety Officials Practice for Real-Life Threats** Simulated mass casualty exercises cut cost and add flexibility. www.govtech.com/em/261426
6. **Wireless Sensors May Help Governments Monitor Health of Aging Infrastructure** Minneapolis bridge collapse spurs monitoring innovations. www.govtech.com/dc/articles/261440
7. **Entire Elgin, Ore., Planning Commission Resigns** Volunteer commission members quit rather than consent to new ethics requirements. www.govtech.com/gt/articles/278639
8. **American ITIL** Oklahoma City implements ITIL principles to strengthen its technology operations. www.govtech.com/gt/95672
9. **Chicago Fusion Center Gives Police New Criminal Investigation Tools** New Crime Prevention Information Center helps city prevent terrorist attacks and revolutionize investigations. www.govtech.com/dc/articles/261463
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Four Questions for Peter Collins

CIO, AUSTIN, TEXAS

PHOTO BY OSCAR WILLIAMS

> "You can have [Project Management Institute] certification and anything else you want, but you've got to be a leader. If you're not a leader, you're not going to get the job done."

AFTER OWNING A SOFTWARE FIRM, PETER COLLINS FOLLOWED HIS INTEREST IN LAW ENFORCEMENT SOFTWARE INTO POSITIONS AS A SONOMA COUNTY, CALIF., SHERIFF'S DEPUTY AND A BOSTON POLICE OFFICER. HE JOINED THE AUSTIN POLICE DEPARTMENT IN THE 1990S AND ULTIMATELY BECAME INVOLVED IN A SERIES OF IT PROJECTS. CHOSEN AS CITY CIO IN 2003, COLLINS CURRENTLY CHAIRS THE TEXAS RADIO COALITION, AN ORGANIZATION WORKING TO IMPLEMENT STATEWIDE RADIO INTEROPERABILITY. IN JANUARY, HE WAS NAMED TEXAS CIO OF THE YEAR AT THE GOVERNMENT TECHNOLOGY CONFERENCE SOUTHWEST IN AUSTIN.

1

You've earned a reputation for successfully completing projects. What's the secret?

I'm a strong believer in good project management. You can have [Project Management Institute] certification and anything else you want, but you've got to be a leader. If you're not a leader, you're not going to get the job done. The other thing that people need to realize is that projects mean problems. It seems like there is a cultural attitude out there that if something goes wrong, it's the end of the world. It isn't. The problem is that things get masked in that environment because people are afraid to say they slipped a little bit.

2

How do you create the atmosphere where it's OK to admit problems?

It's really somebody being mature, self-confident and secure enough to say, "Here's the problem." The key is your project manager. Successful project managers are true risk managers. They can look out on that horizon and see danger lurking and raise a red flag. So it's communication and risk management. And just because there's a problem on the horizon, doesn't mean you're done as a project manager; it means you are paying attention to your job and you are going to be able to lead that team.

3

How does your law enforcement background influence what you do now?

Being a patrol officer was the best job I ever had in my life. If I could go back tomorrow and do it, I would. But I felt I could impact public safety more here in a management role. I actually started in Austin as a police cadet, and I kept a low profile; I just fixed things. Eventually I was asked to do a project called Radio Dispatch and Mobile Trunking which was the regional radio system. We built an 80,000-square-foot communications center and replaced the computer dispatch system for police, fire and EMS, and the report management system.

4

What are you most proud of?

I'm most proud of the folks I've worked with over the years. It's not all about me; it's about the whole team. They're the people I really have to thank because they've made it happen. GT

BY **STEVE TOWNS, EDITOR**

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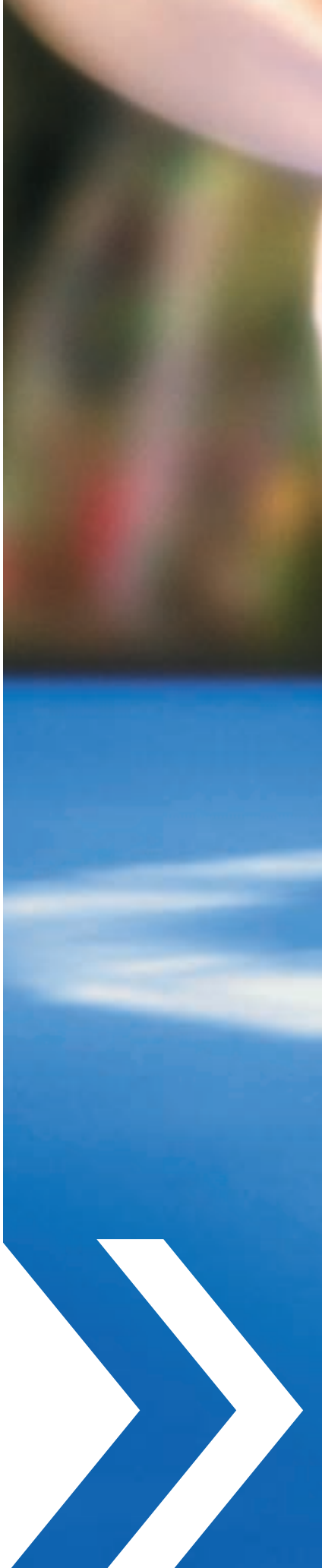


Innovative approaches are reshaping interfaces, infrastructure and intelligence. **The future may be closer than you think.**

"THE NETWORK IS THE COMPUTER"— at least, it is according to Sun Microsystems. Sun's John Gage coined that phrase two decades ago, which was, in hindsight, about 20 years ahead of its time. Today, breakthrough innovations, such as distributing unused computing power to create a virtual supercomputer, are steadily transforming Gage's vision into reality.

There's a lot to look forward to on the horizon. Cloud computing might be the next step in the Internet's evolution. Advances in fields like nanotechnology are enabling robots to become truly ubiquitous; they may even be surprisingly helpful to government agencies confronting the baby boomer retirement wave. And at last, the keyboard and mouse may finally be on their way out — if Microsoft's new hands-on interface is the next big thing.

Technology is always on the march. Here's a look at where some of it is headed.

BY CHAD VANDER VEEN | ASSOCIATE EDITOR

1 Intuitive Interface: The Power of Touch

It's pretty ridiculous that we still use keyboards. It's kind of like trying to fly an F-22 fighter jet with the controls used by the Red Baron. Keyboards are unfriendly and unintuitive. But for more than a century, nobody has come up with a seriously viable alternative — until now.

When Microsoft Surface debuted last year, it represented the first significant move toward a more immersive style of interface. Gone are keyboards and mice; a touch-sensitive screen replaces them. Commands are executed by touching, objects are moved by dragging and art is made by digital finger-painting.

Surface's guts aren't all that impressive — a PC running Windows Vista, a projector and some cameras — packaged inside a table. What's impressive is how Microsoft organized these ordinary elements into something extraordinary.

"Surface uses a series of cameras underneath the tabletop to see objects," said Kyle Warnick, group marketing manager for Microsoft Surface. "Hand gestures and touch — these user inputs are then processed with a standard Vista PC inside, and using rear projection, the input is displayed on the surface of the device."

The cool part happens when the inputs are displayed. Surface completely changes the way a user interacts with a computer because it can recognize more than four-dozen simultaneous, unique touches.

At the 2008 Consumer Electronics Show (CES) in Las Vegas, Microsoft, known more for force-feeding products down consumers' throats than beauty and innovation, showcased the elegance of Surface. Transferring digital photos from a camera to computer, for example, becomes as easy as dragging your finger across the surface. Photo editing is equally simple: Want the photo larger? "Grab" the corners and pull.

Music files work the same way. If you have a Zune digital music player, you can organize your music as easily as CDs.

But Surface is more than just an elaborate media center. The apparent limitlessness of applications is a pleasure to imagine. Microsoft initially hopes to deploy the technology in hospitality and leisure spaces; hotels and restaurants are likely candidates. As shown in Microsoft's CES demonstration, diners could eat their meals on the Surface tabletop, and along the way, the PC would recognize the specially tagged dishware and inform customers about the origins of their food and wine. Afterward, the bill would be paid on Surface by simply placing a credit card on-screen.

"Right now we're focusing with our current partners — T-Mobile, Harrah's, Starwood, IGT — in the retail, leisure and entertainment industries," Warnick said. "Since announcing Surface, we've received more than 2,000 inquiries from 50 countries around the world across 25 different industries. The possibilities are endless, and we believe that over time, surface computing will be pervasive in many industries and even the public sector."

How the public sector would utilize Surface remains to be seen. However, it's easy to imagine Surface in DMVs or social services offices, where customers might handle transactions through the touch interface. Other applications might be GIS-related or even, heretofore unimagined document management software.

With **Microsoft Surface**, photo editing becomes a literal snap. Grab an image with your thumb on one corner and middle finger on the opposite corner, snap and — *voilà!* — the image has been reduced to postage-stamp size.

2 Cloud Computing: Is Software the New Hardware?

Surface is all about making the user computer experience more personal and tangible. Cloud computing, on the other hand, seeks to do the opposite by taking what we do further into the digital ether.

You've probably heard all the terms — grid computing, distributed computing and utility computing, cluster computing, on-demand computing. Although they don't mean the same thing, fundamentally the terms describe something similar: the concept of using another entity's infrastructure to enhance your own capability.

In June 2005, *Government Technology* published a story on utility and grid computing titled *Witnessing an Evolution*, also available at www.govtech.com/gt/94421. The grid is a theoretical network of devices, most of which use only a fraction of their computing power at any time. The idea — that's now often practiced — is to concentrate that excess processing power and focus it on a large problem. Put another way, a major problem is "distributed" across a network of capacity. Stanford University's Folding@home project is one of the finest examples of distributed computing. Windows PC, Linux and Mac users, as well as Sony PlayStation 3 owners, can participate in the initiative by leaving their Internet-con-

nected machines on standby mode when unused. Folding@home co-ops the machines' collective computing muscle to help solve the genetic riddles that plague efforts to cure diseases.

Utility computing is similar in some ways and dissimilar in others. In the utility computing model, rather than randomly dispersed machines working on a single problem, randomly dispersed people access computer farms to solve their own problems. It's called utility computing because it operates like an everyday utility, such as electricity, gas, water, etc.

Regardless of the exact strategy or definition in play, it all comes down to the cloud concept, which is the transformation of infrastructure to software. The machines themselves become less about performing a task and more about accessing computational power. If there was ever a philosophical goal underlying the creation of the Internet, cloud computing may be it — an infinite number of machines using an infinite number of resources to perform a task.

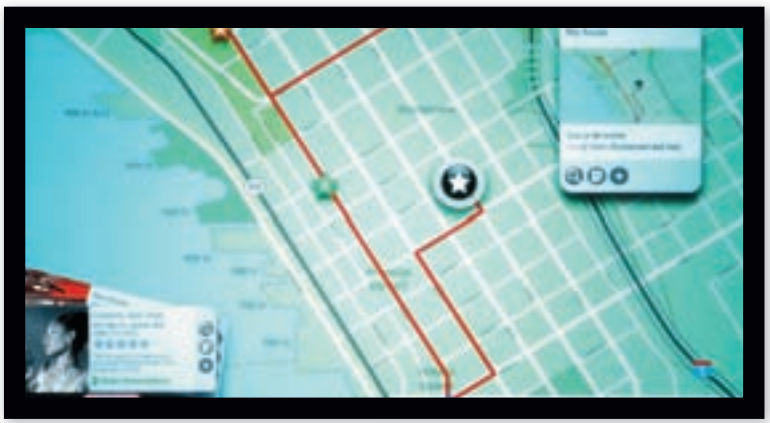
As the Information Age rushes onward, more data is continually created. IT professionals in the public sector routinely confront the challenges associated with maintaining this data onslaught. What if, instead of routinely investing in new infrastructure, an agency could instead access a global cloud of machines to process data? Google and other industry heavyweights are already preparing for the cloud-computing era.

Like Microsoft and IBM, Google has tens of thousands of machines that sit around the world. Accessing these machines' unused computing power would be like tapping into to an enormous supercomputer capable of crunching the biggest numbers.

Christophe Bisciglia, a Google software engineer, recently launched the Academic Cluster Computing Initiative. Through a partnership with IBM and the National Science Foundation, Bisciglia connects universities worldwide to Google's cloud, and along the way teaches students to think and program on a massive scale.

"We started with the University of Washington, and we brought in a cluster of 40 machines, and we taught the first cluster-computing course for undergraduates," Bisciglia explained. "We used an open-source software system called Hadoop. It's an open-source distributed computing platform inspired by Google's published computing technology. It's a software system that gives you the ability to turn a cluster of hardware into a dynamic software system that allows you to manage and process large amounts of data."

What's the use of clusters? As Bisciglia explained, organizations are being inundated with more and more data. Single machines become incapable of processing these vast amounts of information and eventually will fail. Buying more machines becomes unfeasible — particularly for public-sector organizations limited by budgets.



If you've just finished dinner on a **Microsoft Surface** table, you can pay your bill, map your way to the theater, and buy tickets just by placing your fingers (and credit card) on the screen.

"Networks are getting faster and faster. Two computers connected to each other via network are much more like a dual processor machine than they were five years ago," said Bisciglia. "So basically you need to scale out horizontally now. When you want more computational power, you can't just wait for computers to get faster; you can't just buy a faster processor. You need to add more computers in a network's configuration and interact with another cluster, rather than as a single machine."

Cloud computing isn't as far off as it might initially seem. In fact, it's already happening in some respects, but it goes by yet another name: software-as-a-service (SaaS).

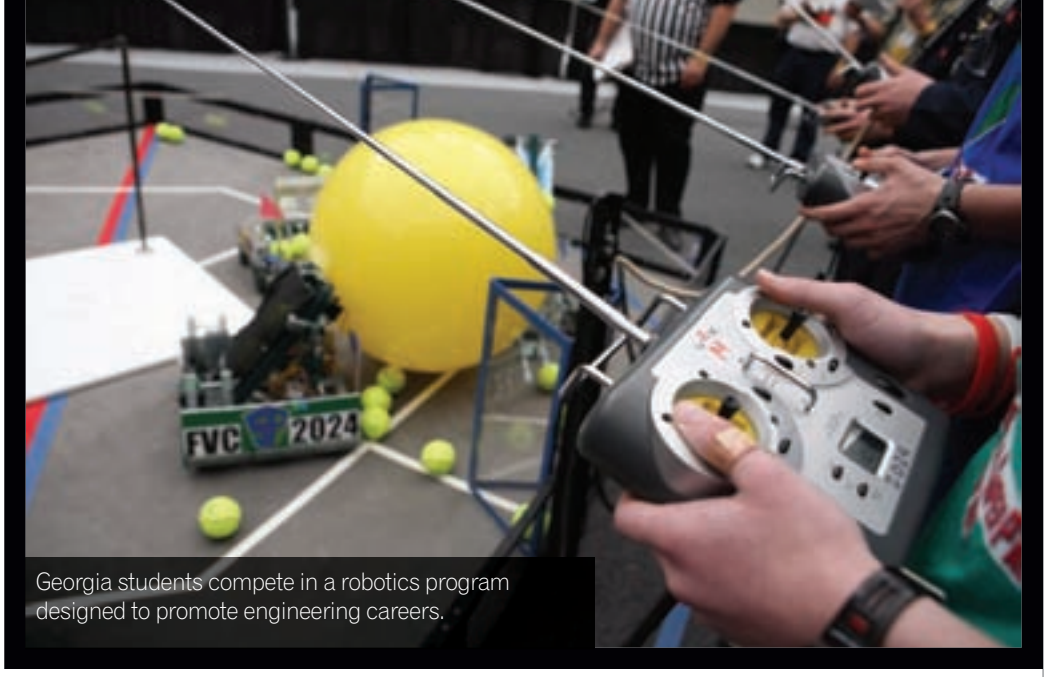
SaaS has been around in one form (application service provider, or ASP) or another for a while. It functions via the same principles as cloud computing. Instead of users investing in more computing infrastructure to complete tasks, they can instead access someone else's cloud to do the work.

Salesforce.com has been a leader in the SaaS industry for years by hosting customer relationship management (CRM) solutions for organizations that can't or won't invest in the infrastructure to do it themselves. The company is now heavily involved in applications that extend beyond CRM, opening its cloud to anyone who wants access. Salesforce.com also offers users a platform service that lets them create their own unique applications in the cloud — and users can keep the applications for themselves or share them with others.

"Platform user service really allows customers to have computing power delivered completely as a utility in the cloud," said Dan Burton, senior vice president of global public policy for Salesforce.com, "so customers can then use the cloud computing architecture to build, test, deploy and run applications in the cloud. What that really means for customers and developers is, instead of going to a preconfigured application, they can really go into the cloud, and using our programming language, APEX, they can custom build any application they want to."

It may not be the stuff that cloud computing dreams are made of, but it represents the inroads that are being made into cloud computing, which are available to an IT crowd desperate to produce more with less.

One obstacle to life in the clouds is security. Public-sector organizations trade heavily in sensitive data; the thought of letting that data loose in some ethereal cluster of random machines is likely to send shivers up CIOs' spines. It makes sense that early cloud activity takes place in an environment mediated by a large, established company like Salesforce.com, which is why several public-sector organizations



Georgia students compete in a robotics program designed to promote engineering careers.

PHOTO BY ADRIANA M. GRONSMAN

are already taking their first steps into the cloud using Salesforce.com's tools.

Mike Goodrich, the director of administration at Arlington Economic Development (AED) in Virginia, said his foray into the cloud isn't about grand ideas of having a virtual supercomputer to do his bidding. Rather, it allows his agency to do business better.

AED creates economic opportunities for Arlington; generally this is accomplished by attracting tourists and businesses to the city. By putting some of its processes, such as event registration, into Salesforce's cloud, it frees IT staff to concentrate on providing better service instead of maintaining equipment.

"Our IT staff has not had to invest their time, effort and money into maintaining servers," he said. "They've been able to simply know Salesforce is maintaining our data. So there's very little involvement from our infrastructure support. It's not really money saved. What it does is improve our business."

Nicholas Carr compares the data center to the answering machine. At first, answering machines required hardware — a tape recorder. Now, voicemail has replaced the hardware. Eventually the physical data center will cease to exist, to be replaced by a virtual one.

It's not just Salesforce.com and Google that are investing in clouds. Amazon offers its Web Services to small businesses that need some IT muscle but can't afford to put it in-house. Amazon customers basically can run any or all of their business processes on the retailer's array of servers, using only the processing power that's needed to do the job.

Nicholas Carr, former executive editor of the *Harvard Business Review*; author of *The Big Switch*; and recent keynote speaker at Government Technology's California CIO Academy in Sacramento, Calif., likens cloud computing to Alan Turing's theoretical "universal computing machine."

"With enough memory and enough speed, Turing's work implies a single computer could be programmed, with software code, to do all the work that is today done by all the other physical computers in the world," Carr wrote in *IT in 2018: From Turing's Machine to the Computing Cloud*. "Turing's discovery that 'software can always be substituted for hardware' lies at the heart of 'virtualization,' which is the technology underpinning the great consolidation wave now reshaping big-company IT."

From running day-to-day processes on far-flung corporate machines, to a global network of load-sharing clusters, the network is becoming the computer — and the clouds are on the horizon.

3 Robotics: Nerds' Revenge?

The booming nanotechnology industry is paving the way for advances in fields as diverse as cancer research and space exploration. The big science of creating such tiny things also exposes a glaring problem for industry, including the public sector: the severe shortage of new workers trained and skilled in math, science and engineering.

Fortunately there is a ray of hope in the form of something else nanotechnology is revolutionizing — robots.

There is plenty of conjecture about what robots will be like in five or 10 years. You can find plenty of guesses — educated and wild — about what capabilities robots will possess. What's underreported is another purpose of robots that they weren't designed for.

"Because of our shortage of people entering into engineering, we've got a crisis in this country," warned Glenn Allen, professor of mechatronics engineering at Southern Polytechnic State University. "The importance of getting and recruiting our future researchers — that's where we're going to fall short."

It's a familiar problem. What are organizations going to do when their knowledge base retires? Furthermore, how can businesses and government encourage the Millennial Generation to pursue careers in science and engineering, especially when all the evidence points to stagnating interest in scientific studies?

The answer may be robotics. Allen is the director of the Georgia BEST Robotics program. BEST (Boosting Engineering, Science, and Technology) and FIRST (For Inspiration and Recognition of Science and Technology) are two programs designed to foster student and community interest in engineering careers.

Students are building machines that compete against other robots. Advocates say it's time to elevate these students to the same level as their athlete peers.

The programs hold regional competitions nationwide that bring together teams of students from all grade levels, challenging them to build robots that perform specific tasks. The goal is to move robotics away from a geeky subculture to something more akin to the local high-school football team — a lofty goal.

"In middle schools and high schools, as students start getting exposed to math and the sciences, they don't see the application, and they get bored with it and don't engage," Allen said. "When the kids get involved in these robotics competitions, they realize that if they want to continue to pursue

CONTINUED ON PAGE 54

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LOOSENING MEDICAID'S GRIP

STATE IT PROJECTS EMERGE AS WEAPONS TO FIGHT SURGING HEALTH COSTS.

ANDY OPSAHL | FEATURES EDITOR

THE CHOKEHOLD OF MEDICAID is tightening on state budgets. The joint federal/state program, which serves as health insurer of last resort for almost 60 million low-income citizens, accounts for 22 percent of total state spending, according to the National Governors Association (NGA).

As baby boomers approach retirement and the national economy nears a possible recession, pressure is mounting. Medicaid spending was projected to grow by more than 7 percent in 2007, the NGA said, driven largely by recent changes in prescription drug coverage. And health-care costs will continue rising at an average annual rate of about 8 percent over the next 10 years, according to Congressional Budget Office projections.

"[Medicaid] is the largest budget item in just about every state. It's now a massive insurance program, and states are increasingly running up against shortfalls," said Ray Hanley, former director of Arkansas Medicaid and now client executive of Electronic Data Systems (EDS).

"Medicaid is the last bastion of the otherwise uninsurable. About 50 percent of all deliveries in every state are funded by Medicaid. They get the frail, blind, lame, high-risk and handicapped infants," he added. "Medicaid supports the long-term care industry. In every state, from 75 to 80 percent of nursing home recipients are on Medicaid. Medicaid supports the majority of the mental health industry."

Emerging state IT projects show how agencies can use technology to cut Medicaid costs, and quantifying the various cost drivers is often the first step. That measurement process is helping states identify and remedy the inappropriate service usage, late diagnoses and fraud partially responsible for surging Medicaid expenses.

Unburdening the ER

People often think of hospital emergency rooms (ER) as default destinations for treating ailments better suited for personal doctors' offices, said Mike Fogarty, CEO of the Oklahoma Health Care Authority (OHCA). Most states identify inappropriate ER visits as a primary factor driving up Medicaid costs. Oklahoma devised an IT strategy that cut ER visits by 42 percent, resulting in $8.3 million in Medicaid savings to date.

The OHCA tracked Medicaid patients' ER visits and flagged inappropriate visits for corrective intervention. That meant contacting those patients after the visits to clarify proper ER use. However, often those

patients didn't have private practice doctors, which led to the other goal of the project: to get more Medicaid patients into the care of private practice doctors. Once that happened, the OHCA could use IT to hold those doctors responsible when their Medicaid patients visited ERs inappropriately.

But there was another obstacle. Many private doctors didn't want Medicaid patients, said Fogarty. The program's bureaucracy made those patients a burden to serve. Could IT fix that? The OHCA started by targeting the hassle of serving Medicaid patients.

In 2003, the OHCA implemented its EDS-supported Medicaid Management Information System (MMIS) to connect medical providers and Medicaid patients to a centralized statewide database. The MMIS offered doctors a quick way to submit Medicaid claims for patients that eliminated the busy work of the old process.

Mike Fogarty, CEO of the Oklahoma Health Care Authority reduced inappropriate emergency room visits to cut Medicaid costs. Tracking patients through a benefits management system made that possible.

"They no longer deal with paper claim forms that get either mishandled at the provider or state level. You eliminate the state input person who takes a paper form and tries to interpret it. The provider literally puts in a claim, enters that claim on a Web-based system that edits it, and it immediately tells the provider if they're leaving out a required element of that claim," Fogarty said.

In the past, providers mailed paper claims and could find out weeks later that a claim was missing information. Doctors had to correct those mistakes before receiving payment. By skipping that process, the electronic system enabled the OHCA to accelerate payments to doctors.

"Our system actually generates an electronic deposit to the provider's account. If the claim comes in by midday Wednesday, there will be an electronic deposit processed and payment of that claim no later than Thursday of the following week. Providers understand that kind of cash flow is real money. It has more value because it's quick," Fogarty said.

The system also enables providers to determine instantly whether a patient is eligible for Medicaid.

"One of the most difficult things for doctors doing business with a Medicaid program is determining whether the person they served was eligible. You can submit a perfect claim, but if it's rejected because the person you treated wasn't eligible, you're really not making progress," Fogarty said.

Another problem existed. Many smaller Oklahoma medical providers didn't have intra-office patient databases, raising questions as to how they'd electronically submit records. The OHCA doesn't purchase care from health maintenance organizations (HMOs), which means many of its providers are small, less IT-savvy practices. The OHCA system means a doctor's office merely needs a computer and Internet connection. The solution proved popular with providers. Roughly 95 percent of the 3 million claims processed annually by the OHCA now go through the automated system.

Oklahoma private practices receive almost $30 per month for each Medicaid patient. Fogarty said the arrangement offers doctors predictable revenue. It can be a sizable chunk of change for doctors who treat Medicaid patients. Changes to the payment and eligibility process seemingly have made Medicaid patients more attractive to Oklahoma physicians. In 2004, the state had contracts with 23,366 providers. By 2007, that number rose to 25,647, roughly a 9.7 percent increase.

"If they've got a panel of 500 or 1,000 patients, they know how much a month they're going to get paid for that," Fogarty said. "It also is a way for us to hold the physician responsible for making sure that patient is being taken care of. We require the physicians to submit 'encounter data.'"

That information lets the OHCA track all treatment the doctor gives the patient. The OHCA notifies each practice when any of its patients visits an ER inappropriately. Naturally the agency doesn't want to pay an ER to treat a condition that it already paid a private doctor to handle.

"If a person with a sore throat goes to see their primary care doctor, we've already paid for that. If that same person goes to an ER, we've paid twice," Fogarty said.

War Against Diabetes

Better citizen health is critical economic medicine for the Delta Regional Authority (DRA), an organization focused on growing prosperity for 240 counties and parishes in eight Mississippi Delta states. Populations in many of the region's counties and parishes peaked before 1980, and 238 of them have per capita incomes at or below the national average, according to the DRA.

The DRA's Healthy Delta program aims to change that by targeting citizen diabetes using early medical intervention. A call center and database will power that strategy.

The organization's theory goes that a work force can't become more prosperous if it is not as healthy as competing work forces. Roughly 10 percent of DRA citizens suffer from diabetes compared to a 7 percent average for the United States as a whole, according to the DRA.

The organization uses marketing campaigns to report potential symptoms of diabetes to a special call center. The DRA also collects this information at health fairs. Call center and fair workers refer citizens to health-care providers. The organization feeds this information into a database. The DRA hopes that in a few years, the database will enable states to reduce diabetes by revealing symptoms they can catch earlier.

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The MMIS also gives doctors reports on their patients' ER visits compared to the patients of other doctors in their regions.

Pre-Emptive Medicine

States like Oklahoma and Kansas also have a predictive modeling IT strategy for cutting Medicaid costs and simultaneously improving citizen health. Most understand that early intervention is key to avoiding grave illnesses that are costly to treat, but human nature frequently ignores that obvious wisdom. The typical outcome is a condition that might have been treated more easily and cheaply with early intervention.

In 2003, the Oklahoma Health Care Authority (OHCA) had trouble keeping just 100 dentists contracted with Medicaid. Using the state's Medicaid Management Information System, the OHCA now boasts more than 700 dental contracts, according to **Mike Fogarty**, CEO of OHCA.

Oklahoma uses MMIS to track symptoms of potentially costly ailments before they advance to the expensive stages of care. The OHCA employs nurses who use MMIS data to monitor Medicaid patients. If a nurse notices treatments for potential symptoms of interest, he or she intervenes with the patient and doctor to check for serious conditions.

"The classic would be identifying patients with high blood pressure, diabetes and other chronic conditions that are very responsive to treatment, but that can go bad very quickly without treatment. The system generates information about those patients based on what services they utilize. We have a nurse who is actively engaged with that patient and their care provider in making sure that patient is getting the treatment they need and that they're responding to that treatment," Fogarty said.

Predictive modeling is among the most promising solutions for cutting Medicaid costs, said Paul Keckley, executive director of the Deloitte Center for Health Solutions.

But Keckley warned government officials to be careful about how they introduce predictive modeling programs to doctors wary of states meddling in treatment. He said these initiatives could be more attractive to doctors if states connected tax incentives to them, or subsidized purchases of electronic medical records systems for doctors.

Equally important is that states avoid using Medicaid tracking and management systems to publicly rate physician performance, said Keckley.

Medicaid by the Numbers

The Oklahoma Health Care Authority implemented a centralized management system for its Medicaid program. The system, implemented in 2003, tracks inappropriate emergency room (ER) use and allows doctors to submit Medicaid claims electronically. The state reports the following results:

- A **42 percent reduction** in ER visits by Medicaid patients, resulting in a $8.3 million savings.
- The automated system now handles roughly **95 percent** of the 3 million claims processed annually by Oklahoma's Medicaid program.
- Nearly **10 percent growth** in the number of doctors willing to treat Medicaid patients from 2004 to 2007.

"[It's critical] that this does not become a platform for writing report cards that are in the newspaper on which doctors get the best results, that it doesn't become a basis for transparency and performance reporting," Keckley said.

He said that would likely result in doctors only choosing Medicaid patients who they thought would improve their scores.

A Step Ahead of Fraud

Medicaid fraud is lucrative. Unscrupulous providers double-bill Medicaid programs for services, which can lead to significant extra costs. Patients, for example, trick the system into giving them narcotics they can sell on the street.

California made tracking this fraud a major IT agenda in early 2000, hiring EDS to handle the details. The Golden State now heralds its per-recipient Medicaid costs as the lowest in the nation. California routinely changes its tactics to keep pace with offenders, said Stan Rosenstein, deputy director of medical care services for the California Department of Health Services (DHS).

"When you approach fraud and abuse, the people who are committing it get much more sophisticated. They change their patterns in reaction to us. They study us. They see what we're doing and change their fraud patterns to avoid what we're looking at," Rosenstein said.

He said tracking fraud was relatively easy at the beginning of the EDS partnership, because the crimes were less sophisticated. For example, the agency caught "phony providers" billing for services from "offices" that turned out to be empty lots. "Sometimes they'd just have a mail drop," Rosenstein said. "As we found the easy things, they got more sophisticated and used technology to get there."

In early 2007, the DHS implemented software to search for new fraud patterns that weren't yet familiar to agency analysts.

"In the past, we had to say, 'Here's a pattern of treatment,' and we'd profile for that known pattern [in the system]. The [new software] looks for the new patterns without us having to program it to say, 'Here's what we think could be happening,'" Rosenstein said. "It asks, 'Are they getting too many services? Are they getting services from multiple physicians? What's their emergency room usage? Are they getting lots of narcotics from going into the emergency room?' It's predictive. It tries to look at the behaviors that occur or could have occurred before we've identified the pattern. It will tell us what it believes to be an emerging fraud pattern."

Using predictive analytics, the software changes the agency's detection practices as offenders change methods. The system uncovered numerous fraud innovations. For example, the software notices when doctors give tests or treatment outside of their specialty.

"We found situations where a physician would always do the same set of tests when they saw [patients]. For example, they would do nerve conduction tests. Everybody they

saw got a nerve conduction test, and the doctor wasn't a specialist in the area," Rosenstein said.

The system notices when a physician bills for more prescription drugs he or she had in supply. Red flags also appear when doctors perform excessive tests unrelated to symptoms reported for the corresponding patients. Some providers double-billed for visits using different billing codes for each visit. Multiple visits to providers by patients during the same day tipped off the system about that swindle.

"We were able to put a hard edit in our system to stop it," Rosenstein said.

In keeping with its strategy to cut Medicaid costs, using EDS to track fraud costs the state no extra revenue. The company gets a cut from whatever savings it produces for California.

"We've got EDS on an incentive process. We don't pay them anything specifically to operate the system. For every dollar they save for us, we give them 10 cents," Rosenstein said.

The company doesn't get its cut from a fraud case until it completes corrective action against the fraudulent provider or patient, demonstrating a reduction in Medicaid payments, Rosenstein said.

For example, in 2006, EDS identified 97 cases of fraud resulting in a $1.9 million savings. EDS received $197,000, and the state kept the remaining 90 percent.

"It works incredibly well because they have a strong incentive to find cases. If it doesn't work, we don't spend anything. If it works, we get 90 percent of the savings," Rosenstein said.

TennCare, Tennessee's Medicaid program, manages its patients' prescription drugs with an "e-prescribing" IT system that enables doctors to see a patient's Medicaid prescription history. TennCare uses the solution to reduce fraud. For example, it uses software to detect when a patient visits several different doctors in a short time each for different ailments, but for prescriptions of the same drug. That patient could be overmedicating or selling the excess quantities on the street.

Stan Rosenstein, deputy director of medical care services for the California Department of Health Services, implemented an IT solution that detects current fraud trends.

"When you talk about a drug like OxyContin [a prescription pain medication], a couple of years ago, the word on the street was that you could get a dollar a milligram for that drug," said David Beshara, pharmacy director of TennCare.

Sometimes Medicaid patients purchase drugs intended for overuse or street sale at pharmacies. TennCare can't detect those cases because the purchases don't involve its e-prescribing system. TennCare has a cost reduction interest in that type of fraud because the agency pays for the doctor visits enabling those fraudulent purchases. Recently passed state legislation will require Tennessee pharmacies to submit all of the narcotic prescriptions they administer Tennesseans to a centralized database. TennCare plans to connect its e-prescribing system to that database. The project could find instances of private prescription drug purchases connected to Medicaid-paid doctor visits.

TennCare also uses the e-prescribing system to reduce inappropriate prescriptions not resulting from fraud, but from pharmaceutical marketing campaigns, said Beshara.

He said patients often see TV ads for drugs they erroneously think they need and get doctors to write prescriptions for them. TennCare uses software to determine the most commonly misused drugs and includes them in its "prior-authorization" process. The e-prescribing system analyzes a patient's past medical treatment before letting a doctor prescribe one of those drugs. If the system rejects the prescription, the doctor can call the agency to appeal the rejection.

"We really have a prior authorization so we can make sure we're paying for things we should be paying for," Beshara said. "With marketing from the pharmaceutical companies, they spend $20-plus billion on marketing activities. They spend that money to create sales for their products, and I can't say with 100 percent certainty that their sales are based on completely justified use 100 percent of the time."

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LOS ANGELES COUNCILMAN **TONY CARDENAS** EXPLAINS HOW INFORMATION TECHNOLOGY MAKES THE CITY MORE LIVABLE — FROM EASING TRAFFIC CONGESTION TO ENHANCING PUBLIC SAFETY.

BETTER LIVING THROUGH TECHNOLOGY

BY JESSICA JONES | CONTRIBUTING WRITER

TONY CARDENAS WAS ELECTED TO THE LOS ANGELES CITY COUNCIL IN 2003, REPRESENTING PARTS OF THE CITY'S SPRAWLING SAN FERNANDO VALLEY. IN EARLY MARCH, CARDENAS SAT DOWN WITH GOVERNMENT TECHNOLOGY TO DISCUSS HOW THE NATION'S SECOND MOST-POPULOUS CITY USES TECHNOLOGY TO STRENGTHEN PUBLIC SAFETY AND IMPROVE QUALITY OF LIFE FOR RESIDENTS.

IN PARTICULAR, CARDENAS POINTED TO L.A.'S JORDAN DOWNS PUBLIC HOUSING PROJECT, WHERE A WIRELESS MESH NETWORK PROVIDES STREAMING VIDEO SURVEILLANCE FOR LOS ANGELES POLICE DEPARTMENT OFFICERS AND WIRELESS INTERNET ACCESS FOR JORDAN DOWNS RESIDENTS. CARDENAS, A FORMER CALIFORNIA ASSEMBLYMAN, ALSO TALKED ABOUT HIS EFFORTS TO FINANCE TRAFFIC LIGHT SYNCHRONIZATION THAT HELPED TAME THE CITY'S INFAMOUS ROADWAY CONGESTION AND ABOUT PLANS FOR CITYWIDE WIRELESS INTERNET ACCESS. »

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GT: WHAT ARE YOUR TOP TECHNOLOGY PRIORITIES FOR THE CITY?

CARDENAS: One is something that our police department has testified is critical in some of the high-crime areas. For example, in Jordan Downs, we have a pilot program with a private company working with the police department. They have two commandments. One is that they have cameras that are already hooked in to the police department, and [officers] can actually watch them from a screen within their vehicles. So if they have a shooting, or a report of rape or other heavy crime, they can turn to those cameras and see the scene before they walk in. They may be going into a scene where someone has weapons, so for the police officer to actually get a bird's-eye view of what's going on in there is a tremendous safety [feature], not only for the public, but for the department.

Now that the infrastructure is there, the second commandment is to have technology and computers available to kids and families in Jordan Downs, which is a public housing facility — one of the biggest and most crime-ridden in the city. They're using the technology for public safety, and at the same time, using that backbone of infrastructure to have technology available so kids become computer literate. … When you look at the digital divide, they're trying to provide answers.

GT: CAN YOU TELL ME ABOUT OTHER WAYS YOU'VE BRIDGED TECHNOLOGY AND PUBLIC SAFETY?

CARDENAS: Reporting is very important. I was trained as an engineer, and it's important for me to have feedback. Once you get feedback, you can decide whether or not the first investment did happen and it's working the way it was expected.

> "A FEEDBACK SYSTEM IS **A FANCY WAY OF SAYING** YOU TAKE INFORMATION AND THEN THINK ABOUT IT, ANALYZE WHAT YOU'VE LEARNED, PUT IT BACK IN THE SYSTEM AND **GET BETTER RESULTS**."

In addition to that, feedback systems are the backbone of human improvement. A feedback system is a fancy way of saying you take information and then think about it, analyze what you've learned, put it back in the system and get better results. One of my responsibilities that I'm holding the police department and also the technology company accountable for, is they stay on course, they report to my IT committee and tell me the progress [of the Jordan Downs pilot].

We're also always looking for opportunities and other beneficial factors, such as making sure that backbone of infrastructure can be used for the community's purposes as well. So it's primarily for public safety, and that's what we use it for. We're keeping our fingers crossed because we hope and expect it will be successful, and if it's proven successful, we want to duplicate [the Jordan Downs pilot program] throughout the city.

GT: IN LESS THAN TWO YEARS, YOU'VE OVERHAULED L.A.'S BUSINESS TAX SYSTEM. WHAT DID THAT ENTAIL?

CARDENAS: L.A.'s mayor [Antonio Villaraigosa] was quoted as acknowledging we had an overburdened city tax system for businesses. We don't rank very well with our neighboring cities — some cities have no city tax for businesses; some have a very minimal tax; we have had one of the highest.

So I became the chairman of the committee and made a commitment to the L.A. community that we were going to reduce their tax to do business in the city. As a result, we removed close to two-thirds of the city's businesses — smallest businesses — off the tax rolls. Once they grow into a medium-sized business, they would fall into that tax system.

In addition to that, we give special exemptions, for example, to people who work from their home in the movie industry, because a lot of those writers and people who work out of their homes were feeling overburdened. One year they make a good amount of money, and they might not the next year. We're able to give them an even higher threshold of not having to pay city taxes.

GT: WAS THERE CONCERN THAT BY ELIMINATING THOSE TAXES, THE CITY WOULD LOSE MUCH-NEEDED REVENUE?

CARDENAS: I was arguing with some of my colleagues about whether this would work, and I had promised them that based on our analysis, if we reduce the taxes on most of the businesses in L.A., we could do two things: One, we wouldn't have to worry about the vast majority of businesses and could focus on proper taxation of the bigger businesses. As a result, we would see a rebounding effect of our tax base and collect more money. People thought that was kind of odd. We actually had professors who explained to us that there is, in fact, an economic phenomenon called the "elasticity effect," and that means (this sounds more like a Republican ideal) that if you reduce the tax burden, you could actually have a healthier government and perhaps more money in your coffer.

We analyzed it and realized that if we get it just right, we would have that effect; with my legislation, we reduced the business tax by

$90 million a year, which is tough for government to do. For a local government to have the cause and effect of reducing the amount of money we're going to collect by $90 million … makes us kind of nervous. But I knew in a short time we would actually have a rebound effect and end up collecting more money.

Sure enough, within a 12-month period, we reduced and eliminated some taxes for most businesses in L.A., and we created certain exemptions. We also took out the tax reporting system for the city that had more than 70 categories; we reduced it to seven. We also eliminated many people from our tax rolls, so we focus on the collection of taxes from our larger businesses in the city, and we had more equity within that community, so fewer people were getting away without paying their taxes. We ended up having a larger tax base a year later than we did the year before.

GT: CAN YOU EXPLAIN THE ROLE TECHNOLOGY PLAYED?

CARDENAS: We had to fortify our tax collection system. That's why we had a staggered implementation — we had to reconfigure our tax collection and notification system so that notifications went out on time with the new information. And we had to give the businesses enough time to interpret the new situation with their accountants, so that they could go ahead and properly report.

We had to invest several million dollars into revamping our tax collection system. We did it in a way that we didn't have any glitches; we were prepared for it, and it ended up being flawless. When we simplified our system from 70-plus categories down to seven, we had to not only re-create forms, but because we allow people to report online, we had to have that reporting system upgraded for the city, and we had to contract and sign a new contract with the third-party provider for our tax collection system.

It was a successful event. It was kind of scary because we had technology that we have to recommit and readjust, and we had [to deal with] the legality of making sure we have proper notification so people couldn't try to get themselves exempt because we misinformed them.

GT: DID THE RETURN ON INVESTMENT COVER THE COST OF IMPLEMENTATION?

CARDENAS: Exactly. Everything was covered within the existing budgets and everything was covered and fortified, and

Curbing Gang Crime

As the chairman of the Ad Hoc Committee on Gang Violence and Youth Development, Los Angeles City Councilman Tony Cardenas is revamping the way the city interacts with gang members, primarily through a unique intervention program.

"[This] is a program where individuals with what they call street credibility can walk up to a gang member and say, 'Why are you doing what you're doing? We have ways in which we can help you get some skills to get a job, to pull you away from that lifestyle,'" Cardenas said. "It's not an easy thing to do."

Since gang members can start as young as 12 years old, convincing them to quit can be a difficult task, Cardenas said.

"Can a social worker do it? Probably not," he said. "Can a police officer do it? Yeah, they might get attention for the moment, but they're not going to get through to them because they don't speak their language, they're not seen as a friend, there isn't a connection between them other than a momentary respect because they don't want to have to deal with the officer."

A gang interventionist is, more often than not, a former gang member, and that's what gives him street credibility, Cardenas said.

Since 2000, when Los Angeles started investing more earnestly in intervention prevention programs, youth homicides and youth violence has slightly decreased each year.

"In my legislation, I required the [California] Department of Corrections, which actually gives out the money to local governments, to report back to the state of California about how many programs they utilize the money for, how many youth were helped, etc.," Cardenas said, adding that technology plays a role in the required documentation from these organizations. "Everybody is using computers; everybody is communicating by e-mail now."

Cardenas said that the average intervention prevention program costs the government about $1,200 to $1,300 per person, while the state spends more than $40,000 per year to incarcerate an adult, and more than $90,000 per year to incarcerate a youth.

"This preventive intervention investment is saving the state millions of dollars," he said, "and over time, billions."

we knew that the elasticity effect would take place. It actually took place a little faster than expected.

Before I became a city councilman, I was a businessman; I had as many as 26 people working for me. I remember those complicated forms; I remember the frustration, and I remember having to pay my county taxes, my city taxes, and my federal and state taxes. I was looking forward to having an honest straightforward system and fewer burdens from our city so that [small businesses] could grow and become more successful tax-paying businesses. So I was motivated by that as a former business owner, but at the same time, I was motivated because I didn't want to be part of the repertoire of people who ran for office who promised reduced business taxes for the city. I made a commitment, and I understood what that commitment meant to businesses because I was [a small business owner] myself. In addition to that, I wanted to be that honest politician who made a claim — who promised I would do something — and actually did it.

When I was in the California State Legislature, I understood how risky it is to make promises of reduced revenue, yet we're going to keep the standard of our funding to the community and all of the things we promised for them. That's when the elasticity research came in, and we understood enough about it to know that is what in fact would take place. All of those moving parts were very important for me to keep my promises as a politician.

GT: HOW IS THE CITY USING TECHNOLOGY TO SOLVE QUALITY-OF-LIFE ISSUES, SUCH AS TRAFFIC CONGESTION?

CARDENAS: We did a pilot in my district and another couple parts of the city where we synchronized our traffic lights, where we proved that by synchronizing the lights on some of our main thoroughfares, we could reduce the travel time by 15 percent to 20 percent. And we're talking about peak hours, not just the easy times: peak hours in the morning and afternoon. We did that pilot, and once we did it, we realized that the results were actually coming through.

So we used our political clout in Sacramento, and when they put an initiative on the ballot two years ago — a transportation bond — we actually infused in the bond a minimum of $140 million. We had already calculated how much it would cost for us to do that in the entirety of the city in our main thoroughfares. That [bond] passed, so we already have the money in place to go ahead and synchronize lighting through technology that is in place on certain corners of those main thoroughfares. The cameras and digital technology can actually be adjusted remotely.

> "WE'RE STILL ON THE ROAD TO FIGURE OUT HOW TO BE **THE FIRST CITY THAT IS SUCCESSFUL** IN PUTTING TOGETHER A CITY WI-FI SYSTEM."

GT: WHAT OTHER CHALLENGES ARE YOU FACING?

CARDENAS: We're trying to implement citywide Wi-Fi — and we're hopefully going to be successful, but the model has changed from what we had anticipated — so we can get digital access, digital inclusion to every part of this city ... from the poor parts of the community to the most affluent.

We were skeptical that other cities had bragged about the fact that they were implementing citywide, but at the same time were still saying, "Wait a minute, the implementation is lagging."

So we announced that we were going to put out an RFP to see if we could get a citywide Wi-Fi, and hopefully we could do it with private dollars and the city wouldn't have to commit its own money. Obviously we would have to have a public-private agreement, and the private provider would have some kind of advantage in providing Wi-Fi privately.

Since we started the process, we realized that every single private provider that has agreed with local cities throughout the country has backed off and isn't moving forward as before. Now we're looking at the possibility of having a public-private partnership where we come to the table with either resources or dollars with the private industry.

One of the beautiful things we have in L.A. is the largest Department of Water and Power in the country. So tip to tip and in every corner of the city, we have hardwired capability to have communications in every home and every business in the city. Our Department of Water and Power may even be one of the components and partners in this future partnership. If we don't do it with them, we're going to be working with our other communication providers such as AT&T, Verizon, Time Warner — possibly have different regional components communicating with each other across jurisdictional lines.

We're still on the road to figure out how to be the first city that is successful in putting together a city Wi-Fi system. It's a tremendous challenge, and again, I had personal conversations with the mayor, and because of my background as an electrical engineer, I said to the mayor, "Look, it sounds pretty good, but there's a reason why nobody has been able to figure it out; there's a reason why every other city that's embarked on this journey is having problems getting to the implementation stage. Since then, every single one has backed off, and now they're having to reconsider how to do it. Their previous agreements don't seem to be coming to fruition." GT

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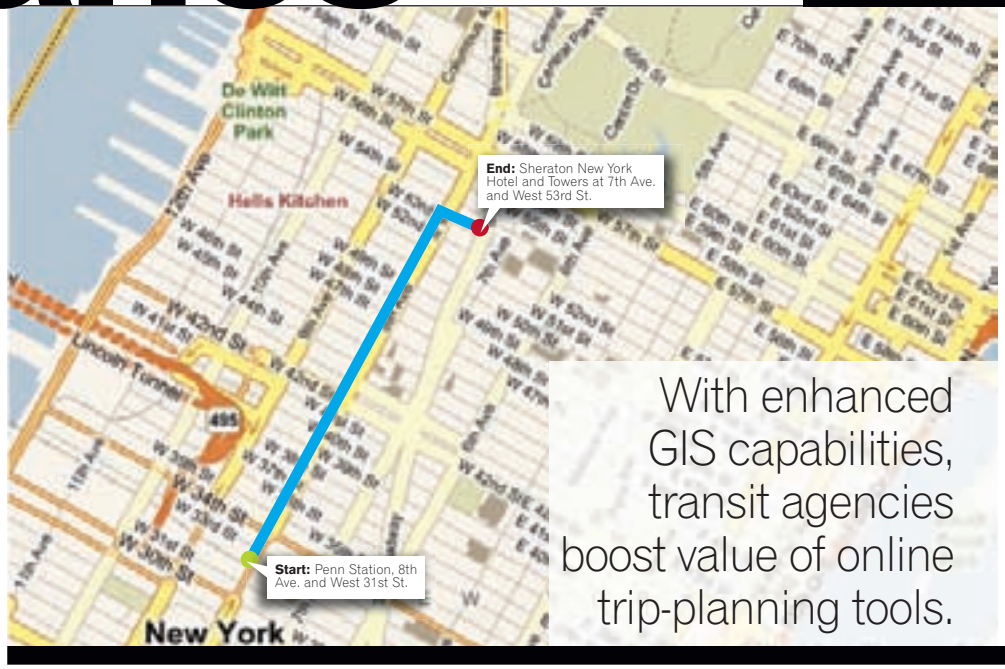
Synopsis: New York City Transit uses its own databases and enhanced mapping capability to help citizens take advantage of public transportation.

Technologies: ATIS database software, Microsoft Virtual Earth, Navteq digital maps.

Contact: Paul Fleuranges, vice president of corporate communications, New York City Transit, paul.fleuranges@nyct.com.

Immersive Itineraries



With enhanced GIS capabilities, transit agencies boost value of online trip-planning tools.

I live in a suburb of Philadelphia. This morning as I planned a business trip to New York for next week, I went online to New York City Transit's Trip Planner http://tripplanner.mta.info to figure out how I would make my way from Penn Station to the Sheraton New York Hotel and Towers at 7th Ave. and West 53rd St.

Entering my starting point and destination quickly brought up several public transportation options, along with walking directions from the closest subway stops.

New features recently added to the Trip Planner make the experience much more immersive for users and reduce the likelihood that visitors will end up calling Metropolitan Transit Authority's NYC Transit agency seeking help. The updated Trip Planner includes aerial and three-dimensional views of the city. Users can now get walking directions and print walking maps from the closest subway stop to their destination. By using Microsoft Virtual Earth and map data from Navteq, NYC Transit says it can provide a more realistic view of the street grid than it previously could, making it easier for users to visualize the walking instructions.

More Detailed Maps

Like other public transit and transportation departments around the country, NYC Transit is making the most of its own databases and enhanced mapping capability to empower citizens to take better advantage of transportation systems.

NYC Transit began offering the online Trip Planner in late 2006, when the agency switched the database software used by call takers in its own travel information center to a product called Automated Transit Information System (ATIS), from Trapeze Software Inc. Agency staff wrote Trip Planner as an interface to the ATIS database and made the interface available online to the public.

"We needed a product that was scalable and Windows-based," said Paul Fleuranges, NYC Transit's vice president of corporate communications. "At the same time, we realized we needed a good online tool. We provide information to a huge number of users, so it was important to get in the game with trip planning."

A team from NYC Transit's staff of 16 Internet developers created Trip Planner, said Sohaib Mallick, senior director of Internet technologies at NYC Transit. The same team worked on the Virtual Earth mapping upgrade and a feature that lets users use Trip Planner from mobile devices.

Enhancements to Trip Planner using Microsoft's Virtual Earth platform allow for accurate 3-D city modeling, Mallick said, and the map data from Navteq, a digital map provider, is much more detailed than the data previously provided by Trapeze. The new version makes zooming in and out easier as well. NYC Transit's Internet Technologies Group programmed the application to let users overlay subway routes and stations on the street grid. Adding Virtual Earth and Navteq features took the Internet team only a few weeks in January before going live in February 2008, Mallick said. Although he didn't provide detailed cost figures, he said the expense was minimal because the agency is on a transactional licensing model.

Fred Benjamin, NYC Transit's assistant vice president for customer service, said the

BY DAVID RATHS | CONTRIBUTING WRITER

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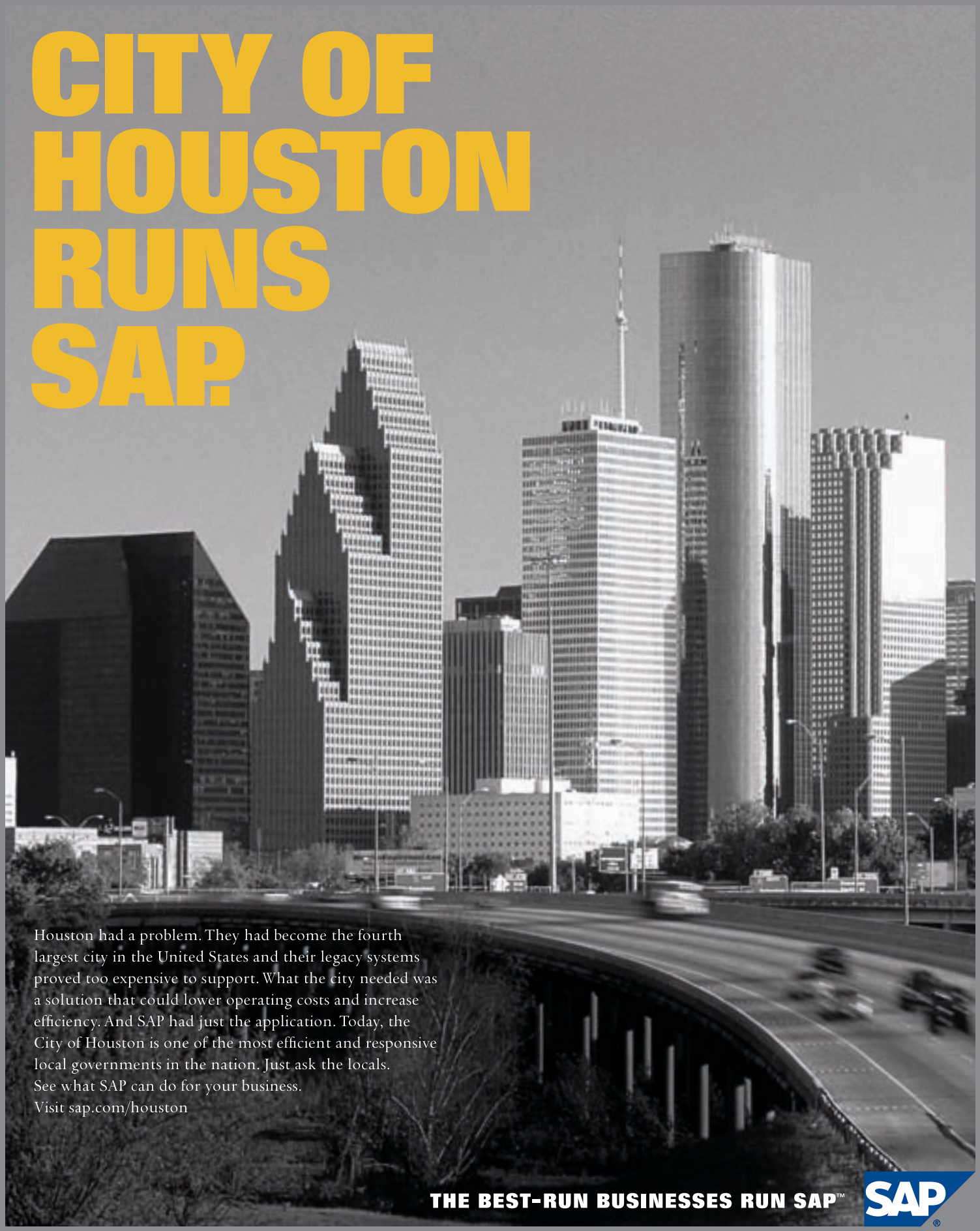

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Trip Planner pays dividends to the agency. "Since December 2006, we have seen a 193 percent increase in unique visitors to our Web site," he said. "We had 1.3 million visitors in 2007 and 185,000 in January, so the number of customers we're serving keeps growing."

Additionally people getting directions through self-service instead of calling for help translates into cost savings, and Benjamin said his agency has started work to quantify them. For instance, the abandonment rate on calls — people who get tired of waiting on hold — has dropped dramatically. "This is allowing our call center to handle calls from substantially more people, and we can redeploy some staffers who previously answered phones."

Making the Portal Interactive

Trip Planner improvements are just one of many enhancements to NYC Transit's Web site. Riders can use Trip Planner not just from PCs but from mobile devices as well.

Making your way through New York City and its boroughs can be a challenge even for those who live in the area. While you could always hail a cab to get where you need to go, public transit is a far more economical solution. With a few mouse clicks on NYC Transit's Web site and $2 for a subway ticket, even first-time visitors to the Big Apple can make sense of, and make their way through, the ultimate concrete jungle. This Trip Planner map is an aerial view showing subway lines in a portion of the city.

Through the portal, users can get real-time information about elevator and escalator outages. Alerts provide riders with information on unplanned disruptions in subway service, and users can sign up to receive e-mail notifications of planned construction work. Advisories, which detail information on planned service disruptions, are attached to all itinerary requests. Users can send e-mails directly to individuals assigned responsibility for customer service by rail line, and they can read the results of riders' customer service report card survey results.

"With the portal, we try to offer as much information as we can because we recognize it has become a vital tool for people," said Fleuranges. "We always offered directions and fare structures online, but we have made a big push in the last three years to improve on that."

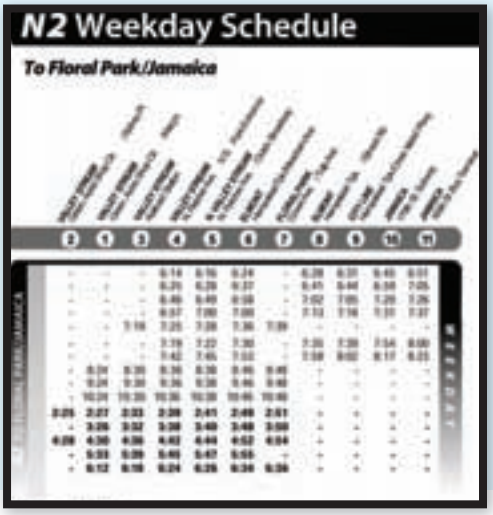
Kevin Adler, a Microsoft geospatial solutions specialist, said one of the neat things about the Trip Planner upgrade is that the agency "built it themselves and have made it much more of an immersive experience. They are not geospatial specialists, yet they can create something quite sophisticated — for instance, using a tool called MapCruncher to overlay subway routes on city maps."

Adler said improvements in geospatial technology make it easier for public-sector customers to innovate. For instance, in Texas both the El Paso and Houston areas created portals that allow the public to check on traffic flow, accidents, camera views of highways, and message signs — with all data overlaid on maps.

"These examples are enabling public agencies to better expose their data to citizens," Adler said. "The cities can visualize their data on top of our maps, and they can focus on their data."

Other transit agencies around the country are looking at ways to use GIS and GPS technology to enhance their trip planners. For instance, TriMet, the public transit agency in the Portland, Ore., area added a feature called TransitTracker that provides real-time bus and light-rail train arrival times that riders can access online, on the street and over the phone. By equipping every TriMet bus with a GPS transmitter, the agency can relay to users exactly how far a bus is from their stop.

Trip Planner features a host of next-generation mapping tools for those trying to make their way through Gotham City. However, travelers familiar with the city can still access traditional time and location diagrams for a quick summary of what goes where and when.



> "This is allowing our call center to handle calls from substantially more people, and we can **redeploy some staffers** who previously answered phones."
>
> **Fred Benjamin,** *assistant vice president for customer service, New York City Transit*

Powered by Google Maps and map data from Tele Atlas, the Massachusetts Bay Transportation Authority's Boston-area Trip Planner allows riders to add to their itinerary map landmarks such as museums, shopping centers and hospitals, with walking directions and their distance from the nearest subway stop.

NYC Transit's Mallick said his team constantly seeks ways to improve Trip Planner and other interactive features of the agency's portal. "We are always looking at the best and brightest in other regions for ideas," he said, "as well as at the newest technology on the market or about to come on the market." GT

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Synopsis:
Cities find 311 Web self-service eases the burden on 311 call centers.

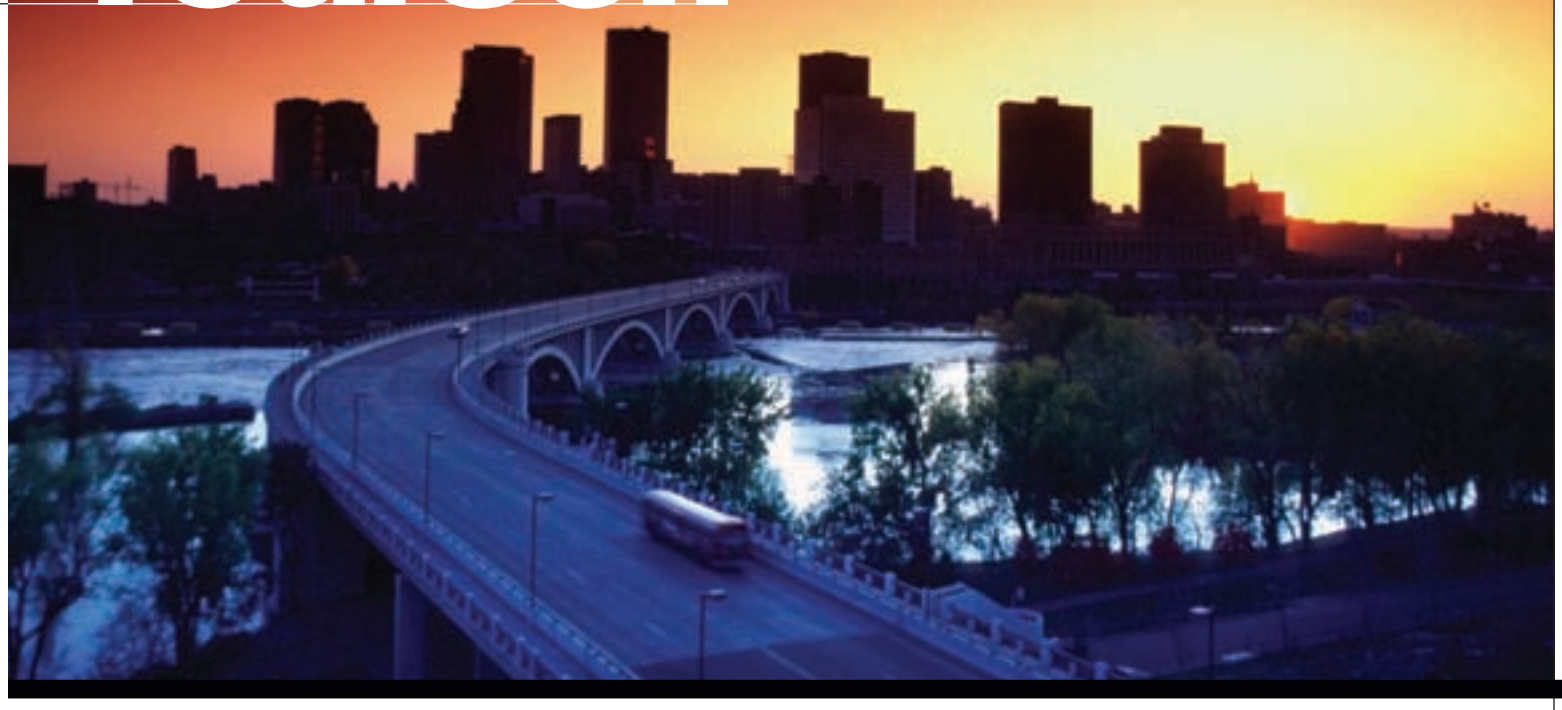
Jurisdictions:
Fort Wayne, Ind.; Minneapolis.

Technologies:
311 systems.

Contact:
Casper Hill, Minneapolis Communications Department, 612/673-2342.

Help Yourself

Web self-service offerings help 311 efficiency.



Until 2006, Minneapolis city government was burdened with an inefficient calling system. The Minneapolis Blue Pages telephone book listed more than 270 city government phone numbers. The city received about 16,000 calls daily, with as much as 30 percent being misrouted. The Minneapolis Police Department reported between 60 percent and 85 percent of its calls were misdirected.

In 2006, city officials decided a change was in order and developed a 311 call center to provide an easy access point to city services. The 311 center enabled residents to place a single phone call to reach city agencies, including public works, regulatory services, community planning and economic development, animal control, police, fire and human resources.

Though it was an immediate hit with city residents, the call center outgrew its success as it became overburdened with thousands of calls daily. Within the first month of operation, nearly 9,000 Minneapolitans accessed 311, and within a year Minneapolis 311 received 340,000 calls. In 2007, the annual calls jumped to 440,000. The increasing demand prompted city officials to choose between hiring more staff for its call center or seeking an alternative method to handle the influx.

Efforts to enhance 311 in Minneapolis and elsewhere reflect a larger trend for 311 services nationally. Whether at the city, county or state level, 311 programs often provide Web self-service for citizens to alleviate 911 nonemergency calls, provide better service and save money. These systems are often cited as examples of how governments can do more with less, while simultaneously becoming more cost-effective at the service level.

According to Gartner, an IT research and advisory company, 311 call centers represent a first phase of centralized municipal service. The second phase is a multiple channel service delivery center that usually incorporates phone, Web and mail services. The third phase is utilizing data collected from 311 centers to further enhance service. Mature 311 system deployments provide data and insight into patterns that allow agencies to take pre-emptive action.

However, the third phase is relatively new for governments, with only an estimated 10 percent of the country's municipalities implementing this feature, said Rishi Sood, vice president of Gartner. But more governments

BY CHANDLER HARRIS | CONTRIBUTING WRITER

that use 311 Web self-service offerings are expected to use data to their advantage in coming years.

"What's really new and next-generation is local governments are starting to mine this data as an intelligent modeling tool to understand trends really quickly and develop a response mechanism to address common city complaints before they become too big," Sood said. "It enables governments to be reactive and proactive to citizens' problems."

Land of Too Many Calls

In 2007, as an alternative to hiring additional 311 call staff, Minneapolis offered a 311 Web self-service feature for citizens submitting minor police reports and requesting public works services. The Minneapolis 311 Web self-service initially offered 13 services, eventually adding 14 more services in August 2007 to keep up with demand.

"With that kind of growth, we had to look at options on how [to] not continue to add staff and still provide the same level of service and quick response," said Don Stickney, assistant director of Minneapolis 311. "We found the key strategy was a robust self-service offering."

City officials soon declared the new Web offering a success: Of the city's nonemergency services available, 21 percent of requests were made online, rather than by phone. Online service requests include animal control, cable complaints, environmental violations, and crime and pothole reports. At first, the most commonly used Web self-service was for sidewalk snow and ice issues, however, requests for graffiti removal now top the list.

Citizens who utilize the Web self-service can attach a photo to their request to help city officials accurately identify the claim. For each claim, citizens receive e-mails on the status of their requests. The 311 system, in turn, creates a detailed interaction history for every contact, including key milestones tracked by an agency and defined service-level agreements to provide trend documentation.

The Gartner study on the Minneapolis 311 call center found a significant return on investment when residents used the Web instead of calling 311, which forces agents to log cases on the customer's behalf. The study found that each telephone call or e-mail inquiry cost an estimated $4.50, while Web self-service cost 50 cents per inquiry. Once 311 Web self-service was offered in Minneapolis, 20 percent of cases were logged onto the city's Web site rather than the call center, which has saved thousands of dollars annually.

Minneapolis' 311 call center also proved to be useful during a disaster. When the Interstate 35 bridge collapsed in Minneapolis in August 2007, the 311 call center became the *de facto* nonemergency public information center, fielding thousands of calls for assistance, status of victims, alternate road routes and media requests.

"We learned a lot through the process, such as how to better utilize our knowledge base," Stickney said. "With the battery of service requests we had, we are now prepared in advance for any disaster situation."

Self-Serve Grows Popular

Currently 65 cities have 311 call centers for nonemergency calls to police and other government offices, according to *Dispatch* magazine. Like 911, 311 call centers have become inundated with calls, forcing municipalities to keep up with increasing demand. Many municipalities are embracing a supplemental 311 Web self-service that works in conjunction with the 311 call center to alleviate high 311 call volume or provide additional city services.

"I think [311 Web service] is a natural extension to 311 call systems already in place," said Sood. "The 311 call centers have been a very important customer service tool to provide centralized services and centralized points of access to cities. But now the extension to multiple channels on the Web is an important pathway for cities and counties to accelerate services forward."

> "I think [311 Web service] is a **natural extension to 311 call systems** already in place. The 311 call centers have been a **very important customer service tool** to provide centralized services and centralized points of access to cities."
>
> **Rishi Sood,** *vice president, Gartner*

Like Minneapolis, Fort Wayne, Ind., implemented its 311 system, One Call to City Hall, in October 2007 and is averaging about 7,300 calls per month for all departments, with 61,600 calls in 2007. While the Fort Wayne call center previously offered a central calling location, city residents' calls weren't being transferred correctly.

Fort Wayne worked with Lagan Technologies to implement the 311 call center that includes Web self-service. The city initially provided Web services corresponding to the highest-volume case service requests: solid waste, neighborhood code, parking control, street department, property management, sign and signal operations, and right of way. Additional departments will be incorporated in the near future, including animal control, water maintenance and traffic engineering, said Sally Clem, billing systems manager for Fort Wayne and technical manager for Fort Wayne's 311 call center.

The 311 Web self-service option in Fort Wayne allows citizens to log requests after-hours, becoming a 24/7 call center in a way, Clem said. This feature is particularly effective for services like missed trash pick-up and abandoned vehicles, helps expedite service in the city.

"We feel it will be a great advantage to our customers to identify an abandoned car, and they can report that car to us anytime they want via the Web," Clem said. "We feel we will be able to provide better and faster service to our customers if we do it this way."

Clem said the 311 Web self-service will make city departments more efficient since they'll spend less time on the phone and will save money overall. City officials are looking to expand 311 Web service offerings in the coming year. Fort Wayne has been rolling out fiber-to-the-home services, in partnership with Verizon, and it's hoped the service will be an incentive for people to use the Web 311 instead of calling.

"Our departments can concentrate on what they need to do instead of answering the phone, and they can start putting a team together," Clem said. "Overall it makes our departments more efficient, and in being more efficient, saves us money." GT

Taking the Bait

Sacramento Calif., Police Department tempts auto thieves with bait cars.

Synopsis: The Sacramento, Calif., Police Department keeps auto thieves on their toes by tempting them with bait cars.

Agency: Sacramento Police Department.

Technologies: GPS.

Contact: Sgt. Matt Young, Sacramento Police Department, myoung@pd.cityofsacramento.org, 916/808-0808.

PHOTO BY JESSICA JONES

The bait might be a Toyota, Honda or Acura. It looks like any other car, but it's not.

It's abandoned in a neighborhood plagued by a rash of car thefts. If and when — usually when — a thief decides to take the bait, that's when the fun begins.

When the thief drives away with the bait car, he may think he's gotten away because there might not be police in the area. But starting or tampering with the car activates a hidden GPS tracking system and alerts the police command center, which immediately begins monitoring the vehicle and alerts nearby police units.

"When an activation has occurred, the information is transmitted to the dispatcher. She gets units rolling, gives them a description of the car, the direction of travel and speed," explained Ben Gomez, a detective in the Office of Investigations for the Sacramento Calif., Police Department. "The issue here is increasing safety for the suspect and the officers. We don't want any pursuits."

Patrol units locate and stop the vehicle. If the occupant decides to flee in the car, the officer can instruct the dispatcher to shut down the vehicle, which will bring it to a gradual stop. If necessary, the dispatcher can also lock the bait car's doors, keeping the thief inside as officers approach.

Intangible Benefit

"The benefit to the public is not tangible because [the theft] never occurs, but it's huge," said Sgt. Matt Young of the Sacramento Police Department. "As everyone knows, some of these high-speed pursuits are extremely dangerous, and unfortunately, at times, result in death or injury to innocent people. That's the last thing we want to see, but we still have to go out and make arrests and find these guys out there committing these types of crimes. This program allows us to do that very efficiently."

Police now maintain their usual patrols while the bait car and its technology are positioned in a strategic location. "The beauty of the bait car, the way we use it with the tracking system, is such that it uses minimal resources while deployed. At the time of theft when the activation occurs, dispatch receives that information, makes the broadcast and officers respond, locate the vehicle and make the arrest," Gomez said.

> "We want the bad guys to know **[the bait cars are] out there**, but at the same time, **we don't want them to know how many** and what they look like." **Ben Gomez,** *detective, Office of Investigations, Sacramento, Calif., Police Department*

In the early days — the bait car concept was introduced in the 1990s — the operation involved a regular car and police to physically monitor it. It was labor-intensive and took cops away from their normal patrols.

"We identify locations of either vehicle thefts or areas where the vehicles are being

BY JIM McKAY | JUSTICE AND PUBLIC SAFETY EDITOR

dumped after being stolen," Gomez said. "We'll use information from crime analysis; we'll take information from citizens groups. Many times the citizens groups will have more updated information than our crime analysis unit, so we'll use that."

The cars are nondescript and there are several, although the Police Department wouldn't disclose just how many. "We want the bad guys to know that they're out there but at the same time, we don't want them to know how many and what they look like,"

"When an activation has occurred, **the information is transmitted to the dispatcher.** She gets units rolling, **gives them a description of the car**, the direction of travel and speed."

Ben Gomez, *detective, Office of Investigations, Sacramento, Calif., Police Department*

Gomez was careful not to reveal all the bait car's bells and whistles as he talked about the tracking device, camera, GPS and other features. "We have the ability to lock the doors, we have the ability to kill the engine, and we have some other features I won't divulge," he said.

Police want the bad guys to be aware of the bait cars, but they don't want them to know many of the specifics about how the technology works, however. "The bad guys will start speculating, 'That may be a bait car. Let's get inside and tear it apart.' Or maybe they steal a car but in the process of stripping it, they put two and two together — and this *has* happened — and they realize this is where the stuff is."

PHOTO BY JESSICA JONES

Gomez said. Crime analysis reports show that Hondas, Toyotas, Acuras and trucks tend to be the vehicles most coveted by thieves, Gomez said. "Whatever is being stolen, we try to find a vehicle that's very similar. Why not give them what they're asking for?"

According to the **National Insurance Crime Bureau**, the Sacramento Metropolitan area is one of the nation's 10 hot spots for car theft. In 2006, Sacramento was ranked 7th for the second consecutive year with 19,558 vehicles stolen.

Crooks know of the concept of bait cars, but some thieves still can't stop themselves.

"Ideally we'd like to see our bait cars never get stolen because everyone's too afraid to break into a car, but criminals aren't the smartest people in the world," Young said. "There are always going to be people willing to commit these crimes in our city, but hopefully this is somewhat of a deterrent. If it's not enough of a deterrent, if they choose one of these vehicles, the consequences are going to be quite severe."

Anyone caught in a bait car is almost guaranteed to do some jail time. Sacramento has a 100 percent conviction rate with no injuries sustained during the city's bait car deployments.

"We have the ability to record both audio and video," Gomez said. "Additional features allow us to basically provide evidence at the court level that is nonarguable. How can you say 'that's not me' when, in fact, there's videotape right there in front of the jury of 12?"

Tangible Benefits

Sacramento's vehicle theft statistics have remained fairly static, possibly because bait car use there is limited. Other police departments have seen great reductions in vehicle theft, however, and credited that to bait cars. The Minneapolis Police Department was one of the first to deploy the high-tech bait car in 2004 and saw its auto thefts decrease by 37 percent in the first six months.

Spending on bait car programs depends on an agency's resources and the depth to which it wants to develop the program. "It's like anything else," Young said. "A tracking system can be as basic as $1,000, depending on how sophisticated you want to be. There are systems out there for about $5,000 or $6,000. We fall in between — about $3,000 and $3,500."

The benefit of putting car thieves behind bars with little cost to the taxpayer is a no-brainer, he said. "Your front-end costs consist of setting up the equipment, but where the recovery occurs is the back end. You have no court time; you're not using taxpayer dollars on the back end.

"Some people estimate the cost of a trial at $8,000 to $10,000 a day. With this technology and this program, you're able to look at the evidence, and it's so overwhelming in terms of guilt they're much more inclined to plead out."

In fact, Young said there has never been a trial in Sacramento for theft of a bait car. "It's an open-and-shut case." GT

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TO WATCH GTtv's VIDEO REPORT ON THE SACRAMENTO POLICE DEPARTMENT BAIT CAR, VISIT: WWW.GOVTECH.COM/GT/VIDEO

Shared Connection

Wisconsin police departments stick together to upgrade their network and overcome security challenges.

Synopsis: A trio of Wisconsin municipal police departments assigned its task force to encrypt part of its network and upgrade to high-speed wireless.

Agency: Middleton, Fitchburg and Sun Prairie, Wis.

Technologies: High-speed wireless network, encryption and records management software.

Contact: Matthew Prough, systems administrator, Multi-Jurisdictional Public Safety Information System, Matthew.Prough@city.fitchburg.wi.us.

The cities of Middleton, Fitchburg and Sun Prairie have similar-sized populations, are almost equidistant and are on the outskirts of Wisconsin's capital city, Madison.

They also share some things that are far less obvious: an encrypted wireless network that links their police departments, a bundle of high-tech software and the joint commission responsible for it all.

The MultiJurisdictional Public Safety Information System (MPSIS) task force formed four years ago to fix the police departments' ailing records management systems, and since then it has procured high-tech tools and provided cost savings.

"We consolidated a lot of what police departments need to do their job," said Matthew Prough, the system administrator and sole MPSIS employee.

Prough, whose background includes law enforcement and technology, steered the cities' latest collaborative project: upgrading slow T1 links (in place since 2004) to high-speed wireless and encrypting part of the network's traffic. The improvement initially presented a challenge for the MPSIS.

Going the Wireless Way

When the cities looked to upgrade their network, a speedier connection wasn't on top of the must-have list. Officials wanted the ability to extend a flat Layer 2 network out to the network's physical locations to prevent disruptions, while also preserving the existing IP network addressing scheme.

As a result, if the main Fitchburg server failed, a backup server at a different location would assume operations without the need to reconfigure. "This gives us an easy ability to establish redundancy and business continuity for our systems," he said.

Redundancy is especially important for public safety entities because a several-minute glitch could endanger people.

Prough said the decision to extend the Layer 2 network out to the sites — instead of routing between them — to provide a backup network backbone often comes as a surprise to others. "My experience is that there's a basic assumption made by people that since we have three separate sites, we route between them," he said.

Some consultants discarded the idea of a Layer 2 network, Prough said, especially when it came to encryption and backup links. Prough suspected that familiarity with routed networks was partly to blame. "But we knew what we wanted to achieve, and simple persistence and patience ultimately allowed us to achieve the results we were looking for," he said.

Segment Solution

Because of the wireless upgrade, the MPSIS had to comply with Criminal Justice Information Services (CJIS) security requirements — federal mandates for sensitive information. The requirements are compulsory for police departments, which access state and federal databases (e.g., when pulling license plate data) and information from local police departments connected by a Web-based tool called the Wisconsin Justice Information Sharing (WIJIS) Justice Gateway.

Although CJIS compliance with WIJIS policy is not mandatory until 2010, any upgrade or new connection must comply immediately, Prough said.

To secure the wireless network, the MPSIS turned to encryption. Of the five responses to the organization's RFP, three offered wireless radios with built-in encryption and two offered wireless-only solutions with the option to encrypt via a third-party vendor.

BY JESSICA HUGHES | CONTRIBUTING WRITER

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What's a Layer 2 Network?

A Layer 2 network is like what you might use in your office — it's a flat network where all the participating machines can communicate without the need for a router, said Matthew Prough, MultiJurisdictional Public Safety Information System system administrator.

"In contrast, a Layer 3 network is one in which separate networks exist, each with their own unique address space," he said. "To make a host on one network talk to a host on a different network, you need to have routers."

In cases where different locations are connected, a Layer 3 network setup is common, with individual networks and different network addresses at each location.

However, a Layer 3 network takes additional work to manage because of the multiple networks involved, Prough said. And in the instance of a server failure, the backup server would need to be reconfigured.

That's not the case in a Layer 2 network environment, where the backup server would automatically assume the same address as the primary server.

"Having a Layer 2 network across our sites makes management easier, because no matter which city you are in, you are on the same network subnet. This becomes very beneficial when you start talking about business continuity," said Prough.

For the MPSIS, the choice hinged on price.

"The two that included encryption options external to the wireless radios were significantly less expensive," Prough said. The cities tapped CommConnect for the wireless connection and took CommConnect's advice to enlist third-party vendor CipherOptics for the encryption.

CipherOptics proposed its CipherEngine to meet MPSIS's cost and performance requirements. In addition to encrypting traffic on the Layer 2 switched network, the MPSIS called on CipherOptics to segment the nonencrypted traffic from the Fitchburg Fire Department, so the fire department would connect via half of the Fitchburg Police Department link, thereby consolidating the two existing links that used the same water tower.

This created a serious challenge for the MPSIS because typically everything that goes with encrypted data gets encrypted, said Brian Irish, CipherOptics' marketing director.

To deal with the problem, CipherOptics implemented two virtual local area networks (VLANs) using encryption, Irish said. This capability wasn't always available. "In the past, encryption and VLANs have been like oil and water," he said.

The solution gave Prough what he was looking for — the power to dictate which data gets encrypted, he said. "This deployment has been a great example of how municipalities can get security as they transmit data in a way that works for them," Irish said.

Implementation of the encryption onto the network was a snap for Prough. CipherOptics talked Prough through the software configuration, and he did the work himself. Prough said he's had no trouble making encryption modifications to the wireless paths, even when operating from a remote location.

The simplicity of the system and additional savings, especially on the operational side, have made the encryption solution valuable to the MPSIS, Prough said.

The entire wireless system cost approximately $200,000, with the encryption portion about $35,000 of that total, said Fitchburg Chief of Police Thomas Blatter. The MPSIS received more than $1.1 million in federal grant money since 2004, which played a big role in implementing the joint software and recent upgrades. U.S. Rep. Tammy Baldwin, D-Madison, played a key role in landing those grants, Blatter said.

"The federal government can provide valuable financial and moral support by encouraging and assisting this type of intercommunity cooperation for the public good," Baldwin's spokeswoman said.

Consortium Formation

The MPSIS was originally formed in late 2003 to replace three aging records management systems.

Other software items were included in the original project like police dispatch software (Global Dispatch) and mobile data software (Global mReach), which together were "pretty inclusive of what police departments need on a daily basis," Prough said.

The records management system, Global Justice, took time to roll out because of the difficulty of converting data from the three separate systems, said Phil Sisk, president of Global Software Corp., MPSIS's software provider.

The result was worth it. The records management system, which was in full use by November 2005, is central to the police departments' functions, Prough said. The system shares and stores incident, accident, citation, arrest and evidence information from the three departments — it basically gives officers more information to fight crime, Sisk said.

The availability and accessibility of information helps officers do more in the car (on squad car computers), and they don't have to enter data twice. "These communities deal with the same issues and often the same people," Sisk said. "They have a better picture of whom and what they are dealing with when they share this type of information."

While the founding goal of the MPSIS was to purchase and implement a shared records management system, the objective naturally progressed; the cities looked into other components that fit within the joint framework and its existing systems, Prough said.

For example, the trio purchased a digital dictation system, municipal court software and fingerprint identification technology — all woven into the records management system.

Prough said the collaborative framework gives the cities access to new technologies and services that would've otherwise been unattainable. It also encouraged the police departments to join forces in other areas like training.

A key part of working together, Prough said, is to give all cities a say, but let no single city have too much control. However, democratizing the process has its downside.

"Any changes they wanted to make had to be voted on and agreed to by the group as a whole," Prough said, "but it can work if you can work through that — the consolidation can be very successful."

A future goal of the MPSIS is to provide some data access to the public, such as the locations and types of service calls the departments receive.

The MPSIS is also open to the idea of other police departments coming on board. The MPSIS's high-speed wireless network and encryption upgrades are tailored to be flexible and scalable.

Prough put it this way: "Since everybody is doing it the same way, it makes sense to build that out a little further." GT

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Alison Levine | Wednesday, September 24

Alison Levine is no stranger to risk-taking. She has survived sub-zero temperatures, hurricane-force winds, sudden avalanches, and a career on Wall Street — all without the use of supplemental oxygen. Please join us to hear her extraordinary story.

Frank Abagnale | Thursday, September 25

You met him in the major motion picture *Catch Me if You Can*. This is your chance to see him in person and relive his daring exploits as a teen-age confidence man. Now Mr. Abagnale has plenty to say about fraud, identity theft, forgery, embezzlement, and document security.

Greg Schwem | Thursday, September 25

Greg Schwem earned a degree in journalism at Northwestern University, and spent five years working as a newspaper and NBC television reporter before quitting his job to pursue his dream of performing stand-up comedy as a career.

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Up Close

Broadband Speeds

The nation that invented the Internet is quickly falling behind in the race for broadband speed supremacy. A comprehensive 2007 report produced by Speed matters.org and the Communications Workers of America found U.S. broadband speeds are sorely lacking compared to other developed nations.

In the United States, the average download speed is a piddling 1.9 megabits per second (Mbps). Overseas and even across our northern border, average broadband speeds best the United States by factors of 10, 20, 60 or more. In Japan and South Korea, the average is more than 40 Mbps.

A population's geographic dispersion is a factor often asserted as justification for slow speeds in the United States. But Canada, our closest equivalent, averages 7.6 Mbps. Much of our sad showing stems from the report's finding that about 35 percent of American Internet users still access cyberspace via dial-up connections.

This graphic illustrates average broadband speeds in all 50 states. While some areas clearly outperform others, the country as a whole is falling further behind the rest of the developed world.

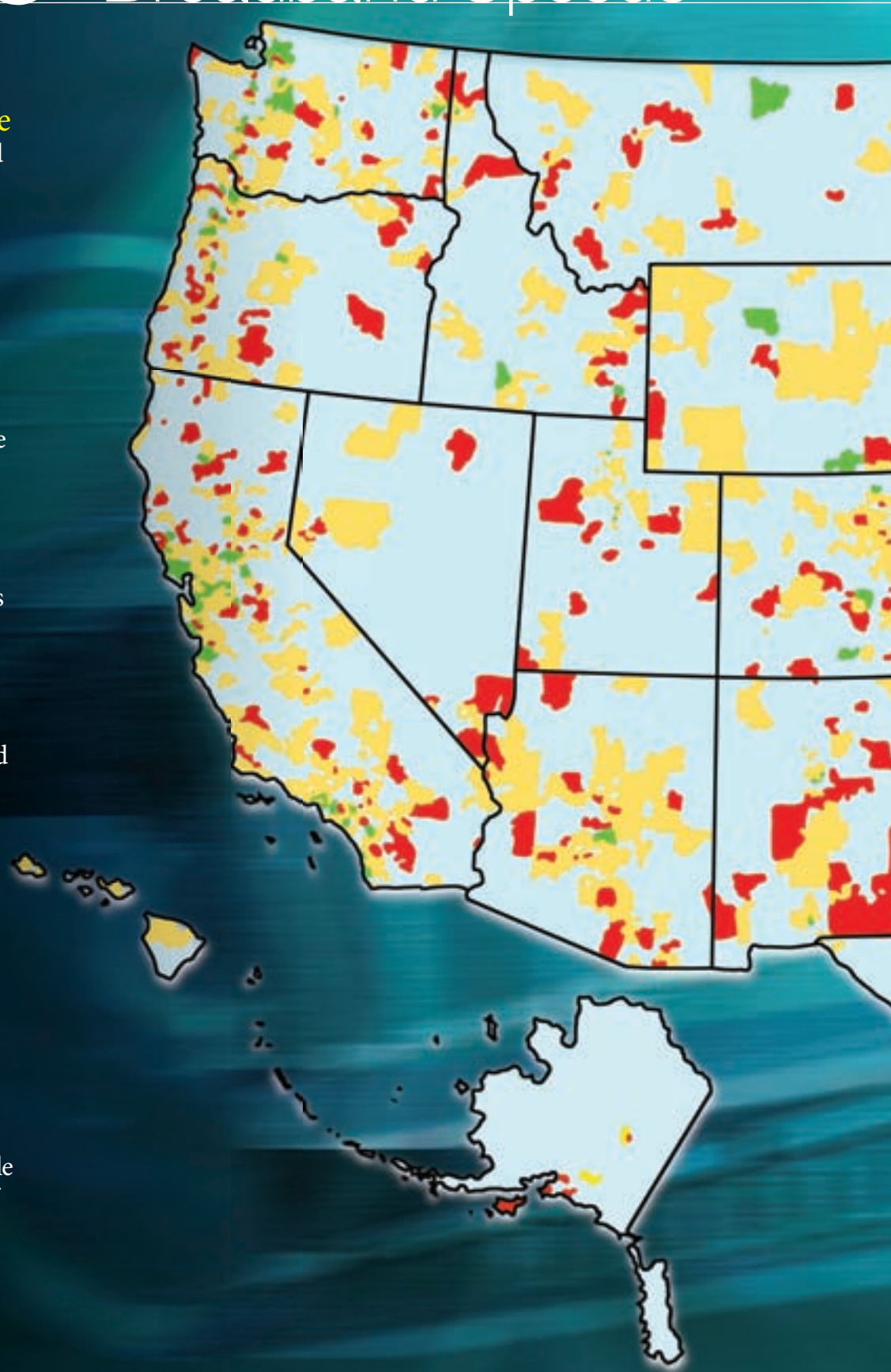
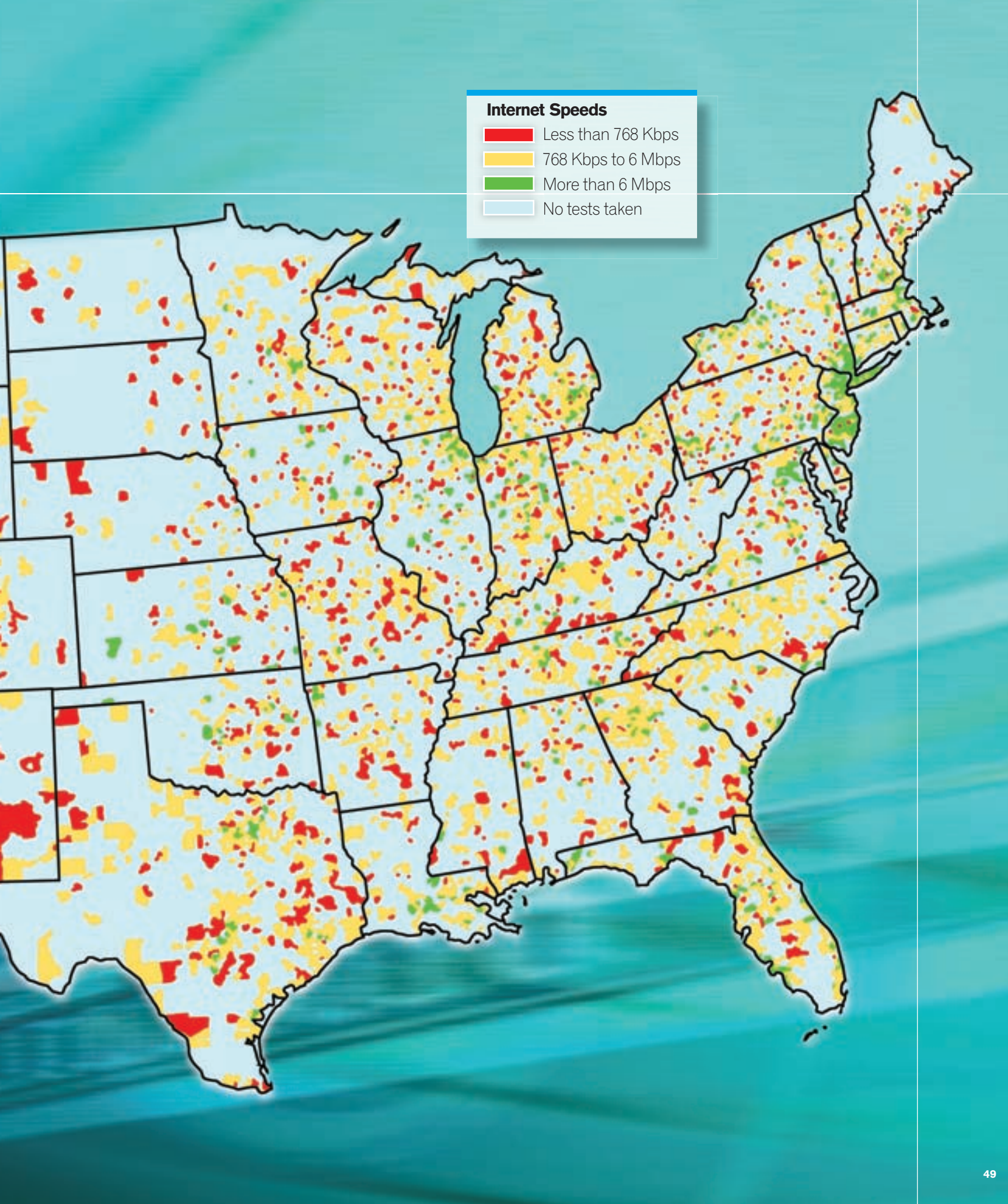


IMAGE COURTESY OF SPEEDMATTERS.ORG


Internet Speeds
Less than 768 Kbps
768 Kbps to 6 Mbps
More than 6 Mbps
No tests taken

spectrum

reports from the IT horizon

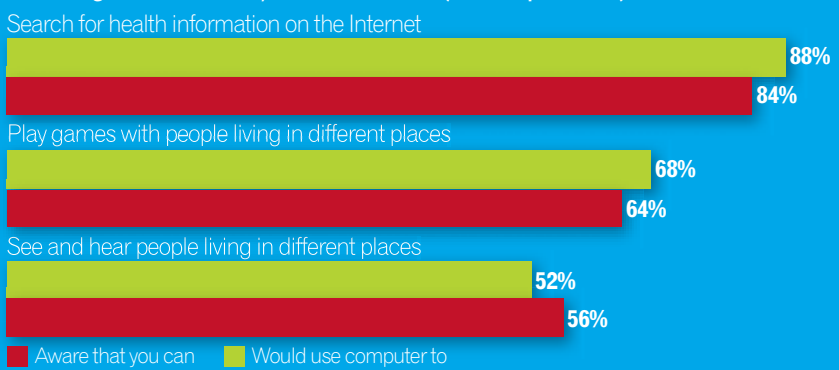
Building Trust

Market research firm TNS Sofres' *Digital Trust Barometer*, which surveyed 1,000 U.S. adults, revealed that users are wary of e-commerce because of digital security threats. When asked whom they trust as a source of reliable information on digital security, 42 percent of respondents believed friends and family are the most reliable source for security advice. After relatives, 27 percent of Americans considered companies specializing in digital security an accurate and reliable source of information. Banks, at 7.6 percent, were a distant third as a trusted information source.

Online Health Care

Three-quarters of U.S. consumers ages 65 and over are comfortable with telemedicine, "telepharmacies" and other online tools that extend doctors' reach. But more than 80 percent of caregivers still think they will struggle to get seniors to use the technology.

Awareness and Potential Use of Computers and the Internet for Select Activities according to U.S. Seniors, December 2007 (% of respondents)



— AARP

Anything for Chocolate?

Women are more likely than men to give away their passwords to total strangers, according to a survey by Infosecurity Europe. Forty-five percent of women versus 10 percent of men were prepared to give their passwords to market research impostors with the lure of a chocolate bar as an incentive for completing the survey. The survey was conducted in London as a social engineering exercise to raise awareness about information security. In 2007, 64 percent of people were prepared to give away their passwords for a chocolate bar, this year it dropped to just 21 percent.

Send spectrum ideas to managing editor **Karen Stewartson** kstewartson@govtech.com

Sense of Touch

Computers may soon let people sense the texture of objects or feel how they fit together thanks to a haptic, or touch-based interface, developed at Carnegie Mellon University.

The device uses magnetic levitation and a single moving part called a flotor, much like a joystick, to let users perceive textures, feel hard contacts and notice even slight changes in position.

Electric current flowing through embedded wires in the flotor interact with powerful permanent magnets underneath, making the flotor levitate. A control handle attached to the flotor lets users move the handle like a computer mouse, but in three dimensions, with six degrees of freedom — up/down, side to side, back/forth, yaw, pitch and roll.

Optical sensors measure the flotor's position and orientation, and this information controls a virtual object's position and orientation on the computer display. As this virtual object encounters other virtual surfaces and objects, corresponding signals transmit to the flotor's electrical coils, resulting in touch-based feedback to users.

— Carnegie Mellon University

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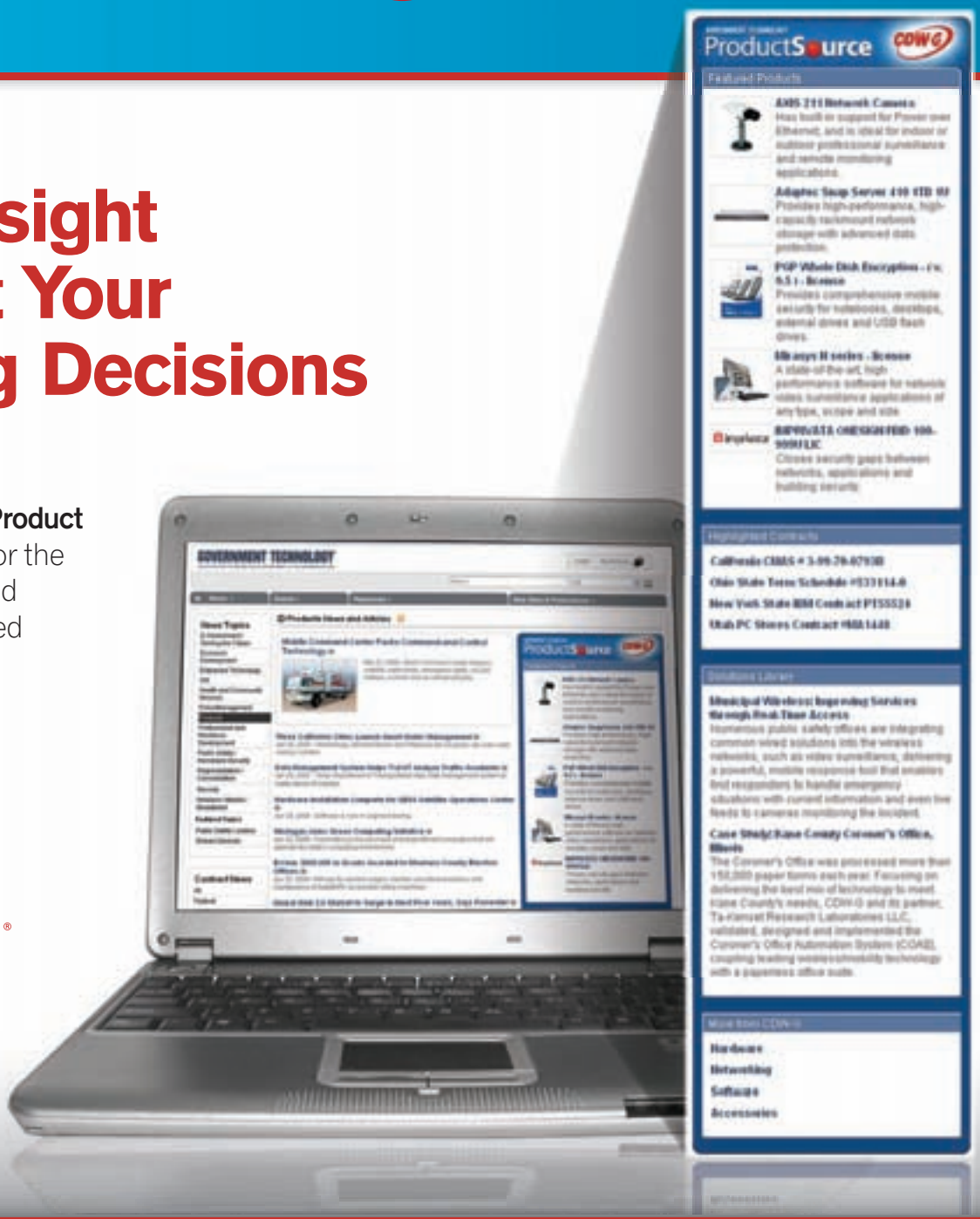

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The **Magellan** Maestro Elite 5340+GPRS connected auto navigation unit features Google Local Search, which provides rendered 3-D landmarks and buildings; 6 million points of interest; a USB port; and voice command. It's also equipped with a 5-inch WQVGA widescreen; a 533 MHz S-Media 3362 processor; and the ability to perform deep searches on local areas and receive information sent wirelessly from a PC. **www.magellangps.com**

E-Discovery Aid

The **DataCove** 1000 e-mail archive appliance is designed for 1,700 to 3,300 users and offers a 1 TB SATA hard drive, 2 GB ECC memory, Sony AIT-2 WORM tape and 1 U server chassis. **Tangent's** operating system for the appliance — DataCove OS 4.0 — features search and retrieval of e-mail and instant messages, redundant disk and tape archiving, a fully searchable database and automatic archival to WORM media. **www.datacove.net; www.tangent.com**

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CoolIT Systems' MTEC Workstation Cooler uses liquid and thermoelectric cooling to lower server or workstation CPU temperature by 40 percent. The cooler has a 50,000-hour life cycle and cuts noise by reducing inefficient air cooling. The cooler's control center monitors CPU usage and temperatures 24/7, and issues text message and e-mail alerts if a pump or fan fails. **www.coolitsystems.com**

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General Dynamics' Tadpole M1400 mobile ultra-thin client computer has a 14.1-inch WXGA TFT 1280x800 LCD display, integrated 802.11 a/b/g wireless networking and a Gigabit Ethernet port. 3G mobile broadband connectivity and virtual private networking are optional. It weighs about 5.5 pounds with the optional nine-cell battery. The laptop includes an Express card/54 slot, SMART card reader and three USB 2.0 connectors. **http://tadpole.com**

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CONTINUED FROM PAGE 20

this — stuff they love, stuff that's fun, and they want to make a career out of it … they realize math and science do have applications."

It's long been known that kids love math and science — to a point. Somewhere around the 11th grade, there is a precipitous decline in the number of students participating in technical pursuits. The numbers are a bad omen for companies and organizations looking for the future work force. Allen said that despite technology's massive expansion, the number of graduates with science and engineering degrees hasn't changed significantly since the 1970s.

Randy Schaeffer, regional director of New York/New Jersey FIRST, argues that a big part of the problem is the culture, as anyone familiar with IT projects can relate.

"On any fall afternoon, you don't have to go too far to find 22 kids out on a big, grassy field with hundreds and hundreds of community members, cheerleaders, pep bands, coaches and a lot of hoopla," said Schaeffer. "The local papers devote pages and pages to what those kids are doing. As a result, they come away with the feeling that what they're doing is pretty cool and pretty important."

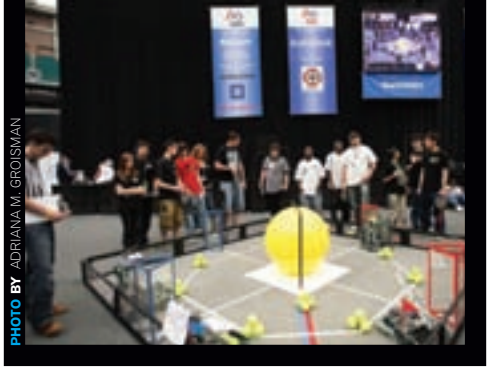

PHOTO BY ADRIANA M. GROISMAN

Allen echoed the same concern. Students need to be motivated as if they are star athletes to stay with these pursuits, as do those who volunteer their time to help mentor students in science and engineering.

"Think about football games," he said. "The coach, he gets paid to be there after school coaching those students in athletics. The robotics coaches that I know of in Georgia do it out of devotion. These guys are working every evening; they're working weekends — zero compensation in most cases. Think about the booster club for the football team, basketball team and soccer team. Where is the booster club [for areas like robotics], and where are the parents? There's not a mechanism to give these coaches the resources they need. We need to make robotics a lettering sport. We need to make it culturally acceptable."

The BEST and FIRST programs are making headway. The regional FIRST competition made the front page of several California newspapers. The numbers show progress too: Kids involved in FIRST and BEST are more likely than their peers to attend college. They're more likely to attain a post-graduate degree and major in science or engineering.

Changing the culturally accepted notion that athletes are cool and kids who like science are not isn't going to be easy. The roots of these perceptions reach into many facets of life. But there are signs of a shift. Pay attention to social networking sites and Web forums — the "nerdier" among us often rule the roost online. The onus to embrace math, science and engineering is as much on the community as it is on children.

Hopefully it isn't too little, too late. Regardless, people like Allen and Schaeffer are doing what they can to make geek chic.

And you thought all robots did was vacuum. GT

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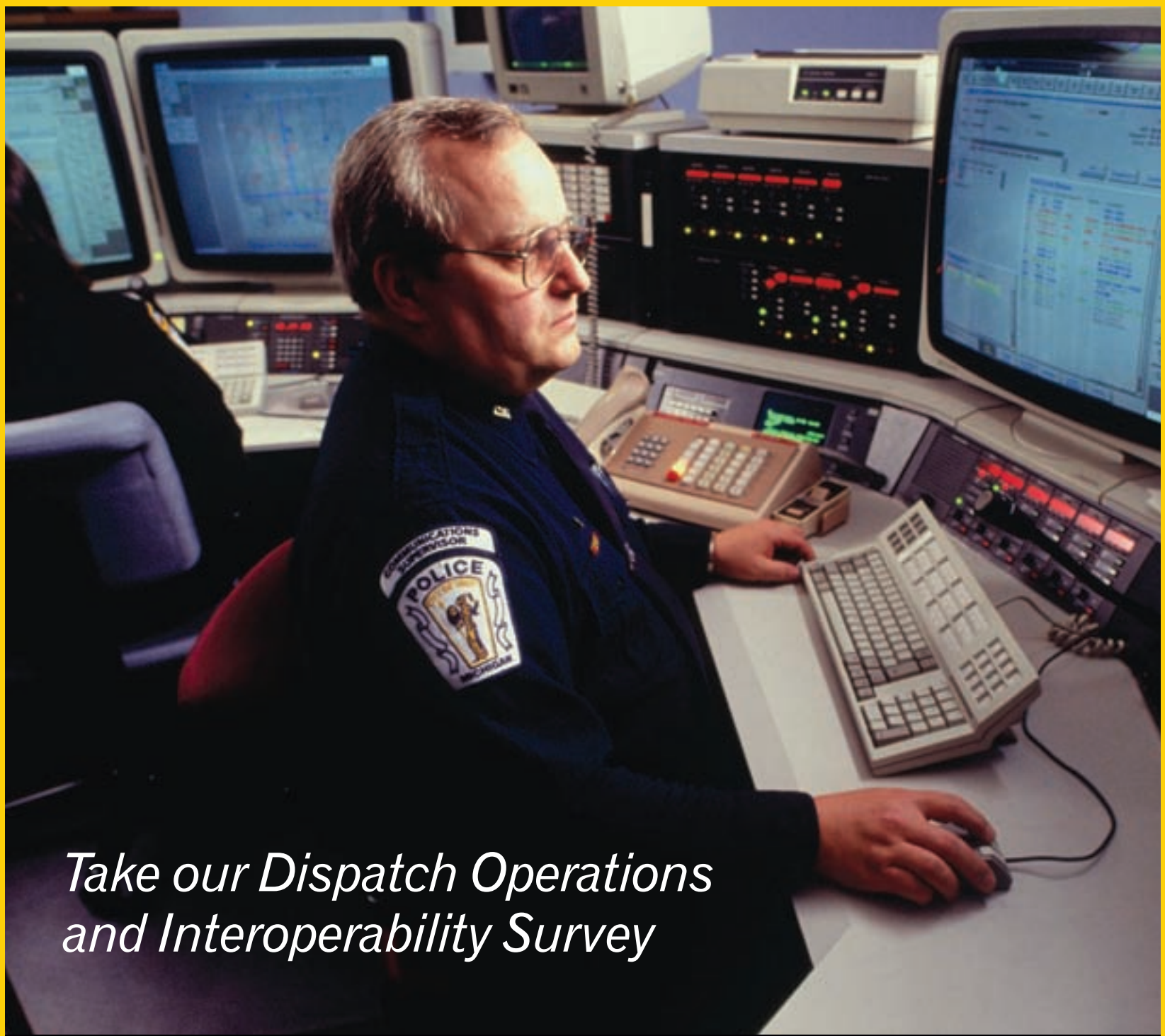

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Emergency Management Magazine would like to understand the depth of the problem as it relates to dispatch centers or incident command posts ability to identify and communicate with resources effectively.

To participate, go to: ***www.emergencymgmt.com/survey***

Sprint ahead

GOVERNMENT TECHNOLOGY'S EMERGENCY MANAGEMENT

ALL RESPONDENTS WILL BE ENTERED INTO A GIFT CARD DRAWING AND RECEIVE A COPY OF THE SURVEY RESULTS.

BY REID GOLDSBOROUGH

Photography Skills Matter in the Digital Age

One of the real success stories of the digital age is the marriage of photography with personal computers. Digital technology is used for taking photos, correcting mistakes, adding special effects, and printing, sharing and displaying.

All of this makes it easier and more enjoyable to take pictures for business and pleasure. But what hasn't changed in the transition from analog to digital is the photographic skill needed to produce a compelling image. There are rules of the road to follow when transforming raw images into eye-popping photographs.

Lighting is one common stumbling block, and many casual shooters — even business photographers — are in the dark about it.

When shooting outside, the best light is in the early morning or late afternoon. If you have to shoot at midday, put yourself and your subject in the shade, if possible, to avoid harsh highlights, dark shadows and squinting eyes.

If you must be in the sun, try to shoot with it beside you rather than at your back. If you can't avoid shooting with the sun behind your subject, turn on your camera's flash and use it to avoid a background that is overly dark or bright.

Photos snapped indoors can present tricky lighting challenges as well. Subjects illuminated with conventional incandescent bulbs may have a slightly orange cast because cameras are preconfigured for the sun's "color temperature."

You can correct for this in any of three ways: Change the camera's "white balance" setting, use special "daylight-balanced" light bulbs, or place your subject by a window to take advantage of natural illumination.

Using a flash can also prevent this, but flash photography has problems all its own. The inexpensive built-in flash in ordinary digital cameras can make your subject unnaturally bright and the background artificially dark.

Instead, if possible, turn off the flash and use additional lighting by moving a lamp or two close to your subject. If you must use a flash, experiment with diffusing its light by bouncing it off a light-colored ceiling or nearby wall. One way to do this is to hold a small mirror in front of the flash at a 45-degree angle.

Flashes can also cause the devilish "red eye" problem in living subjects. To try to prevent this, you can use your camera's red-eye setting, if it has one. Another option is to tape a small piece of tracing paper over the flash to diffuse its light.

Composition — how you position your subjects and yourself, and what you choose to include in the photo — is another crucial aspect of good photography that's often overlooked.

A frequent mistake is to shoot too far away from the subject. It's generally best to fill the camera's LCD screen or viewfinder with your subject and minimize the foreground and background. You'll get sharper results by moving in closer, if possible, rather than using your camera's zoom mode or a telephoto lens.

You can crop a photo later using an image-editing program, but you risk losing sharpness here as well. A high-megapixel camera can preserve the clarity.

Pay attention to the background. Avoid positioning your subjects directly in front of vertical objects, such as telephone poles — it

will look like something is growing from atop their heads. Also avoid backgrounds that are overly cluttered, which distract attention away from your subjects.

You can correct many mistakes and add in amazing special effects using image-editing programs, such as Adobe Photoshop Elements or Paint Shop Pro.

But avoid the temptation of doing too much. An over-edited photo can look as amateurish as an over-designed Word document or Web site.

What size you make the final photos depends on whether you intend to print them out on your inkjet printer, send them via e-mail, post them to your Web site, or make them available to whomever you choose through a photo-sharing site such as Shutterfly, www.shutterfly.com, or Snapfish, www.snapfish.com. Photos meant for viewing on a computer screen should be smaller than those that will be printed out: One rule of thumb for Web photos is that the width should be no more than 800 pixels.

The durability of the ink used by inkjet printers is improving all the time. But to minimize the chance of an image fading, mount prints behind plastic or glass, or for optimal protection use special ultraviolet glass available from picture frame shops. GT

REID GOLDSBOROUGH IS A SYNDICATED COLUMNIST AND AUTHOR OF THE BOOK *STRAIGHT TALK ABOUT THE INFORMATION SUPERHIGHWAY.* HE CAN BE REACHED AT REIDGOLD@COMCAST.NET OR **WWW.REIDGOLDSBOROUGH.COM**.

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BY PAUL W. TAYLOR
CHIEF STRATEGY OFFICER
CENTER FOR DIGITAL GOVERNMENT

Make it Alone ... or a Loan

In these final days of the fiscal year, there is a rush in some quarters to spend down fund balances. In some IT shops, this process is as close to a technology refresh cycle as there is.

More importantly, the new fiscal year — beginning on July 1 in most political subdivisions — reflects the realities of widening public-sector revenue recession. The first decade of the new century is limping out as it limped in: beset by budget woes. And it may be a better result than we have any right to expect — especially given local governments' nontrivial exposure to the subprime mortgage mess and their disproportionate reliance on once obscure auction-rate securities for supposedly inexpensive long-term financing. They turned out to be anything but.

We've become accustomed to IT funding strategies that focus on institutionalizing an IT value chain in justifying new investments. This approach is necessary, but not sufficient in the current environment. In an earlier day, British Lord Rutherford famously quipped, "We have no money so we must think."

At the Center for Digital Government, we have been thinking about how to modernize without money. A new white paper called *Be IT Resolved* (available as a free download from the Center Web site or www.govtech.com) explores a handful of hybrid approaches to moving forward.

On the threshold of the new fiscal year, it seems appropriate to dedicate this back-page column to the proposition of public agencies using funds at hand to be their own venture capitalist.

Initial capitalization is a hard nut to crack. Without it, even the best ideas — complete with compelling business cases, feasibility studies and return on investment (ROI) projections — languish. Ironically the harder the times are fiscally, the more governments could use the next great idea. Of course, public agencies will never realize the operational and efficiency gains from systems they cannot afford to build. To avoid this dilemma, a dozen states have used bonding to raise capital funds for technology projects, while nine have created a technology investment fund.

Through its Office of Enterprise Technology, Minnesota is the most recent state to advocate "enterprise venture capital seed money" for system replacement and the attendant "business process re-engineering [and] technological innovation" through "loans to agencies for planning and predesign projects, or for development or modification efforts in emergency situations."

On this last point, "loan" is the operative word. Without the expectation of repayment to the fund, a couple of bad things will likely happen. First, the financial disciplines to deliver the project's hard-dollar benefits and the ROI are undermined, and the promised public value is not realized. Second, except those chosen for the initial round of funding, agencies that agreed in good faith to participate in the investment pools find themselves at the wrong end of a pyramid scheme, where they are left with no prospect of using the investment fund and diminished prospects the next time around in front of more skeptical legislators who also got burned by the process.

The current crisis is changing the conversation with funding authorities in unexpected ways, as in: If you cannot give us the money, can you make it a loan? Because we cannot make it alone. GT

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