GOVERNMENT TECHNOLOGY
SOLUTIONS FOR STATE AND LOCAL GOVERNMENT
VOL25 ISSUE12 | DECEMBER 2012

A LOOK AT THE TRENDS THAT SHAPED HOW WE WORK AND LIVE

2012 [YEAR IN REVIEW]

PLUS:
Digital Communities Quarterly Report

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COLORADO CIO
KRISTIN RUSSELL

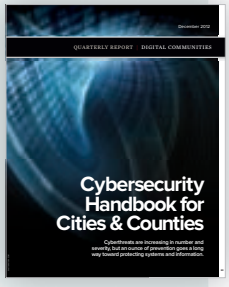
COVER STORY

COVER ART: SHUTTERSTOCK.COM

DEPARTMENTS

Digital Communities Quarterly Report

Cyberthreats are increasing in number and severity, but an ounce of prevention goes a long way toward protecting systems and information.



COLUMNS

NEWS

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workday.

By Steve Towns / Editor

A Vote for Big Data

One of the most pronounced technology trends for 2012 was the emergence of "big data" to improve the performance of everything from police departments to school districts. As of Nov. 6, you can add presidential campaigns to that list.

Anyone seeking proof that subjecting massive data streams to sophisticated analytics can yield powerful insight need look no further than President Barack Obama's re-election campaign. The Obama campaign used big data to stunning effect in its victory over Republican challenger Mitt Romney.

Mark Halperin, senior political analyst for *Time* magazine and MSNBC, called Obama's re-election effort the most technologically sophisticated campaign ever run, helping the president to prevail despite the sluggish economy, a rocky relationship with business leaders and rabid Republican Party opposition. Advanced data-mining techniques were used to pinpoint Obama supporters — particularly women and immigrants — in critical swing states and then the campaign shrewdly used social media to ensure those voters went to the polls.

"The Obama campaign targeted the nine states that were competitive, and they engaged in a very focused effort to get the majority of votes in those states," said Halperin, speaking last month at re:Public, our annual leadership retreat in Tucson, Ariz. "In almost every one of those states, they hit their targets perfectly."

He said the campaign purchased all of the commercial data it could find, and then supplemented that information with data collected by field staff that went door to door. Purchased data and field staff findings were fed into a single massive database that was mined to produce a remarkably precise road map for success.

"They knew the election would be very close, but they knew they were going to win," Halperin said. "They were down to the household and individual level. They knew who their voters were."

Republicans found themselves badly outgunned on the technology front. But you can bet they won't lag behind for long; sophisticated data operations quickly will become standard for major political campaigns — and experts already are debating the impact of this. Some worry about voter manipulation or that these expensive data-crunching efforts are beyond the reach of all but the most well financed candidates.

But as a sheer demonstration of big data's effectiveness, it was quite a display. If state and local agencies can harness some of that power to reduce recidivism, keep kids in school or improve community health, then big data will be a valuable tool indeed.

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Easy Street

Annoyed by red lights that always seem to pop up when you're driving? If so, a new smartphone app may soon help you cruise through green lights at every intersection. Called **SignalGuru,** the mobile app uses the cameras on cellphones to crowdsource traffic signal data and relay to users exactly how fast they need to drive to avoid red lights. Developed by researchers at the Massachusetts Institute of Technology, the app analyzes the data, and using the GPS in the smartphone, calculates the distance to the signal and optimal speed.

Good Connection

Illinois awarded $2 million to an economic development effort that will deploy gigabit fiber and wireless Internet access in Chicago's Mid-South Side. The funds come from the **Illinois Gigabit Communities Challenge grant program,** launched earlier this year to encourage world-class broadband infrastructure in the state. Gigabit Squared, a digital economic development corporation, will lead the project, which could bring super-fast access to more than 200,000 Chicago residents.

3.6 MILLION

The number of taxpayer Social Security numbers exposed in a series of cyberattacks on the South Carolina Department of Revenue.

WHO SAYS?

"About 70 percent of CISOs say they saw a breach in their state. But my guess is that number is low."

www.govtech.com/security/Survey-States-Struggle-with-Cybersecurity.html

TOP-TWEETED STORIES

North Carolina Embracing Enterprise-wide IT Changes — 112 tweets

Governments Expand Mobile Payments to Everything from Parking to Property Taxes — 96 tweets

San Francisco to Hire Chief Data Officer — 68 tweets

HOT OR NOT?

Most read stories online:

Street-Level Maps of Carbon Dioxide Emissions Show Potential
4,918 VIEWS

2012 Digital States Survey: Utah, Michigan Stay at the Head of the Class
4,730 VIEWS

7 Characteristics of Weak Passwords
2,099 VIEWS

Least read stories online:

Virginia "Socializes" Public Safety
297 VIEWS

Texas Buys High-Tech $7.4 Million Aircraft
294 VIEWS

Rhode Island Names its First Chief Digital Officer
248 VIEWS

reader/**comments:**

"There is no excuse to continue on the wrong path of patching systems that do not collaborate just to make them work. No excuse to hold employees back using systems unable of fostering direct contact, social interaction and collective learning. We are all clients of government, and government exists to serve us. We need clear, fast and easy access to services. We also need them now. We all change our old systems to be more productive, stay current and be competitive. Why is it unreasonable to expect the same from government?

***ER in response to* Colorado Goes Google Apps for Government**

"Strip away all the attractors that offset lower-than-industry pay, and what do you expect? Job stability and good benefits are no longer a given for state workers, so industry salaries and pay for performance should become the norm. By the way, this shortage was predicted more than 10 years ago. About time someone started thinking about it.

***Dave in NC in response to* Massachusetts Struggles to Attract and Retain IT Employees**

"Congratulations Smart 21, you all proved to the world that you are the best in broadband, digital inclusion, knowledge workforce, innovation and advocacy in the world. Your communities will be ones that businesses and citizens will want to move to. Great job!

***Steve Reneker in response to* Top 21 Intelligent Communities Nominated for 2013**

"After reviewing this list and comparing it to lists captured over the years, it is my assertion that the lack of longevity in the state CIO chair is the single most compelling reason that these priorities, such as consolidation, are not accomplished. Just one person's opinion.

***Tom McQuillan in response to* CIOs' Top 10 Tech Priorities**

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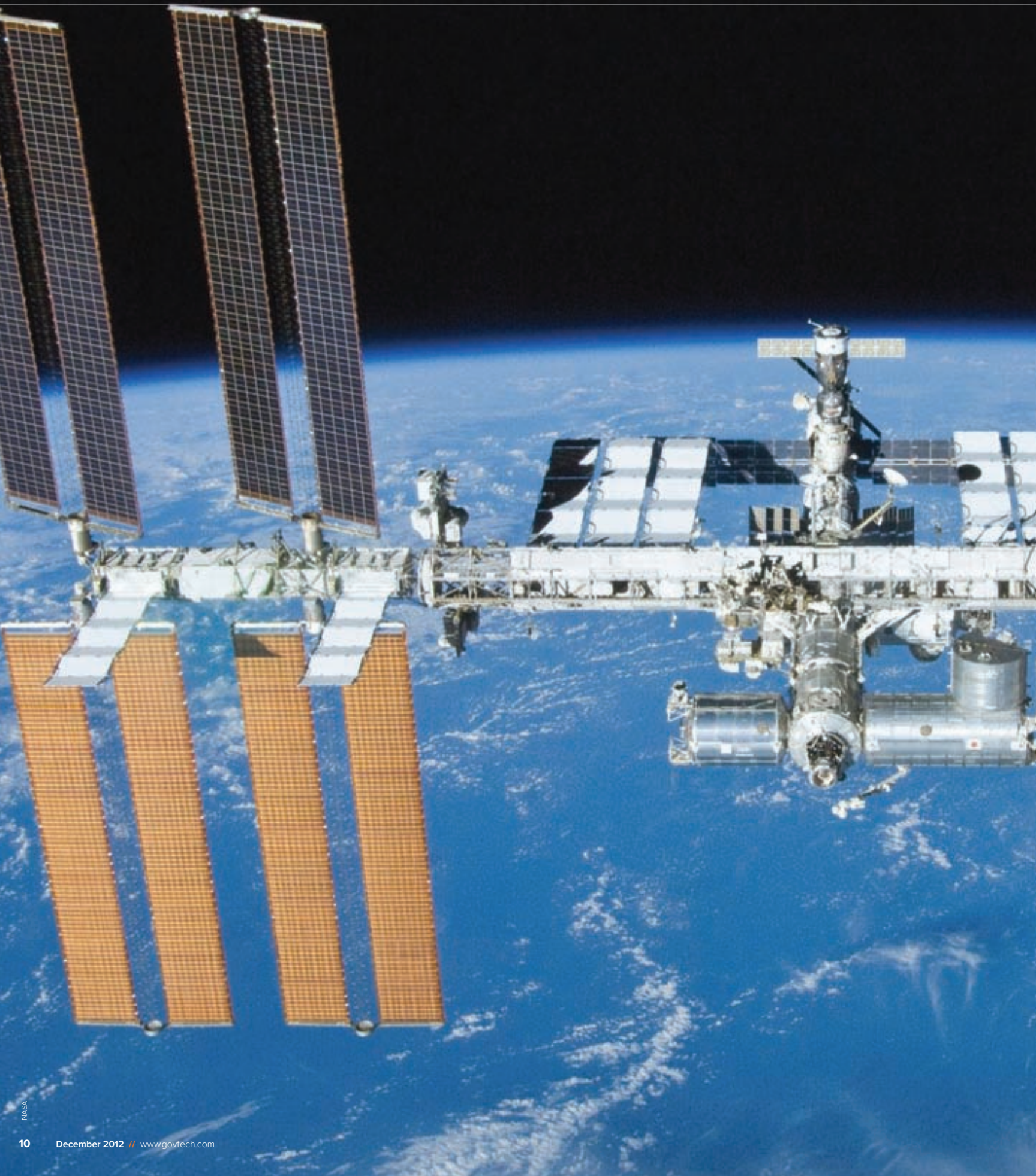
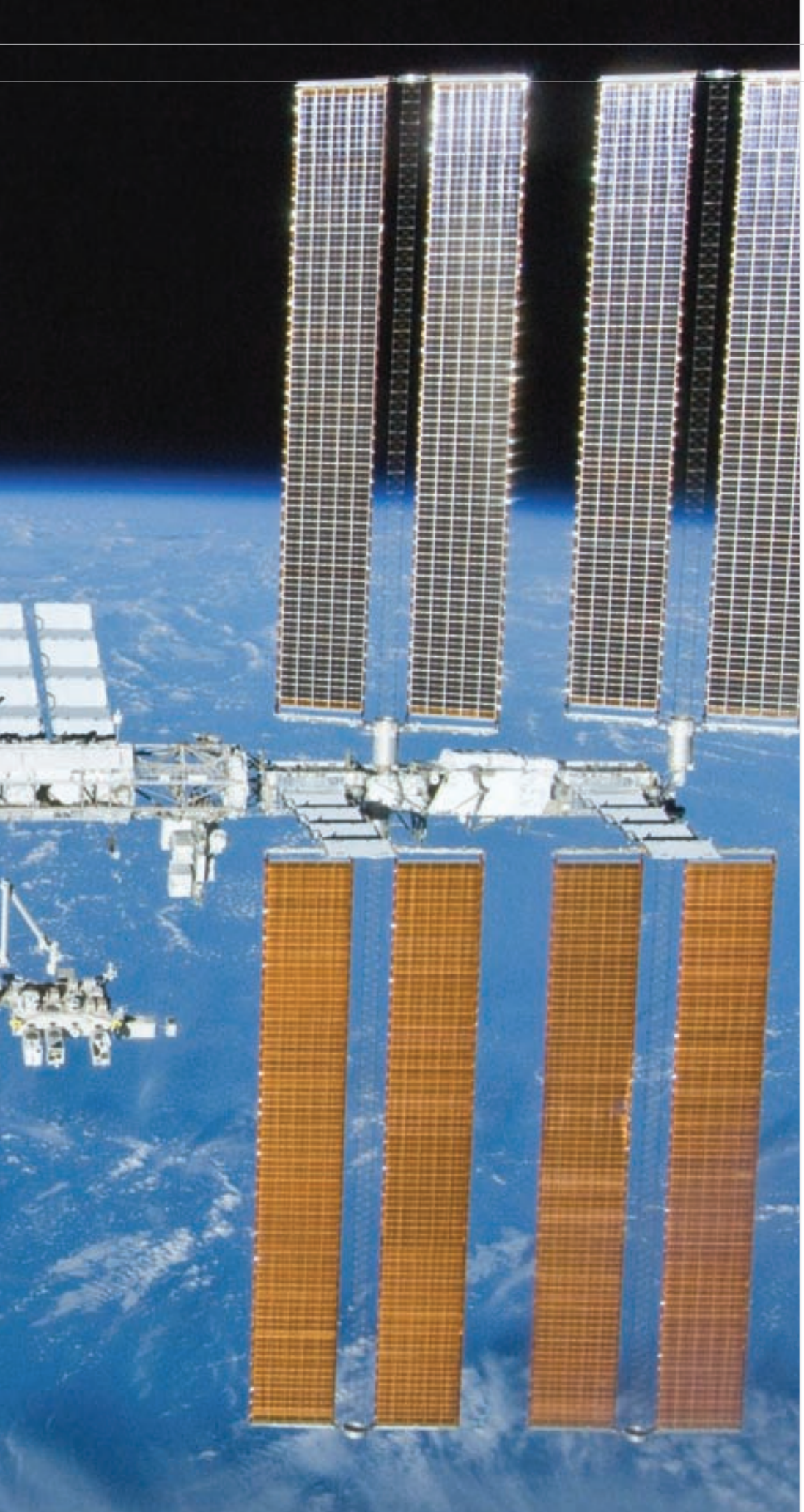


NASA



Eye on the ISS

Have you ever wanted to see the International Space Station (ISS) from your backyard? Truth be told, it's not particularly difficult, given that the ISS is the third-brightest object in the sky (after the sun and the moon). But to make finding it easier, NASA created a service that will send email and text alerts when the ISS is directly above your location. The service — called Spot the Station — will only send alerts for "good" sighting occasions, which, according to spotthestation.nasa.gov, are sightings that are 40 degrees or higher in the sky and last long enough to give someone "the best view of the orbiting laboratory."

Greg Sebasky

chairman, Philips North America

Greg Sebasky has represented Philips in several different roles, which have allowed him to speak at conferences about the company's role in areas like sustainability and health care. Sebasky is currently chairman of Philips North America. He's been interviewed by media outlets such as The Wall Street Journal *and* Fast Company *about his leadership skills. In this abridged discussion, he talks about the energy efficiency of LED lighting.*

1 What cities, nationally or internationally, can you point to as models of sustainability? In the U.S., there are a number of them, but I would point to New York City as a model. We have recognized Mayor Michael Bloomberg for putting in place energy standards that require building owners at the time they do renovations above a certain size to upgrade their buildings to new codes that are among some of the strongest [in the] nation around energy efficiency. Amsterdam and Denmark also come to mind.

2 What partnerships does Philips have with cities, counties or states? We have been attending the National Conference of Mayors for a number of years now. Mayors have an interest in how Philips can help them become more sustainable. A lot of the discussions have been around street and roadway lighting, because they face the dilemma of trying to bring down their costs. Through the use of advanced LED lighting and swapping out street lighting, they have improved energy efficiency [and] can control the lights from a Web-based application.

3 Do you think this is a trend? Will this continue happening in the future? It is accelerating from where it was a couple of years ago. We are doing a number of projects with mayors around the U.S. The last couple of years, they have also been intrigued by unique design lighting solutions because they feel that by enhancing the environment with light in the evening for safety and color, they also can improve tourism.

4 What's on the horizon for government as far as Philips is concerned? We have been building up our government relationship programs to try to work with energy ministries at the local level to do three things. One is to enhance communities through light, either by energy efficiency or improving design and ambiance. The second is to help connect patients at home into the health-care system through our health-care business. The third is to provide healthy appliances for people in their homes. People in the U.S. have seen our Sonicare and Avent product lines, but if you go outside the U.S., we have a range of products for healthy food preparation. In China, people are worried about the quality of food coming out of the farms, so we have appliances that can wash fresh vegetables and fruits and disinfect them through light. GT

— Karen Stewartson,
Managing Editor

The last person Sebasky listened to on the radio was Jason Mraz.

TOPHER COX PHOTOGRAPHY

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2012
[YEAR IN REVIEW]

A LOOK AT THE TRENDS THAT SHAPED HOW WE WORK AND LIVE

Over the course of a year, we write hundreds of stories covering myriad topics. On the following pages, we attempt to make sense of it all. We looked for trends that had a profound impact this year — and that are likely to be even more influential in the future. We think our choices fit that mold. Social media is steadily reshaping how agencies deal with the public, while growing use of big data holds new promise for improving government performance. Meanwhile forces like BYOD, cloud computing and software as a service are challenging long-held assumptions for how agencies acquire and use technology. And the emergence of chief innovation officers hints at eventual challenges to traditional organizational structures themselves. We expect these trends, which took root in 2012, to impact our work and world as we move into next year and beyond.

[BY GOVERNMENT TECHNOLOGY STAFF]

01.2012

Federal CIO Steven VanRoekel announces the launch of a mobile road map for the federal government that relies heavily on cloud strategies.

New Hanover County, N.C., begins a phased deployment of a "super Wi-Fi" network in the TV white space spectrum.

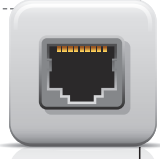
YouTube modifies its terms of service agreement to better protect state government agencies.

U.S. Supreme Court shoots down warrantless GPS tracking, stating that an extended warrant is required.

Anthony Schlinsog becomes chief information technology officer of Kansas.

02.2012

Charles Thompson begins work as Houston's CIO after serving in the same capacity since 2007 for Phoenix.



Ohio plans to invest $10 million to expand the speed of its broadband network to 100 Gbps.

Congress passes legislation that reallocates airwaves and supplies $7 billion to kick-start the nationwide public safety broadband network.

North Carolina CIO Jerry Fralick steps down; Jonathan Womer, an Office of State Budget and Management official with technology expertise, steps into the role.

The Nevada DMV approves regulations for testing driverless vehicles.

IMAGE: FLICKR/MARIA LY

Social Media: A Public Expectation

IF YOU'RE STILL DEBATING whether to dive into the social media deep end, heads up: It's time to swim with the rest of the public-sector fish. 2012 was the year that using social media to reach citizens became business as usual. People expect government to use the communication outlets that they do, and social media's growing user base (56 percent of Americans have a profile on a social networking site, according to Edison Research) illustrates that using the popular platforms is a good way to engage the public.

In 2009, 25 percent of the nation's 75 largest cities used Twitter. Research from the University of Illinois at Chicago said that percentage rose to 87 in 2011. Eighty-seven percent of the cities also used Facebook last year, compared with 13 percent in 2009. And those numbers continued to rise this year as more cities, counties and states started using social media to spread their messages.

But even as agencies flocked to social networks, they often struggled to use these new communication channels effectively. And that's where 2013 comes into play. Going forward, social media use needs to become more sophisticated. Truly engaging with residents means more than simply posting links to press releases — it means two-way communication and keeping social media pages active with current content on a regular basis.

An indication of social media's rising importance in government is the creation of new positions charged with determining how to best use these platforms and encouraging dialog with the public. New York and Chicago added social media director positions over the past several years. Similar posts have been established in small communities, too, including Roseville, Calif., and Oak Park, Ill.

The worry that hiring social media staff will look like a waste of government funds is lessening. However, in most agencies the social media duties are still being assigned as an add-on to existing positions like public information officers and webmasters.

Social media should be viewed and treated the same as rolling out any other new platform in the government space. Training about best practices is critical for everyone using the platforms. It also requires the development of strategies and understanding how it fits into a master plan — something that will continue to be explored in 2013.

2012 showed that governments are ready to embrace the benefits that social media provides: reaching many constituents directly, on a platform that they're comfortable with and providing an easy way for them to reply or directly ask a question.

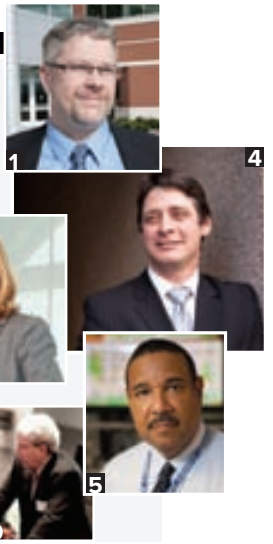
"I don't think that you will need the advocating as much as we go forward, it is just part of how we do communications," Ben Niolet, North Carolina's director of new media, told *Government Technology* earlier this year.

— Elaine Pittman, Associate Editor

MOST SOCIAL CIOs OF 2012

A relatively small, but growing, contingent of government CIOs are prolific social media users. Here are some of the most active:

1 / Bill Greeves, CIO, Wake County, N.C.
2 / Casey Coleman, CIO, U.S. General Services Administration
3 / Joe Palmer, CIO, Jefferson County, Colo.
4 / Jon Walton, CIO, San Francisco
5 / Steve Emanuel, CIO, New Jersey
6 / David Fletcher, CTO, Utah Department of Technology Services
7 / Janet Claggett, CIO, Richland County, S.C.
8 / Catherine Maras, CIO, Bexar County, Texas
9 / Sonny Hashmi, deputy CIO/CTO, U.S. General Services Administration
10 / Chris Moore, CIO, Edmonton, Alberta



IMAGES: DAVID KIDD, GSA PHOTO, CITY OF EDMONTON

SHUTTERSTOCK.COM

BYOD: Resistance Is Futile

CIOs THIS YEAR who attempted to stop the adoption of personal mobile devices in the workplace can perhaps sympathize with King Canute of England who sat in his throne on the beach, ordered the tide to stop and nearly drowned. Some 6 billion mobile devices have been purchased worldwide, and they have revolutionized personal life and society.

If our interviews with IT leaders throughout the year are any indication, 2012 is the year that bring your own device (BYOD) strategies reached a tipping point. Instead of resisting, many CIOs began to embrace the tsunami of privately owned mobile devices into city, county and state computing. Cities and counties struggled with the risks of lost or stolen devices, the acceleration of mobile malware, and troubling requirements such as discovery and Freedom of Information requests. But they recognized the efficiencies of replacing some government-owned devices with personally owned ones, the trend of "blurring" work and personal life, and welcomed new capabilities such as mobile apps for everything from transit schedules to pothole reporting.

The pioneer in mobile government computing — Research in Motion's BlackBerry — had a good reputation for managing security but could not compete with the explosion of newer devices. This fall, even the federal Immigration and Customs Enforcement agency dropped the BlackBerry in favor of the iPhone.

Michael Armstrong, CIO of Corpus Christi, Texas, said BYOD isn't the first disruptive idea to shake up government computing. "We've been through this in the old days when PCs came into the mainframe environment, and that's a very close parallel," he said. "I think you are always more successful if you try to embrace new technology rather than keep it out of your environment. Your customers will stay happier, and you're going to get more work done. And I think there are ways of mitigating the risks with that."

Mobile device management (MDM) is a comprehensive method of risk mitigation, and MDM firms have proliferated this past year. "I've seen a veritable explosion of new mobile device management software," said former Seattle CIO Bill Schrier, who is now deputy director of e.Republic's Center for Digital Government. "It used to be a niche for certain companies like Good Technology and MaaS360. Now mainstream companies like Microsoft, Symantec and AT&T have their own MDM [systems]." However, cautioned Schrier, adoption is still not widespread, citing a *Network World* article that maintains accelerating security issues are dogging BYOD adoption.

Many CIOs we interviewed said that BYOD is the future, and that attracting young tech-savvy people to government depends on keeping up with the latest technology developments. Without BYOD, the Canutes of the world might be surrounded by the bones of former employees with not a nibble from the coming generation.

And what happened to King Canute? He took some lessons learned, changed course and defeated "Ethelred the Unready."

— Wayne Hanson, Digital Communities Editor

03.2012

→ West Virginia CTO Kyle Schafer leaves the position after working for years to consolidate the state's technology infrastructure.

→ **Colorado announces that it is moving its enterprise email to Google.**

→ The Obama administration promotes Todd Park to the position of U.S. chief technology officer, following Aneesh Chopra's resignation in January.

→ SAIC agrees to a $500 million settlement over the implementation of New York City's automated workforce management system — it is believed to be the largest single recovery in a state or municipal contract fraud case.

→ **Minnesota's Office of Enterprise Technology upgrades almost 40,000 state workers to Microsoft Office 365** with plans to bring cities into the shared system.

04.2012

→ **Chattanooga, Tenn., claims its 1-gigabit-per-second Internet service is the nation's fastest.**

→ Iowa's Cerro Gordo County offers online real-time view of voter activity for local special election.

→ New York City CIO Carole Post steps down to take a job with New York Law School. She is replaced by former Merrill Lynch CTO Rahul Merchant.

→ **Georgia and others ditch proprietary content management systems** in favor of open source Drupal platform.

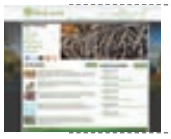
→ Seattle pulls the plug on free community Wi-Fi program after seven years of operation.

05.2012

Growing popularity of iPhones and iPads in government drives speculation that Apple may improve support for enterprise customers.

Los Angeles County uses data mining and predictive modeling to eliminate nearly $7 million in child-care fraud.

Former CIO of Wayne County, Mich., pleads guilty in corruption probe. David Edwards admits to accepting a $13,000 bribe from an unnamed contractor.



Palo Alto, Calif., uses group of tech-savvy citizen advisers to remake the city's website.

Utah CIO Steve Fletcher resigns after state officials discover that health and Medicaid data for nearly 800,000 residents had been stolen from a poorly secured server.

06.2012

Colorado launches comprehensive state and local data portal with advanced visualization features.

Spat over scope of duties leads to loss of funding for Florida's enterprise technology agency and a new job for state CIO David Taylor.

First lady Michelle Obama joins Pinterest, the fast-growing image-sharing website.

Maryland Chief Innovation Officer Bryan Sivak leaves the state to become CTO for the U.S. Department of Health and Human Services.

Unable to justify the expense, Detroit closes its 311 call center. A study pegged costs at nearly $8 per call.

Big Data: It's Really Happening

FROM GIS TO PREDICTIVE POLICING, data streams are being used to provide better services to communities. Government and law enforcement agencies ramped up their use of big data this year in a number of different ways.

One of the more interesting developments was the first major project of the G7 — short for Group of Seven — an informal collaboration between big city CIOs. The group launched Cities.data.gov on Aug. 1. The website adds a new layer to the federal government's open data portal, Data.gov, featuring data sets from Chicago, New York City, San Francisco and Seattle.

While not every data set from each city is online yet, G7 member and San Francisco CIO Jon Walton said his city has about 90 percent of its data on the shared portal and plans to add new data sets to it regularly. Other member cities also are expected to contribute new data. Perhaps even more important, the data is standardized. By making the flood of data available, cities could spur innovation among developers through hackathons and other collaborations to create apps and other advancements to improve residents' quality of life.

Creating those apps on standardized data sets increases the potential for multi-city development events and more convenient apps for users. For example, the same parking app people use at home in San Francisco could also work for them while vacationing in New York City. The approach also makes it easier for G7 cities to evaluate their performance against their peers.

The concept of big data — analyzing large data sets and using the information to make decisions — continues to grow as agencies get better at capturing and sharing statistics on what they do.

For example, Colorado is looking at data from the state departments of education, higher education and a number of others to get a better understanding of why some students prosper and others don't once they finish school. The idea is to find out whether factors such as early childhood education or having an incarcerated parent make a tangible impact on a student's success.

BIG DATA WAS A BIG TREND IN 2012 AS AGENCIES EMBRACED IT TO HELP BETTER MANAGE AND DEPLOY RESOURCES.

The problem with big data, however, is that much of the information has errors that affect the quality of studies being done from it. To overcome this, Colorado is relying on technology known as master data management, which analyzes bits of wrong information such as name misspellings and slightly incorrect addresses to determine what data belongs with a particular individual. It cleans up "dirty data" and makes it more reliable.

Another growth area for analytics is law enforcement. Police departments throughout the United States continue to harness the power of data analytics to get a better handle on crime hot spots and, in some cases, stop illegal activity before it happens.

For example, predictive policing was a huge success in Santa Cruz, Calif., this year. Through the use of advanced analytics and predictive technology, the Santa Cruz Police Department reported a 19 percent reduction in property theft in the first six months of 2012 compared to the same time period in 2011. No changes were made in the department

IBM

during that time, except for the use of data-driven prediction methods.

Looking ahead, some experts believe big data will expand beyond statistics into behavioral practices, leading to further success in anticipating crime through technology.

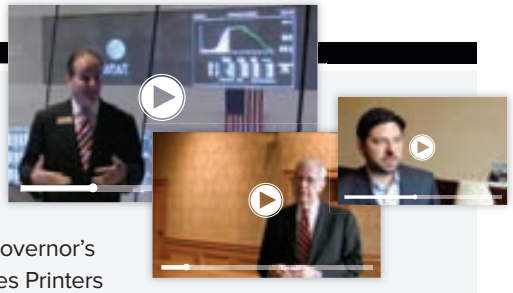
Dawn Clausius, police intelligence analyst with the Olathe, Kan., Police Department, told *Government Technology* earlier this year that offender behavior and other nontraditional information such as virtual gaming could increase the effectiveness of predictive technology in the years to come.

"I don't think law enforcement and public safety has even tapped into that as far as a data source or intelligence," Clausius said. "There are all kinds of games for all different purposes ... and maybe on a federal level they are already gaming and in those worlds, but from a local law enforcement level, we are not in any of that."

— Brian Heaton, Senior Writer

WHAT YOU WATCHED

Here are govtech.com's most popular videos for 2012:



- See How the World's Largest Telcom Company Manages its Network
- Chattanooga Claims America's Fastest Broadband Service
- Maryland Governor's Office Trades Printers for iPads
- Colorado Goes Google Apps for Government
- Roseville, Calif., Police Department's Crime Lab Separates Fact from Fiction

07.2012

Fraud detection software uncovers $5 million in back taxes owed by Miami-Dade County, Fla., residents.

New York City puts Wi-Fi hot spots at payphones. Pilot launches with free wireless access at 10 locations. IMAGE: FLICKR/NYCDOITT

President Obama urges Congress to pass the Cybersecurity Act of 2012. But the bill is declared dead in August.

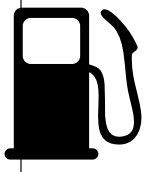
Google unveils plans for "fiberhoods" in Kansas City, Mo.

08.2012

Cities.data.gov mimics the federal government's transparency portal, Data.gov, and features data sets from San Francisco, Chicago, Seattle and New York City.

New York City spends $4.2 million to help Manhattan's district attorney launch a cybercrime unit to fight computer-based crimes.

The FCC says 19 million Americans don't have access to broadband — even if they wanted to subscribe to service.



New fuel standards require automakers to build vehicles that have an average fuel efficiency of 54.5 miles per gallon by 2025.

09.2012

Cybercrime costs consumers $110 billion annually, says report released by Norton.

Philadelphia uses crowdfunding website to pay for a project to plant 15,000 trees in the city.

Reaffirming its commitment to commercial space flight, Virginia announces a new program that will include eight resupply missions to the International Space Station.

→ Pilot project at a San Antonio school district uses RFID tags in identification cards to track 4,200 students.

→ California joins 10 other states by offering online voter registration to simplify the process for citizens.

10.2012

→ **Michigan and Utah top the 2012 Digital States Survey,** a biennial review of the technology practices of state governments conducted by the Center for Digital Government.

→ Hawaii launches a 12-year plan to overhaul its approach to technology.

→ Thom Guertin is named the first chief digital officer of Rhode Island, where he will launch the state's Office of Digital Excellence.

→ The University of Texas System announces plans to partner with edX and develop massively open online classes, which are free and open to anyone.

→ **Laura Fucci resigns as CIO of Clark County, Nev.,** and starts as CIO of Henderson, the state's second largest city.

→ Texas launches a new program that will help state agencies improve Web page accessibility for people with disabilities.

11.2012

→ Thirty-one states used electronic voting machines during the presidential election.

→ South Carolina begins project to encrypt Revenue Department data after the personal information for 3.6 million taxpayers was leaked by hackers.

→ The Commercial Mobile Alert System sends geo-located text messages to warn people about Hurricane Sandy.

Chief Innovation Officers: Are They the Answer?

TYPICALLY THE TITLE "CIO" in government refers to the chief information officer, but in 2012, a new type of CIO entered the public-sector arena — the chief innovation officer.

Desire to reshape existing IT and business practices is prompting local governments to create innovation officer positions that focus on public-facing responsibilities like community engagement and economic development. The theory behind at least some of this activity is that CIOs have enough on their plates with running daily IT operations, making it challenging for them to focus on innovative projects. In many cases, the innovation officer also has a purview that's broader than technology, spanning into areas like working with startup companies to stimulate job growth.

FLICKR/ADRIEL HAMPTON

INNOVATION OFFICERS LIKE **JAY NATH** SEEK TO RETHINK GOVERNMENT.

So far, only a handful of chief innovation officers have been appointed across the U.S. Jay Nath was named San Francisco's chief innovation officer in January. That same month, Ted Smith, the director of innovation for the Louisville Metro Government in Kentucky, was appointed a new position called the chief of economic growth and innovation. Both Nath and Smith work in conjunction with a CIO — Nath working with San Francisco CIO Jon Walton and Smith with Louisville CIO Beth Niblock.

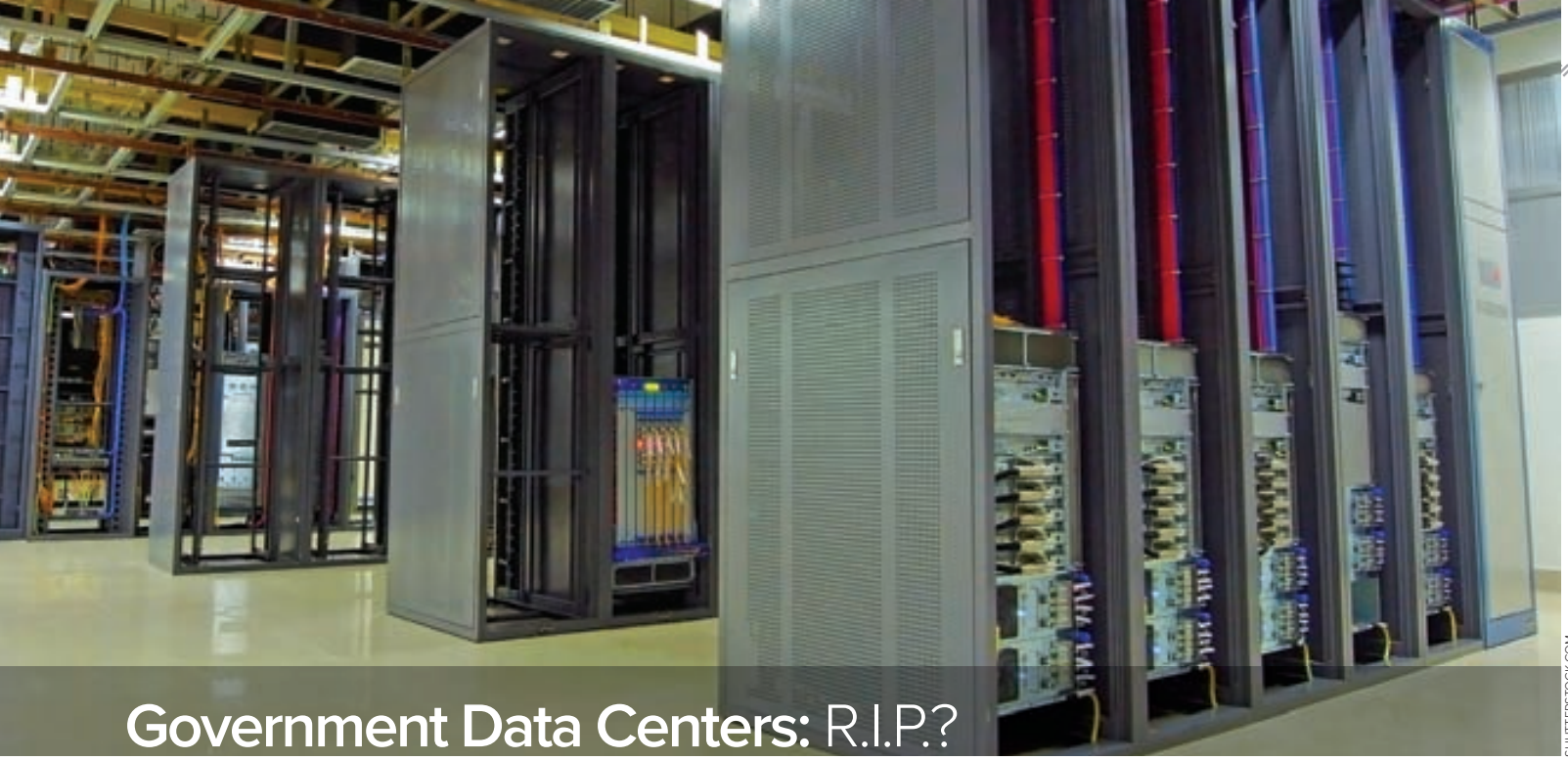
In Louisville, the division of labor appeared to work well, allowing Smith to focus on projects like Asthmapolis, a program that uses sensors on asthma inhalers to gauge the city's air quality. By raising money from the private sector, Louisville was able to distribute 500 asthma sensors, which in the long run will help tackle a prominent health issue in the city.

In other cities, the CIO position is being charged more explicitly with innovation responsibilities. Philadelphia changed the name of its chief technology officer post to chief innovation officer. The city hired former New Jersey CIO Adel Ebeid late last year for the revamped position, which includes responsibility over strategy, implementation and day-to-day operations of all technology and information services. Similarly, New York City renamed its CIO position the chief information and innovation officer when it hired Rahul N. Merchant for the job in April.

Though chief innovation officers currently are few and far between, more are expected to be appointed across the nation in 2013. Earlier this year, for instance, funding was approved in Austin, Texas, to create the position, which is expected to be filled next year. Some observers expect chief innovation officers to be in place in most major cities next year.

It remains to be seen whether government's newest C-level post becomes firmly established — but current activity around the position indicates growing demand for innovation in the public sector, regardless of which CIO delivers it.

— By Sarah Rich, Staff Writer



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Government Data Centers: R.I.P.?

GOVERNMENT DATA CENTERS haven't disappeared yet — but a good number of CIOs are doing their best to get rid of them. Throughout 2012, CIOs made it clear that their first choice for new systems and applications is the cloud.

"The cloud is the only salvation the public sector has from an IT standpoint," said Colorado CIO Kristin Russell at a meeting earlier this year. And her comments were echoed by a number of other state and local CIOs, who pointed to the difficulty of owning, operating and maintaining large, complex systems. But CIOs weren't just talking about going "cloud-first." A growing number are putting their money where their mouths are.

In March, Minnesota finished moving almost 40,000 workers in more than 70 state agencies to Microsoft's cloud-based Office 365 for email services and collaborative tools. And Russell announced in October that her state had moved its 26,000-member workforce to Google Apps for Government. In addition, Colorado is part of a four-state consortium — along with Montana, Oregon and Utah — that recently awarded contracts for shared cloud-based storage.

Meanwhile, Texas is making good progress on a retooled data center outsourcing initiative. State CIO Karen Robinson signed a series of multiyear data center services contracts early this year, replacing an outsourcing deal with IBM that was terminated by the state in 2010. And other jurisdictions are moving toward similar models or considering hybrid approaches that mix internal and external resources.

Activities like these have been under way for several years, of course. But in 2012, these approaches became much more pervasive. In some respects, the cloud – or at least a cloud mindset – is now the norm, rather than the exception.

"We're seeing this slow evolution from a system-centric view to a services-centric view of the world," said NASCIO Executive Director Doug Robinson. But that evolution won't be without challenges. Robinson notes that many technology departments support themselves by charging other agencies fees for mainframe computing. If the data center cash cow disappears, they'll need to develop new business models.

"The cloud is the only salvation the public sector has from an IT standpoint.

— KRISTIN RUSSELL, CIO, COLORADO

Another potential obstacle is reconciling this new service-centric world with rigid federal cost-allocation rules. Regulations tied to federal funding for state-operated social services, transportation, public safety and health-care programs can make it tough to move toward elastic, on-demand services. "The color of money is still a big issue," Robinson said. "CIOs could be a lot more flexible and innovative if they didn't have those constraints."

Of course, not everyone is intent on ditching their data center — but it's still not business as usual. Speaking at an e.Republic event earlier this year, California CIO Carlos Ramos said the state is boosting its data center capacity in order to host services for struggling local governments. "The locals need some place to land," he said, "especially for applications that deal with sensitive data."

Likewise, Oakland County, Mich., CIO Phil Bertolini is doubling down on his data center. In February, the county announced a national shared services partnership with the National Association of Counties. Oakland County already provides shared computing services to 62 neighboring jurisdictions. The expanded program, known as G2G Cloud Solutions, will make those services available to counties, boroughs and parishes nationwide.

So, the government data center may never completely disappear. But in 2012, two things became clear: Agencies will operate fewer of these facilities in the future — and those that are left may look drastically different than today.

— Steve Towns, Editor

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Businesses in Oklahoma can use the state's QuickTax application to file and pay taxes online.

eGOVERNMENT GROWS UP

The public sector embraces technology to improve service delivery and reduce costs

Over the last 20 years, a near-literal explosion of growth in online services has taken place. This technology revolution has not limited itself to the private sector; the public sector is embracing a new digital frontier as well. Local, state and federal agencies are increasingly adopting new, tech-savvy ways of doing business and serving constituents.

The electronic tools and services used by and with government, known collectively as "eGovernment," enable civil servants and constituents to navigate the public sector more quickly and efficiently. Government officials and employees can communicate more easily with citizen and business users, streamline their departments' practices, improve transparency and do a better overall job of carrying out the vital work of government.

The shift toward eGovernment is also motivated by another, more fundamental factor: money. Ongoing economic challenges have brought about major budget cuts in the public sector, and agencies have had no choice but to reduce spending everywhere possible in response. By making operations more efficient and sustainable, eGovernment has helped many public sector entities maintain — and even increase — their level of performance in the face of fiscal challenges.

Efficiency, transparency, communication, and cost-effectiveness are the hallmarks of the eGovernment revolution. So what are some real-world examples of how eGovernment tools are improving the work of government and the lives of constituents? And who helps forward-thinking public agencies — which are often limited by budget and workload constraints — implement eGovernment solutions and reach their technological goals?

Bringing government up to speed

In government, change is not always easy. While regulations, protocols and institutional traditions are necessary to help government reliably serve constituents, they can sometimes make it difficult to implement new ideas and innovations. The cutting-edge tools eGovernment delivers are helping governments across the country do more with less. Oklahoma provides a clear example.

Prior to digital government, Oklahomans who needed to renew their vehicle registration tags had to visit one of the state's 300-plus government offices or authorized private sector tag agent locations. They would stand in line, wait for their turn and handle the renewal in person. Depending on the physical location of the agent and the time of day (morning commute, evening rush, lunch hour), citizens could end up spending hours to complete this task.

Aware of the obvious drawbacks to this process, in February 2010 Oklahoma turned to an eGovernment solution, implementing the Convenient Auto Renewal System (CARS), which took the entire tag renewal process and put it on the Internet. Now, Oklahomans can renew their vehicle registration tags from the comfort of their home or anywhere else with an Internet connection. The process takes seconds, not hours. The rise of eGovernment in Oklahoma has not eliminated the in-person option, either — Oklahomans can continue to go to a state office or tag agent if they wish.

Oklahoma then further embraced eGovernment by implementing QuickTax, a statewide

online business tax filing system. Launched in early 2011, QuickTax allows most businesses to file and pay their taxes via the Internet. It's the kind of easy, common-sense service that eGovernment excels at providing. "It's been a huge success," says Mary Frantz, Deputy Executive Director of the Oklahoma Tax Commission. "If we don't have to touch a piece of paper, the errors are reduced and costs are saved."

A big believer in the power and potential of eGovernment, Frantz envisions a future where this kind of highly efficient, automated, electronic interaction with government is the norm. No more lines or piles of paper forms — everything is online and streamlined. "The perfect world, at least for me, is a world that's almost paperless," Frantz says.

She's not alone. A paperless world is closer than anyone could have imagined just a decade ago. Back then, for many people, filing physical paperwork was easier than fumbling with an electronic submission form. But today, electronic literacy is widespread. In another 10 years, it could be universal. The result of this evolution is a rapid increase in demand for online government tools, like CARS and QuickTax.

Innovation goes public

Some public sector entities are taking eGovernment one step further. Along with moving existing services online, innovative agencies are harnessing the power of eGovernment to create original applications and services that can only be made possible through technology.

The state of Tennessee's Department of Transportation will soon launch its very own mobile transportation app, called SmartWay. Using GPS technology and linking it with traffic reports and real-time video, SmartWay is designed to help Tennessee drivers reach their destination while avoiding traffic and other hassles. Commuters will be able to view live shots from traffic cameras on their route, helping them see what's ahead and plan detours if necessary. SmartWay will also provide a real-time text stream of incidents happening on their route that could cause delays, including accidents and construction, which further helps drivers get to wherever they need to be on time. Drivers will also be able to plan alternate routes and avoid crowded areas, easing road congestion and making everyone's commute smoother.

John Chobanian, Director of Digital Strategy for Tennessee Gov. Bill Haslam, is impressed with the capabilities SmartWay brings to the table. "The features we're most excited about are the ability to add different routes you travel throughout the day to the app and the option to receive relevant push notifications on your phone" whenever something happens along those routes. No more listening to the radio for traffic updates — SmartWay sends them directly to the user's mobile device.

Chobanian says eGovernment tools like SmartWay do much more than just make citizen interaction with government faster and easier. By using technology to help citizens more easily access government services, eGovernment effectively engages citizens more directly with the public sector. In turn, this added engagement facilitates communication and feedback, enabling government to learn more from its constituents in order to more effectively meet their expectations.

"Being able to gauge real-time citizen reaction has changed the way we look at different services and how we respond to needs, requests and opinions about how things are working," says Chobanian. "It's great to have that built-in, real-time feedback."

It can take a little time for government employees to become acclimated to the increased proximity between constituents and government agencies — and the ability for citizens and businesses to quickly and easily make their voices heard. Government entities should be prepared for greater levels of scrutiny. Technology makes it much easier for constituents to critique government directly — meaning a lot more criticism gets voiced. "It can be a little daunting at times, coming in at the fast and furious pace it does, but the feedback is invaluable," says Chobanian with a laugh.

But while eGovernment enables the flow of more constructive criticism of the public sector, it also helps government better serve its citizens. Along with SmartWay, Tennessee recently unveiled iPad kiosks in driver license service centers to offer a self-service option for license renewals, duplicates, reinstatement payments and changes of address. The iPad kiosk initiative takes advantage of the popularity of the iPad, and when combined with the in-station signage, visitors are drawn to try the self-service kiosk and forego a face-to-face transaction.

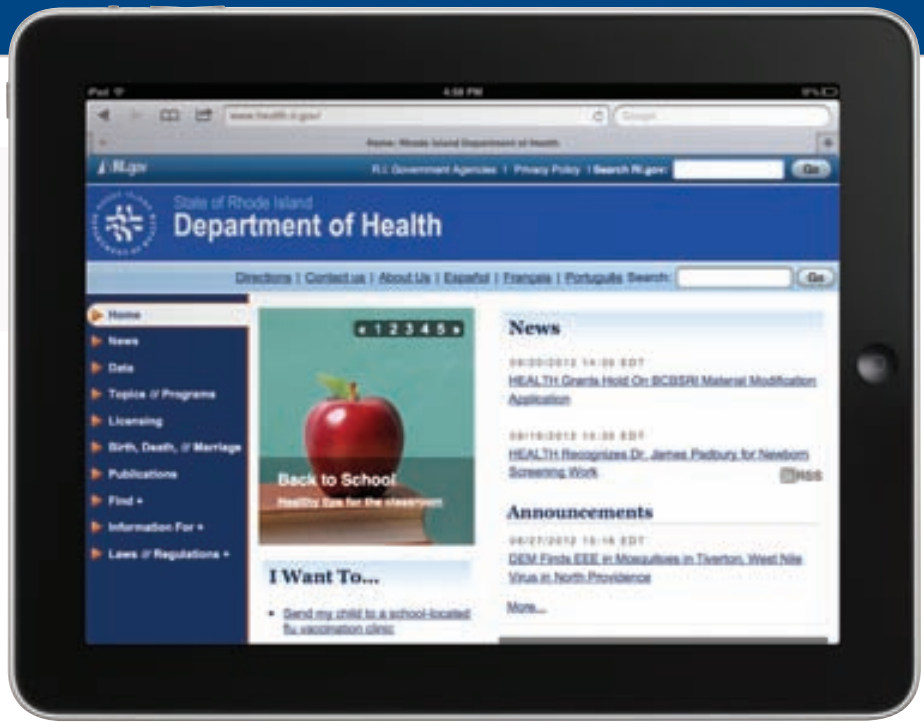
The application interface uses standard iPad data entry functionality that is familiar to iPad users and easy to learn for first time users, so the vast majority of visitors who attempt to use the kiosks are able to quickly complete their transaction. Self-service transactions have increased 230% since the iPad solution was introduced.

Making mobile easier

In Rhode Island, the state Department of Health (DOH) recently revamped its online portal to better accommodate the use of mobile devices. The switch to a mobile-first layout was driven by simple math: every year, more and more people were visiting the DOH website with mobile technology. "We could see that last year in July we had 7,000 visits a month that came to us on mobile devices. The year before it was 2,000 or 3,000," says DOH Webmaster Sally Johnson. "This year it's 12,000."

The foundation of DOH's web presence is responsive design, which provides a set of development tools for the agency to build eGovernment services that scale automatically

SmartWay, launched by Tennessee's Department of Transportation, uses GPS technology and links it with traffic reports and real-time video to help Tennessee drivers reach their destination while avoiding traffic and other hassles.



Responsive design is allowing **Rhode Island's Department of Health** to make its site more accessible via mobile and easier to navigate for everyone.

www.health.ri.gov

to fit the browser window of a computer, tablet, or mobile device. By leveraging responsive design, DOH only needs to design a solution once — instead of having to create different versions of web pages and applications for each browser type or mobile platform.

Responsive design is allowing DOH to make its site more accessible via mobile and easier to navigate for everyone. Now citizens can get the public health information they need via any device, and traffic is still climbing. The site is an increasingly popular and trusted resource. "A larger portion of the people coming to the site are coming for information that is uniquely ours," says Johnson. "People are getting the information they need."

Johnson's best advice for any agency looking to upgrade its eGovernment operations is to avoid getting bogged down in complexity and detail. "The most useful advice is: keep it simple," Johnson says.

Greasing bureaucracy's wheels

In addition to bridging the gap between public sector and citizens, eGovernment tools can be used to make internal government operations vastly more efficient.

The state of Indiana recently implemented an innovative overhaul to its school bus inspection system. Every year, Indiana inspects every school bus to ensure the vehicle is up to safety standards. A handful of inspectors go from bus to bus, marking off items on checklists. It's an important task that is vital to ensuring the safety of the children riding the buses on a daily basis. Until recently, however, it was also an extremely labor-intensive and time-consuming challenge. Among other things, inspectors traditionally had to log their notes on paper forms, which were cumbersome and left the door open to all sorts of problems that could potentially delay response time on bus repairs — including misplacement, water damage, unclear handwriting and manual data entry errors.

Today, however, the hazards of the paper-based inspection system are no more. In November 2011, Indiana rolled out a new inspection system based on a mobile device platform. Now, instead of handling fragile and lengthy paper forms, inspectors mark off items quickly and easily on a touch-screen tablet. To date, more than 17,000 bus inspections have been conducted with the new mobile system.

Officials are thrilled with the results. "It's been a very favorable project with the state police," says Robert Paglia, Director of IN.gov for the Indiana Office of Technology.

The new system, in addition to being much more efficient, is also more durable. The heavy-duty mobile devices come with a waterproof covering that still allow inspectors to use the touch-screen. "Just because it rains doesn't mean Indiana's going to stop bus inspections," says Paglia. And most importantly, by quickening the pace of the inspections and increasing their reliability, the new system helps keep the state's fleet of school buses safer than ever.

The success of using mobile technology for bus inspections is motivating Indiana to consider deploying the same solution for other inspection-related work as well, such as elevator inspections that are mandated by Department of Homeland Security regulations. "There are a ton of things the state is responsible for inspecting out in the field," says Paglia. "I think there are endless possibilities to use mobile inspections for any type of agency that has to do field-related work. I don't see any reason why this platform couldn't be used across any type of mobile employee, doing any type of inspection or audit."

Leading the charge: NIC

So where does the public sector go for the expertise it needs to develop, implement and manage eGovernment services without getting bogged down in technological complexity and minutaie? How can government agencies both modernize and "keep it simple," in the words of Rhode Island's Sally Johnson?

For 20 years, the preeminent face of the eGovernment industry has been NIC. In 1992, NIC launched as the Kansas Information Consortium, providing telnet access for the state of Kansas. Since then, a total of 28 states, dozens of local governments, and two federal agencies have partnered with NIC for help with planning, implementing and managing eGovernment solutions. In 2011, Forbes magazine ranked NIC 20th on its list of the "25 Fastest-Growing Technology Companies in America," alongside companies like LinkedIn and Apple.

NIC is a national organization that operates primarily through state-level subsidiaries. Each of the 28 states in which NIC operates has its own locally managed subsidiary, which provides a high level of customer service that is unique in the industry. This structure gets rave reviews from people like Rebecca Morris, Director of Business Services with the Alabama Secretary of State's office.

"NIC goes in and sets up what's like an individual company for each state," says Morris. "You never feel like you're working with a big conglomerate. They don't work that way, and I wouldn't want to work with people who work that way."

The cornerstone of NIC's business model is its unique funding model. With this approach, modest efficiency fees are applied to selected high-volume transactions that primarily serve the business community. This funding source enables NIC to provide the staff, technical infrastructure, application development, security, payment processing, marketing, and customer service support to deliver best-in-class eGovernment solutions. Self-funded is currently used by 27 states to provide digital government services, the vast majority of which are offered at no cost to citizens.

In times of economic crisis and uncertainty, this model has obvious advantages. Transaction-based self-funding allows government agencies to overcome shrinking budgets to reap the benefits of eGovernment, which is often otherwise too expensive to afford. "We had the ability to build what we needed to coincide with Alabama law, and it didn't cost the taxpayers a dime," says Morris.

NIC's subsidiaries enjoy a large degree of autonomy, and their close proximity to state and local government enables the development of long-lasting, beneficial relationships with public sector clients. As an example, the Oklahoma Tax Commission recently decided to upgrade all of its legacy tax filing systems to an integrated system that would enable quicker service and better communication between the state and its citizens. NIC's Oklahoma subsidiary played a big role in making the upgrade a success — which is par for the course, according to Mary Frantz. "I think they have made a real difference in Oklahoma," Frantz says. "They've taken a lot of agencies to a new place in terms of what they can do."

Throughout the country, agencies have realized eGovernment success by partnering with NIC's subsidiaries. In Tennessee, NIC helped the Department of Safety & Homeland Security launch the aforementioned driver license iPad kiosks; users can now complete transactions in fewer than 10 minutes and avoid waiting an average of 34 minutes for a face-to-face transaction. In addition, statewide media attention has emphasized the agency's innovative use of technology and the awards for which the service has been nominated.

Impressed with its work on eGovernment, Chobanian hopes to continue partnering with NIC's Tennessee subsidiary in the future, implementing additional eGovernment solutions to help the state's public sector run more efficiently. Next on the agenda is a new notifications application, which will aggregate all email and text message notifications into one seamless platform. "It's going to allow all state agencies to be more effective and efficient in their efforts to communicate directly with citizens," Chobanian says. "Right now, in Tennessee state government, there isn't a unified application that does that. There are a lot of siloed apps. This app is essentially going to provide a single place for departments to create notifications and for citizens to sign up for them" using email, text messaging and other means. "It's something we're really excited about."

The eGovernment evolution continues

eGovernment is exciting and constantly changing. Governments across the nation are preparing for the future and considering how to deliver the next generation of solutions.

That's where NIC comes in. As it has since the beginnings of the movement two decades ago, NIC remains the eGovernment industry leader. Its unique approach to service, founded on local relationships and an innovative funding model, makes it all but certain to stay at the forefront of eGovernment for a long time to come.

"They really care," says Frantz. "They're professional, they're in it for the long haul and they don't stop. And they don't say no, they say 'let us figure it out.' And they always think about it and come back with ideas."

Coinciding with the exponential growth of technology, further advances in eGovernment are happening at a fast and furious pace. State, local and federal agencies continue to look for the steady hand, expertise and innovative thinking of a partner who's been there and done that. With the combination of local expertise as well as a national library of more than 7,000 installed eGovernment solutions that can be rapidly customized for agency use, NIC is well positioned to support the future needs of federal, state, and local government.

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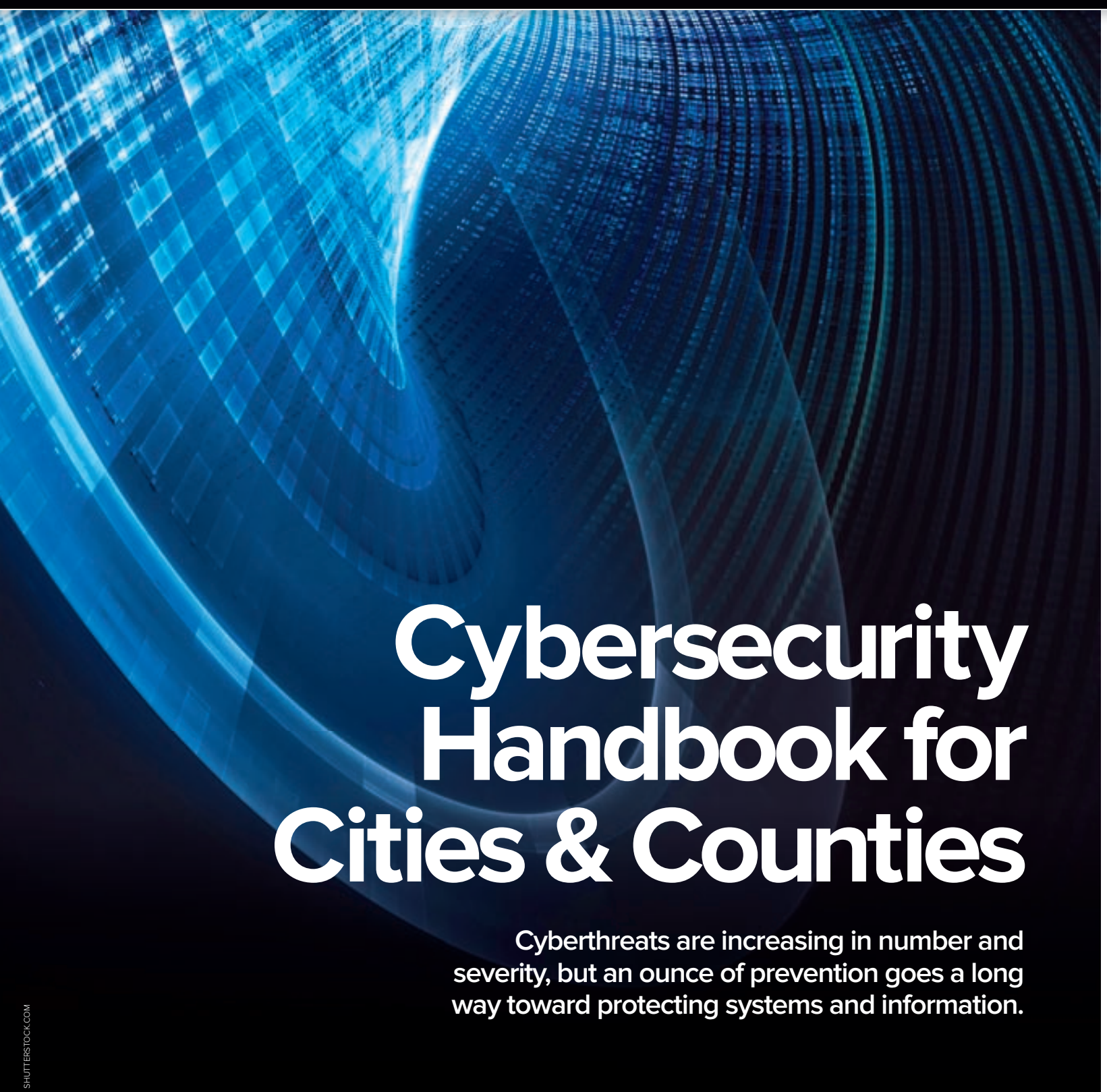

Cybersecurity Handbook for Cities & Counties

Cyberthreats are increasing in number and severity, but an ounce of prevention goes a long way toward protecting systems and information.

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Staying Secure in a Dangerous World

BY WAYNE E. HANSON | EDITOR, DIGITAL COMMUNITIES

ANYONE RESPONSIBLE FOR THE SECURITY OF CITY OR COUNTY information systems has reason for concern. Not only are hackers accelerating their attacks, but nations — including the United States, according to a recent *New York Times* article — also are joining in with new, well bankrolled attacks so sophisticated that it can take years to spot them. It is almost routine now to read of attacks that expose Social Security numbers, passwords, credit card information, medical records and more.

Even banks, supposedly the gold standard for IT security, have been hacked, and in one exploit — called Operation High Roller — a coordinated cyberattack against 60 different banks netted hackers some $78 million. Chiming in to the growing discord are "hacktivist" groups determined to make political or social points by attacking their opponents. What was once seen as a somewhat benign activity of young nerds has become much more serious.

Hackers and security researchers once mixed amiably at the annual DefCon hacker conference, but things are becoming more serious.

HACKERSFORCHARITY.ORG

"The first 20 years in the war between hackers and security defenders was pretty laid back for both sides," said Kevin Poulsen in a 2009 *Wired* magazine article. "The hackers were tricky, sometimes even ingenious, but rarely organized. A wealthy anti-virus industry rose on the simple countermeasure of checking computer files for signatures of known attacks. Hackers and security researchers mixed amiably at DefCon [a hacker conference] every year, seamlessly switching sides without anyone really caring. From now on, it's serious," he warned. "In the future, there won't be many amateurs."

Poulsen — who served prison time for hacking and is now news editor for Wired.com — knows what he's talking about. Attacks have become more sophisticated and numerous, creating real economic damage as Americans spend more time and money online. *Consumer Reports* said that in 2010, malware cost Americans $2.3 billion, and globally the annual price tag of consumer cybercrime is $110 billion, according to the *2012 Norton Cybercrime Report*.

The threats have accelerated, and costs have spiked just as cities and counties struggle to emerge from the

About This Report

This report is based on the activities of the Digital Communities program, a network of public- and private-sector IT professionals who are working to improve local governments' delivery of public service through the use of digital technology. The program — a partnership between *Government Technology* and e.Republic's Center for Digital Government — consists of task forces that meet online and in person to exchange information on important issues facing local government IT professionals.

More than 1,000 government and industry members participate in Digital Communities task forces focused on digital infrastructure, law enforcement and big city/county leadership. The Digital Communities program also conducts the annual Digital Cities and Digital Counties surveys, which track technology trends and identify and promote best practices in local government.

Digital Communities quarterly reports appear in *Government Technology* in March, June, September and December.

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The odds on anyone ... finding a magic solution to the computer security problems are exactly zero. Most of the problems we have are due to buggy code, and there's no single cause or solution to that.

recession in which budgets were cut, IT staff slashed and new hiring virtually stopped. Chief information security officers are in short supply and only some larger jurisdictions can afford them, leaving information systems vulnerable.

But it's not just smaller jurisdictions that are having trouble. When Eastern European hackers broke a weak password and grabbed 800,000 records from the Utah Department of Health, the state's highly regarded CIO took the fall. Utah Gov. Gary Herbert said hackers mounted 1 million attacks per day on the state's IT systems prior to the breach.

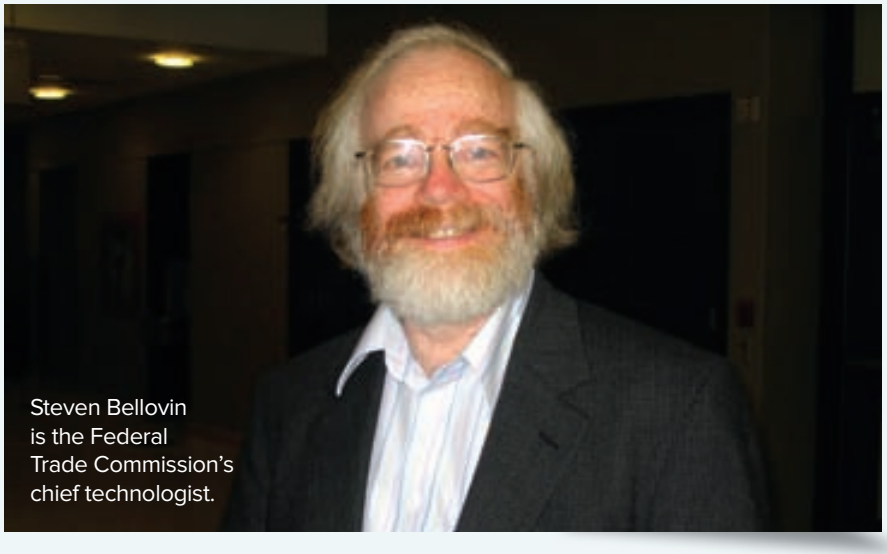
And according to a 2011 report from the U.S. Government Accountability Office, "Weaknesses in information security policies and practices at 24 major federal agencies continue to place the confidentiality, integrity and availability of sensitive information and information systems at risk. Consistent with this risk, reports of security incidents from federal agencies are on the rise, increasing 650 percent over the past five years."

Is there an end in sight? Will someone create a solution that will solve the problem and give everyone some much-needed relief? Not according to security experts. Some, including Internet pioneer Vint Cerf, have suggested that security might improve with better authentication although that may compromise privacy, while others see only a continual escalation of attack and defense.

In 2009, for example, Columbia University computer science Professor Steven Bellovin said, "The odds on anyone ... finding a magic solution to the computer security problems are exactly zero. Most of the problems we have are due to buggy code, and there's no single cause or solution to that."

In a recent interview with *Government Technology*, Bellovin — who is now the Federal Trade Commission's chief technologist, but spoke for himself and not the FTC — said his viewpoint remains the same: The complexity of millions of lines of computer code is too difficult a problem to have a single solution. "I think we need to build systems with different architectures, ones that are designed under the realization that there will be security failures," Bellovin said. "Authentication won't do it. In most breaches, the bad guys go around the strong authentication, not through it. My own working philosophy is that programs will have security bugs — then what?"

By these accounts, it appears we are condemned to an eternity of infuriating, expensive and seemingly intractable cybersecurity attacks. Fortunately, however, there are things that can be done to improve security and prevent most — if not all — attacks. It's similar to health, said several experts. No one can guarantee perfect health, but specific steps can be taken now to prevent the majority of illnesses and improve health while science works to eliminate disease. And that's the practical approach to security advocated by many experts interviewed for this special section.



Steven Bellovin is the Federal Trade Commission's chief technologist.

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The Opponent

Here are some examples of the different types of exploits launched against individuals and jurisdictions over the past few years.

Stealing confidential information and using it for criminal purposes:
Example: In California, hackers inserted scanners into gasoline pumps, so that when a customer inserted a credit or ATM card and punched in a PIN, those bits were copied and later retrieved by the hacker. Then that information was used to empty bank accounts, run up fraudulent charges, etc.
Example: Hackers broke into Sarah Palin's email account while she was running for vice president and posted her personal emails online.
Example: Bradley Manning, a soldier, is charged with providing hundreds of thousands of diplomatic cables, intelligence reports and other classified information to WikiLeaks.

Erasing records and information:
Example: Hackers got into a University of Houston College of Optometry database and deleted the records of 7,000 patients.

Defacing websites:
Example: When a Russian court sentenced members of the band Pussy Riot to jail, hackers defaced the court's website inserting a video and anti-Putin statements.
Example: Utah's Health Exchange website was defaced last August.

Altering information:
Example: Someone broke into the Santa Clara, Calif., University website and changed the grades of 60 students.

Damaging or destroying infrastructure:
Example: In a demonstration of particular interest to government, a power generator was damaged over the Internet.
Example: Earlier this year, Gen. Keith Alexander, head of the National Security Agency and the U.S. Cyber Command, warned that within two years, computer hackers could have the ability to shut down the country's electrical grid. He said that between 2009 and 2011, cyberattacks on American infrastructure increased 17-fold. Attacks on critical infrastructure such as water, electricity, communication and computer networks also are escalating.
Example: In 2008, rebooting a single computer shut down a nuclear plant in Georgia, and the U.S. Department of State warned that such facilities are vulnerable to attack.

Denying access to users:
Example: In 2008, a San Francisco city employee learned that his job was going to be terminated and locked everyone out of the city's local area network, denying access to personnel records, police reports, etc.
Example: Both dc.gov and nyc.gov were brought down by distributed denial-of-service attacks that overwhelmed those websites with traffic.
Example: Offshore gambling sites were told to pay $50,000 each or they would be hacked and brought down.

Hijacking computers:
Example: Hackers distribute a virus that enables infected computers to be taken over and used to launch a denial-of-service attack on other websites. Some even rent out the network of hacked computers to others who want to launch such an attack.

The Onion Defense

An ounce of prevention, as the saying goes, is worth a pound of cure. And while nothing can guarantee a perfect

AFTER BEING HACKED, YOU MAY NEED TO:

1. Change all passwords.
2. Find out how the hack was made and fix the vulnerability.
3. Go through huge numbers of records to see if any were tampered with, changed, deleted, etc.
4. Check for "back doors" left by hackers so they can get back into your systems.
5. Notify citizens, patients, staff, etc., that their information may be compromised.
6. Pay large fines if certain information was revealed (credit card information, Social Security numbers, bank account information, medical records) *and* you had inadequate security in place.
7. Pay for credit monitoring services for anyone whose information is at risk.
8. Defend against lawsuits from people whose information was exposed and who became victims of identity theft.
9. Restore what you can from a backup, after checking the backup for contamination.
10. Reformat and reinstall software and rebuild your systems from scratch.
11. Find another job.

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defense against attacks, there are some concepts that can help greatly. Will Pelgrin, CEO of the Center for Internet Security, likens cybersecurity to layers of an onion, and said there are simple steps that anyone can take to reduce the likelihood of a successful attack on computers, data and systems.

For example, he said, if a jurisdiction were to follow these four strategies, 85 percent of all cyberattacks could be avoided:

1. Patch applications such as PDF viewers, Microsoft Office and Java within two days of threat notification.
2. Use the latest operating system version and patch within two days for vulnerabilities.
3. Limit the number of users with administrative access privileges to those who really need access.
4. Whitelist applications to help prevent malicious software and other unapproved programs from running (e.g., by using Microsoft Software Restriction Policies or AppLocker).

Pelgrin said security measures must be as automatic as putting on seat belts. Drivers don't necessarily wear

RESOURCES FOR CITIES AND COUNTIES: Tools, Templates and Guides

Multi-State Information Sharing and Analysis Center cybersecurity guides for nontechnical managers.
http://msisac.cisecurity.org/resources/guides/

SANS 20 Critical Security Controls
www.sans.org/critical-security-controls/guidelines.php

SANS advice on protecting mobile devices: PINs, passwords, pattern locks, encryption, backups, remote wiping, and what to do if your device is lost or stolen.
www.securingthehuman.org/newsletters/ouch/issues/OUCH-201210_en.pdf

White House Guide to bring your own device (how to safely integrate personal mobile devices into your network).
www.whitehouse.gov/digitalgov/bring-your-own-device

McGraw-Hill basic security training, concepts, definitions, two-minute drill and a self-test.
www.mhprofessional.com/downloads/products/0072254238/0072254238_ch01.pdf

A four-page nontechnical acceptable use template developed by MS-ISAC and LeRoy, N.Y.
http://msisac.cisecurity.org/resources/guides/documents/Acceptable%20Use%20Guide.pdf

This webpage contains many different types of security policy templates from the SANS Institute.
www.sans.org/security-resources/policies/

NIST Computer Security Incident Handling Guide
http://csrc.nist.gov/publications/nistpubs/800-61rev2/SP800-61rev2.pdf

NIST Risk Assessments Guide
www.nist.gov/customcf/get_pdf.cfm?pub_id=912091

The Open Web Application Security Project live CD: testing tools for website security
www.owasp.org/index.php/Main_Page

Metasploit penetration testing tools
http://en.wikipedia.org/wiki/Metasploit_Project

Trustwave perimeter scanning for vulnerability and PCI compliance
https://www.trustwave.com/

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seat belts because they think they may be in an accident, nor do they buckle up because they fear a traffic ticket. They do it because it's become a routine part of driving. Securing computers and systems should become just as routine.

So what are some other onion layers? A helpful analogy is to think of how you secure your home. You lock the doors and windows at night, set an alarm if you're gone, put valuables in a safe, tell your children not to invite people over when you're not there and buy homeowner's insurance. If you live in a high-crime neighborhood, you might have a dog and bar the windows and doors.

With the Internet, however, there are no safe neighborhoods — your "house" is accessible from anywhere in the world. And since cities and counties provide access to the public for information and transactions, you must be prepared to sort the traffic and attempt to keep out the bad guys even with high traffic volume.

Use Strong Passwords

The first element of strong security is a strong password — as boring as that may sound. You have a key to the front door of your house; computers and computer systems use passwords. Weak passwords are like simple door locks that can be sprung with a paper clip. Short, simple words — for example, your dog's name "Scotty" — make weak passwords. Cybercrooks can break these in a few seconds. For starters, a good password is at least eight characters long. Using upper- and lowercase letters also increases the time required to crack it. Adding a number or two strengthens your defenses even more, and adding a punctuation mark or other symbol gets you into "strong password" territory that could take years for a hacker to crack. Use tools like Microsoft's password strength checker to make sure you're on the right track.

Strong passwords are complex — but how do you remember them? Writing them on a sticky note attached to the screen or under the keyboard means anybody with physical access to your computer can get into your data. But experts have come up with a few tricks to jog your memory. Start with a phrase, for example, that commemorates a family activity: "We camped at Humbug Mountain in 2010." Your password could be the first letters of that phrase: "WcaHMi2010." Microsoft's checker rates this password as "medium" strength.

To strengthen it, trade some letters or numbers for symbols. For example,

RESOURCES FOR CITIES AND COUNTIES: Organizations

Center for Internet Security
The Center for Internet Security has three divisions:

1. **The Multi-State Information Sharing and Analysis Center (MS-ISAC)** is a hub for sharing cyberthreat information and responding to cyberattacks. All 50 states belong to the MS-ISAC, along with a growing number of local governments.
2. **The Security Benchmarks division** develops industry-standard best practices for security and provides checklists for securely configuring computer systems.
3. **The Trusted Purchasing Alliance** is designed to drive down the price of security products by combining state and local government purchases into bulk buys. The alliance works with public agencies to pinpoint the areas of greatest need, and then negotiates with vendors for discounted pricing. Product choices are vetted by a review board stocked with analysts and security experts.

NACo Cyber Security Task Force
National Association of Counties (NACo) President Chris Rodgers announced last July that the association is making cybersecurity a priority through a public-private partnership to promote cybersecurity awareness and education. In October — National Cyber Security Awareness Month — NACo held a series of five security webinars. According to NACo CIO Bert Jarreau, the webinars will be followed by a forum in April in Omaha. The Center for Internet Security also has joined the NACo Cyber Security Task Force.

The National Association of State Chief Information Officers
NASCIO posted cybersecurity resources on its website in October for National Cyber Security Awareness Month. The Resource Guide, for example, contains a state-by-state listing of cybersecurity contacts.

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RESOURCES FOR CITIES AND COUNTIES: Reports, Articles and Papers

Digital Communities special report on BYOD: A detailed look at how cities and counties are dealing with security and other issues related to employees who want to use personal mobile devices for work.
www.digitalcommunities.com/personaldevices

2012 Norton Cybercrime Report
www.digitalcommunities.com/norton2012report

TrendLabs Third Quarter 2012 Security Roundup
www.digitalcommunities.com/trendlabs2012

trade the "a" for an ampersand (&), the "i" for a colon (:) and swap the two zeros for letter Os. That gives you: "Wc&HM:2O1O". Microsoft's checker says that's a "strong" password, and it's much easier to remember than a randomly generated strong password. So you've beefed up your front door and installed a deadbolt.

Change Passwords Often

Pelgrin said using the same password for your home computer and work systems is like using the same key for your house, car, office and storage facility. If someone makes a copy of that one key, they have access to everything. Typically, if hackers crack one password, they will try that password on any other systems (e.g., social networks and mobile devices) that you use. "Keep your city or county login password strong and don't use it anywhere else," Pelgrin said. And, even though it's inconvenient, passwords should be changed regularly.

Use a Password Manager

If you have too many passwords to remember, try using a password manager, which stores multiple passwords in an "online safe" where users only need one password for access. "They let you randomly generate strong passwords for all your accounts and store them securely," said Joanne McNabb, chief of California's Privacy Protection Office, in a newspaper article. McNabb said there are a number of free password managers including: KeePass (for Windows, OS X, Linux, Android and iOS), Password Safe (Windows) and Keychain (Mac).

Biometrics Can Help

In some cases, biometric devices that require a fingerprint, retina scan or facial recognition can provide secure access without a password. For instance, staff members at the Sacramento, Calif., City Clerk's Office are piloting fingerprint readers for their mobile devices.

Use Mobile Device Passwords

Americans lose $7 million in mobile devices every day. Yet Pelgrin said he's astounded at how many people don't use a sign-on password for their smartphones. Simply setting a four-digit passcode will keep a thief out of smartphone users' personal information, bank accounts, contact lists, etc., and after a certain number of wrong attempts at cracking the password, the phone will freeze everything or erase all data.

Firewalls: "Who are you and what do you want?"

Using strong passwords isn't the only security measure to take, but it's a good start. The next layer of the "onion defense" is a firewall. If someone knocks on your front door, you would certainly find out who they are and what they want before inviting them in. A firewall does that for a computer. It analyzes traffic coming from the Internet, for example, that's going into the computer system and allows some traffic to enter and stops other traffic based on operating rules designed to protect the system from attacks. Most firewalls offer a choice of "on" or "off." To have this layer of protection, make sure your firewall is on. If the firewall stops a connection you want, then add an exception in the firewall settings.

Use Anti-Virus Software

Viruses are so named because they copy themselves and infect computer systems, traveling from computer to computer over the Internet or wirelessly. They can erase, change or steal information, and even hijack a computer and allow someone else to use it.

Your protection against biological viruses is immunizations, isolation, use of hand sanitizers and so on. Your protection against digital viruses is anti-virus software, along with common-sense measures like not clicking on suspicious emails or email attachments. Anti-virus software should always be installed and kept updated, Pelgrin said. There are a number of subscription-based anti-virus offerings, and Windows now comes loaded with its own free virus protection software called Security Essentials.

Put Valuables in a Safe

In a house, you may put valuables like jewelry, laptops, guns and cash in a safe. It provides an additional layer

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JESSICA MULHOLLAND

Will Pelgrin, CEO, Center for Internet Security

Anti-virus software should always be installed and kept updated. There are a number of subscription-based anti-virus offerings, and Windows now comes loaded with its own free virus protection software called Security Essentials.

of protection for things people would be likeliest to steal. Likewise, cities and counties have data that would be most attractive to thieves, and that needs an additional layer of security. Encryption takes data that may be in plain text and substitutes symbols, etc., for that text. Many databases come with encryption, and some very secure encryption is even available for free.

As with a household safe, not everything will be encrypted, there's not enough room, or it's too expensive, or it makes daily work too slow. So how does one decide what needs extra protection?

What's Valuable?

Ilene Klein, chief information security officer of Phoenix, has some suggestions. For instance, she said there's no justification for encrypting public data. "On the other end of the spectrum," Klein said, "there is data that if released could cause harm. For example, police officers' home addresses. That data has to be protected. There is data that has to be protected for legal or industry requirements." This includes health information, which is protected under the Health Insurance Portability and Accountability Act, and for agencies accepting credit cards, Payment Card Industry security standards must be followed. In addition, criminal justice information and homeland security data often demand special protections too.

"In between [public and sensitive data] you have information that is for internal use only, like employee data, some of that is public information," Klein said. "For example, my salary is public information. But public information is interspersed with confidential information. My Social Security number is part of that employee record, but that's confidential, so that field needs to be protected. If somebody requests my employee record, the public part can be released, but my Social Security number has to be redacted. And hopefully, my home address would be redacted as well.

"Another type of information that falls into that middle category is some procurement information. It is not public yet, because a deal is pending, but after the deal is done, the information becomes public. Make sure you have policies behind everything, make sure all your employees know those policies and know how to handle information appropriately."

Klein said public information can be password protected and posted on the public Internet. The middle layer is password protected, stored on a server, not a laptop. Sensitive information, she said, should be encrypted, stored on a file server, and password protected with access limited to only those people who need it.

Sometimes, executives demand access to encrypted material because they are executives, not necessarily because they use that data. The more people with access, the less secure the data.

The Moat Revisited

Seattle's Hamilton said the proliferation of mobile devices has made it harder to control data entering or leaving city systems. "We don't have control over anything resembling a perimeter," he said. "It would be ludicrous to assume we could address security on every end point; there are just too many flavors of them, so that horse has left the barn. To address the growing risk … it's important to focus on those assets that are really important in the context of city and county government."

Hamilton reeled off some of Seattle's most valuable assets. "We manage transportation, all the signal timing, signage, cameras, that's a big IP network," he explained. "We manage communications that tie together different law enforcement organizations. We deliver energy, water, we remove sewage, and those are all control systems.

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IPV6 AND SECURITY

The transition to Internet Protocol Version 6 (IPv6) — formally launched in June — is necessary in part because there are no more Internet addresses available under IPv4. So does IPv6 — a new Internet communications protocol that's incompatible with IPv4 — offer fewer security vulnerabilities? We asked Steven Bellovin, a Columbia University professor of computer science who is currently serving as the Federal Trade Commission's chief technologist.

"IPv6 offers some minor advantages, but nothing major," said Bellovin, who emphasized that he was speaking for himself and not the FTC. "When we were designing it, we had higher hopes. In fact, circa 1994 the claim was made that it would be more secure. Unfortunately that statement is, as they say, 'inoperative' for several reasons. First, what we mean by 'more secure' was really 'built-in cryptography' — what we now call IPsec, a VPN [virtual private network] protocol.

"There are several problems with that. For one thing, we have a better understanding today of the causes of insecurity. Crypto[graphy] is a great thing, but it's not going to solve the buggy code problem. In 1998, as part of a National Academies study, I analyzed every CERT [U.S. Computer Emergency Readiness Team] advisory issued up to that point. Eighty-five percent of them described problems that encryption couldn't fix: code problems, configuration errors, etc. Second, we assumed that IPv6 would be deployed a lot more quickly than has turned out to be the case. In the interim, every shipping operating system has added IPsec support to its IPv4 code. That negates the advantage that IPv6 was supposed to have.

"There are still some benefits," Bellovin explained. "Privacy-enhanced addressing is one; the relative immunity of a v6-only Net to scanning worms — ones that spread by trying to find all hosts in a given range of IP addresses — is another. These are minor advantages, though, and have to be balanced against ISP and [system administrator] relative inexperience with IPv6 operation and tracing. (By the latter, I mean answering the question 'which host did that nasty thing?' when the host is using a privacy-enhanced address and hence isn't easily identifiable unless you take other precautions.)" *— Wayne Hanson*

"Then we have our big pots of gold," he said. "We have our [human resources] database with everybody's bank routing number, we have a little bit of cardholder data, business license data, so it's very important for us to quit thinking about 'how am I going to control every one of those end points?' I'm going to do risk-based application of controls, and I'm going to build little mini-moats around the really important stuff."

Have a Security Policy

OK, you have strong passwords, have your firewalls turned on, have installed and updated your anti-virus software, and are patching software and operating systems and following security best practices. Now — to continue the home-security analogy — you need to establish some agreements with the family. In city or county governments, those agreements are called policy or acceptable use agreements. Most of these, like security 101, are just common sense.

A family might have policies like: The last one to leave the house turns off the lights, checks the doors and windows to make sure they're locked and sets the alarm. Parents might tell the kids that their friends can't visit unless a parent is present, and if someone is at the door not to open it unless they know who it is. Sometimes people will object to policy or acceptable use agreements, as they are often not the easiest way to do things. Hackers will certainly object to them as it makes their jobs more difficult, which is the whole idea.

Acceptable use policies might be that staff can't use their personal computers to connect to the internal city or county network from home unless they use a virtual private network, which encrypts the information going back and forth. Or a government policy might say that staff members can use their mobile phones to access email and calendaring that are available on the Internet but may not connect by personal mobile device to the internal network. Or that personal thumb drives may not be connected to internal computers as they may contain a virus picked up elsewhere.

It's convenient to sit at a coffee shop using an unsecured Wi-Fi connection. It's convenient to put work files on a memory stick and transport them between home and work. But hackers take advantage of carelessness and convenience, so policies are basically agreements that will help avoid vulnerabilities.

Keep and Audit Security Logs

You can notice changes in your children that might indicate they are coming down with a cold or the flu. Something unusual: a higher than normal temperature, for example, or coughing. With computer systems, said Pelgrin, there are likewise symptoms of infection by malware. Slower-than-usual operation, an unexplained lack of disk space, applications that don't work right, crashes, or correct passwords that don't work. Each of these is an indication that the computer may be infected with some kind of bug. Time to make a trip to

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the doctor; time to scan your system or take the computer in for repair.

A home alarm system and surveillance cameras are useful if something is missing or a mysterious problem arises. Camera footage can be reviewed. If no one is home, an intrusion is noted and authorities are notified. Without an intrusion detection system or computer logs, bad things might be happening without anyone noticing. Someone, for example, trying a password unsuccessfully hundreds of times would be an indication of an attack. Was an attempt to crack into the system successful? If so, which files were compromised? What were they after? How much damage was done? How did they get in? Did they leave a back door so they can return? To answer those and other questions, logs must be kept and audited.

That can be troublesome, said Klein. Security logs use a lot of storage space, and they are time-consuming to audit. But some way or another, they must be maintained and monitored. "Reputable cloud providers have more resources so that's one advantage of going to a cloud provider," she said. "But if your information is breached, you are still responsible. You can outsource the work, but not the accountability."

Teaming With the Neighbors

On the Internet, there are no gated communities; no safe little neighborhoods tucked away off the beaten track. Seattle's Hamilton said his city has been the recipient of targeted attacks. "And frankly," he said, "we see a lot of countries with very dubious law enforcement controls, knocking on our door all the time." But local governments can join together in a sort of "Neighborhood Watch" to keep an eye out for unusual activity.

King County, Wash., for example, is doing just that, Hamilton said. "We have set up something called PRISEMS — the Public Regional Information Security Event Management System. In today's world you have all these preventive measures in place, but the bad guys are going to get in, there's no stopping them. Especially if you have a nation state coming after you, they're going to do it."

The cities of Seattle, Bellevue, Lynwood, Kirkland and Redmond, along with Kitsap County, Thurston County, Seattle Children's Hospital, Snohomish Public Utility District and six maritime ports now send their security logs to one location for analysis, Hamilton said. "So we watch the attack surface of the region. We're all connected; we have trust relationships between all of us because we do manage transportation, communications, law enforcement. ... The bad guys are out there looking for the weak door, and we've been able to prove that."

The Multi-State Information Sharing and Analysis Center is another good security resource for local government. Links to it and other useful resources can be found in the resources chapter of this special section.

Secure Disposal

As computers, servers, storage media and other system components reach the end of their useful life, they may be donated, recycled, etc. But there's a security component to even such mundane actions. According to the Center for Internet Security, "Deleting files does not erase the information. It only makes the space containing the files available to store additional data. The information can often be retrieved by using forensics or other recovery tools. As new computers are purchased, older computers may be sold or surplused. You should assume that sensitive information may have been stored or viewed on all computers at some point in time. Before discarding your computer or portable storage devices, you need to be sure that that data has been erased or 'wiped.'"

Defense-grade wiping software is available for free on the Internet. CDs and DVDs need to be shredded, and hard drives and other storage media returned under warranty should be destroyed.

When All Else Fails ...

If the house burns down, or someone trashes it, there's insurance to rebuild or repair. If someone hacks into your information system and cleans you out, or messes things up, there's a backup ... isn't there? Irreplaceable data on an individual computer can be backed up on an external drive, or one of the new "mini cloud" offerings like iCloud for Apple devices, or Dropbox for a variety of applications, subject to a jurisdiction's security policies.

Some anti-virus software has an optional online backup service for protected computers. Some agencies have cloud email, calendaring and other applications so that mobile devices can get access without coming into the protected city or county system, and that also serves as a backup for those materials.

Bigger systems often have backups that are continually synchronized from somewhere offsite. In any case, if the system is hacked, the burning question is: Have you backed up your data?

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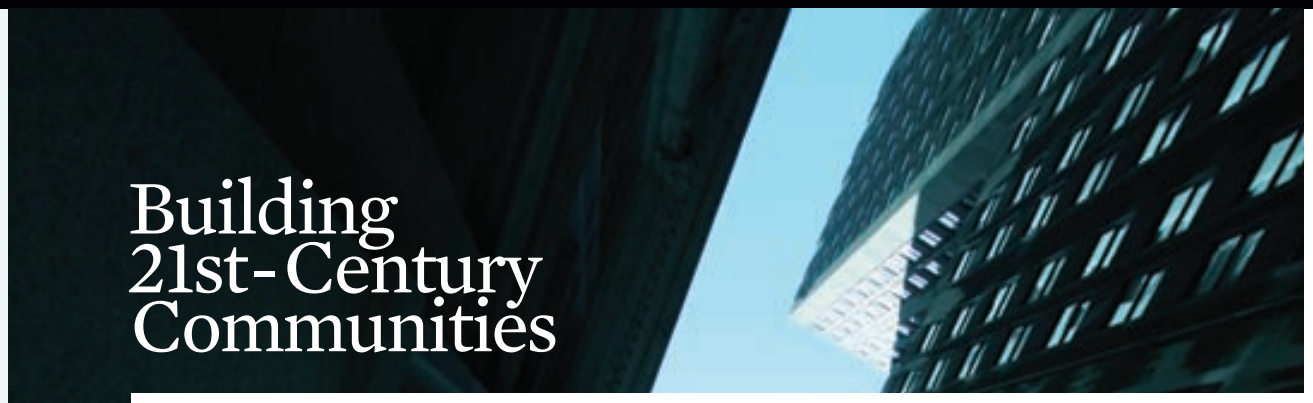

Building 21st-Century Communities

Digital Communities are real places that understand and value the transformative power of broadband connectivity, core computing technologies and interoperable applications to improve the way government conducts business and interacts with citizens. The Digital Communities Program showcases solutions from leading technology companies that are specifically designed for communities and local governments that want to exceed the expectations of their citizens. In addition, the program provides a collaboration forum where community officials discover and share emerging best practices and innovative community technology deployments.

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CASE STUDY

More Power, Less Paper

Bexar County centralizes and streamlines data with Infor.

As one of the largest jurisdictions in Texas, Bexar County has a significant amount of financial and contract data to track and organize. Until recently, keeping this big house in order was no small task. Despite the leaps and bounds that technology has made in recent years, Bexar County's financial, budgeting, planning and contract management systems were mired firmly in the pre-Internet age. The County had computers, but the financial management software it used was not exactly cutting edge.

"We had an old legacy system," says Bexar County Auditor Susan Yeatts. "We didn't have any modules. And the system wasn't providing people with the information they needed in a timely fashion."

The defining characteristics of Bexar County's financial, budgeting, planning and contract management system were decentralization and siloed data. Beyond the absence of an efficient networking tool for monitoring and communicating information was a distinct lack of integration. Each department at the County had its own data, and sharing it was a tedious exercise. "Employees had multiple Excel spreadsheets to keep track of data," says Courtney Lieberman, financial systems manager for the County.

The system was also plagued by speed and efficiency issues. Information was scattered, and the County didn't have the capability to quickly update its financial data and report the changes to the necessary parties. As a result, decision-makers were often working with obsolete information, which led to sub-optimal budgeting choices.

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budgeting, planning and contract management capabilities. Infor equipped the County with three major tools from its Web-based suite: Infor Lawson Budgeting & Planning, Strategic Sourcing and Contract Management. Together, the solutions have revolutionized the way Bexar County handles its business.

"When we did our budget [before Infor], we used to have to do it in an Excel spreadsheet. Now it's all online," says Cathy Maras, Bexar County's chief information officer. "The budget department doesn't have to worry about each version of Excel. It's all interfaced in one solution, one module. We now save a lot of time not having to send new Excel spreadsheets to budget all the time."

Bexar County can also use the Budgeting & Planning module to experiment with different budgeting scenarios in real time. If the County finds a scenario it likes, it can import the new specifications on the spot, implementing the new budget immediately. And all the Infor modules are flexible, working easily with the non-Infor programs the County uses. "It interfaces with other software that we have," says Yeatts. "That has made a significant impact. We didn't have any of that before."

Additionally, the County purchased the Enterprise Financial Management Suite, which included the general ledger, accounts payable, invoice matching, accounts receivable, asset management, project accounting and several other helpful financial tools. All have made a huge difference in the County's financial operations.

A better bid

The benefits of the new system go well beyond better tracking of internal financial data. Using the Infor Lawson Strategic Sourcing and Contract Management modules, Bexar County can now solicit grant proposals and manage contracts much more efficiently than before. The County can also better conserve its resources and save on supply costs, as the entire soliciting and managing process is now paperless. Coupled with the new automation features, this has resulted in impressive cash savings for the County.

"It's just awesome. It helps us with reporting and we can track grants like we never could before."

Susan Yeatts, Bexar County Auditor

"We're scanning all of our vouchers and invoices; before, we had to send them out to a third party. We're saving hard costs right there," says Yeatts, adding that Infor's automation features also allow the County to process paperwork and transactions much more quickly than before.

Lieberman calculates that his own department is saving the equivalent of half a million dollars on salary expenses alone due to the upgrade, thanks to automated workflow processes that dramatically increase employee productivity. "We're doing more with the same folks," he says.

The Infor Lawson Strategic Sourcing application allows the County to conduct the entire contract bidding process online. Vendors can register their names in the system for free and receive notifications whenever a new request for proposal (RFP) is released. They can then submit proposals electronically, at which point the County can review and respond electronically as well.

It's a drastic — and welcome — change from the old days. "For the old system, we would have to upload a PDF of our solicitation and it would send out an electronic notice only to vendors that paid," says Purchasing Agent Dan Garza. "Now it's all automated, paperless and streamlined." Garza estimates that 4,000 vendors have registered with the new system.

Once a bid has been accepted and a contract signed, monitoring the status of the project is easier than ever, thanks to the new system's easy tracking and reporting features. "It's just awesome," says Yeatts. "It helps us with reporting and we can track grants like we never could before. That's really helped out a lot too, because we have a lot of grants. Last year, we had over $32 million in federal grants."

Mission-critical

Of course, even the best electronic system around is useless if the power goes out, which is why Bexar County also worked with Infor to implement a disaster recovery solution that provides quick failover service in the event of a system disruption. "It's almost like a mirror image," says Lieberman. "In the event the main system goes down, everything automatically fails over to another set of hardware and brings the system back up, so the downtime is minimal. ... That was one of our requirements in the RFP, because it's a mission-critical system."

With the benefits of an integrated enterprise system, Bexar County is serving its constituents more effectively than ever. "Now we have one place for everything," says Lieberman. "It's been really helpful for us."

Infor

For more information, please visit:
http://www.infor.com/industries/publicsector/

CASE STUDY

Keeping IT in shape

Texas Health and Human Services Commission stays healthy with its new Active Directory system.

At one time, the state of Texas had 13 agencies providing health and human services to its large and diverse population. However, the sheer size of the state and demand for more cohesive services compelled these separate entities to gradually combine forces, eventually forming five agencies under the oversight of the Texas Health and Human Services Commission (HHSC). The commission is now responsible for providing strategic leadership and support services for all health and human services programs within the state.

Unfortunately, the agency consolidation project did not originally extend to information technology (IT). Each formerly standalone agency still had its own IT setup, including its own directory services platform. As a result, Texas HHSC had to work within a disjointed hodgepodge of separate domains and directories, all based on out-of-date infrastructure.

"We considered it to be obsolete technology," says HHSC Program Manager Carlos Luna. "It did not provide us with the type of enhanced, centralized IT management ability we needed."

Recognizing the need for a major directory upgrade, HHSC retained Quest Software (now a part of Dell) to migrate the agency's many separate directory services platforms into a cohesive Microsoft Active Directory. The update would finally centralize all directory operations and streamline the management and maintenance of HHSC's IT infrastructure.

"Like any enterprise-level organization, the opportunity to centrally manage our directory services was a plus," says Luna of the decision to migrate to Active Directory. "Through AD, we can facilitate the integration of multiple services that we did not have before, such as network storage, data backup processes and the consolidation of multiple pieces of server hardware."

The agency chose Quest due in large part to recommendations from the subject-matter experts the agency consulted with during the migration's planning stages.

"Quest was recommended by our SMEs," says Luna. "We all looked favorably

The Texas State Capitol building, located in Austin.

SHUTTERSTOCK.COM

at the Quest tools, specifically for migrating from the old environments to a Microsoft AD environment."

The migration process was successful thanks in part to the convenient, easy-to-use tools and support services provided by the Quest team at Dell. The products that contributed to a smooth transition included NDS Migrator and Migration Manager for Active Directory.

In particular, the powerful Quest tool Reporter analyzed the old services environment, which allowed HHSC to organize all data in preparation for the switch to AD. During the process, the Quest migration tool performed the migration operations while maintaining all the attributes of the data objects being migrated, ensuring consistency from the old system to the new.

Recovery ready

The ability to quickly recover lost data is critical for any organization to maintain stability and operate consistently in an unpredictable IT environment. Thanks to the switch to Active Directory, the staff at HHSC now benefits from better recovery capabilities than ever before. Even when entire user accounts are accidentally deleted, a Quest solution from Dell — Recovery Manager for Active Directory — allows HHSC's IT personnel to restore the missing accounts in a matter of hours.

"There was an instance where one of our technicians inadvertently deleted a couple of objects, including user accounts. We were able to restore them quickly and with all their attributes," says Luna. "The users were not down for more than a couple of hours."

Luna, understandably, is a big fan of Recovery Manager's recovery process. "The recovery tool helps us save a lot of time and maintain productivity levels," he says. "I can tell you that it is easy to use, and we have our customers up and running much faster than we did before."

Part of what speeds up the AD recovery process is system centralization. For the most part, technicians no longer have to physically travel to different sites to perform recovery operations. "Before, with native tools, we typically would have somebody visit a [damaged] computer; it could take a whole business day to travel to a particular site," says Luna. "Today, we can actually restore services in much less time, without traveling."

"The recovery tool helps us save a lot of time and maintain productivity levels. I can tell you that it is easy to use, and we have our customers up and running much faster than we did before."

Carlos Luna, Program Manager, Texas Health and Human Services Commission

Switching to Active Directory has also greatly improved the consistency and efficiency of service delivery across the agency. "Before, a lot of the IT support was localized," says Luna. "We have a centralized, more delegated approach today. Now, our local IT employees are still performing services, but they're doing it in a much more efficient manner."

HHSC will further upgrade its IT infrastructure by incorporating another Quest solution from Dell, ActiveRoles Server (ARS), into its operations. ARS provides a single, secure portal for IT personnel to perform their delegated roles without the risk of security breaches or accidental changes to the system. Its graphical user interface and ease of access will help HHSC manage, secure and audit its IT operations better than ever. "It will provide us a better way to understand our tools through the directory environment," says Luna.

A Critical Piece of the Puzzle

Together, HHSC's adoption of Active Directory and ActiveRoles Server was just one component of a much larger infrastructure update that included server virtualization, hardware replacements and upgrades, and a revamping of server provisioning architecture. Kathy Arellano and Scott Stansbury sponsored the switch to AD, which was performed over a five-month period in spring 2012, and the implementation of ARS should be completed by the end of the year. To improve security and prove compliance, Quest ChangeAuditor for Active Directory from Dell will provide reports and alerts on any critical changes made to HHSC's Active Directory configuration. Combined with the agency's other recent improvements, Quest technologies from Dell position HHSC to be a reliable, efficient provider of essential services to the citizens of Texas for years to come.

Dell Inc. (NASDAQ: DELL) listens to customers and delivers innovative technology and services that give them the power to do more. Quest, now a part of Dell's Software Group, provides simple and innovative IT management solutions that enable more than 100,000 global customers to save time and money across physical and virtual environments. Quest products solve complex IT challenges ranging from database management, data protection, identity and access management, monitoring, user workspace management to Windows management.

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When Cars Talk...

The largest connected vehicle project in the nation is working on standardizing equipment that allows cars to communicate with one another, improving driver safety.

By Jessica Mulholland / Associate Editor

In late August, the biggest road test of vehicle-to-vehicle crash avoidance technology began in Ann Arbor, Mich. The pilot includes players from the city, state and federal levels, as well as industry — top automakers are collaborating on vehicle-to-vehicle technology so that once it comes to market, Ford can talk to Toyota, which can talk to Volkswagen, and so on.

In this model deployment, approximately 3,000 vehicles are equipped with transmitters and receivers that communicate not only with one another, but also with a central infrastructure — and more than 73 lane miles are outfitted with various technologies to gather data that the vehicles transmit. The data collected during this pilot will help lawmakers, industry and government determine whether to proceed, ultimately making vehicle-to-vehicle technology commonplace.

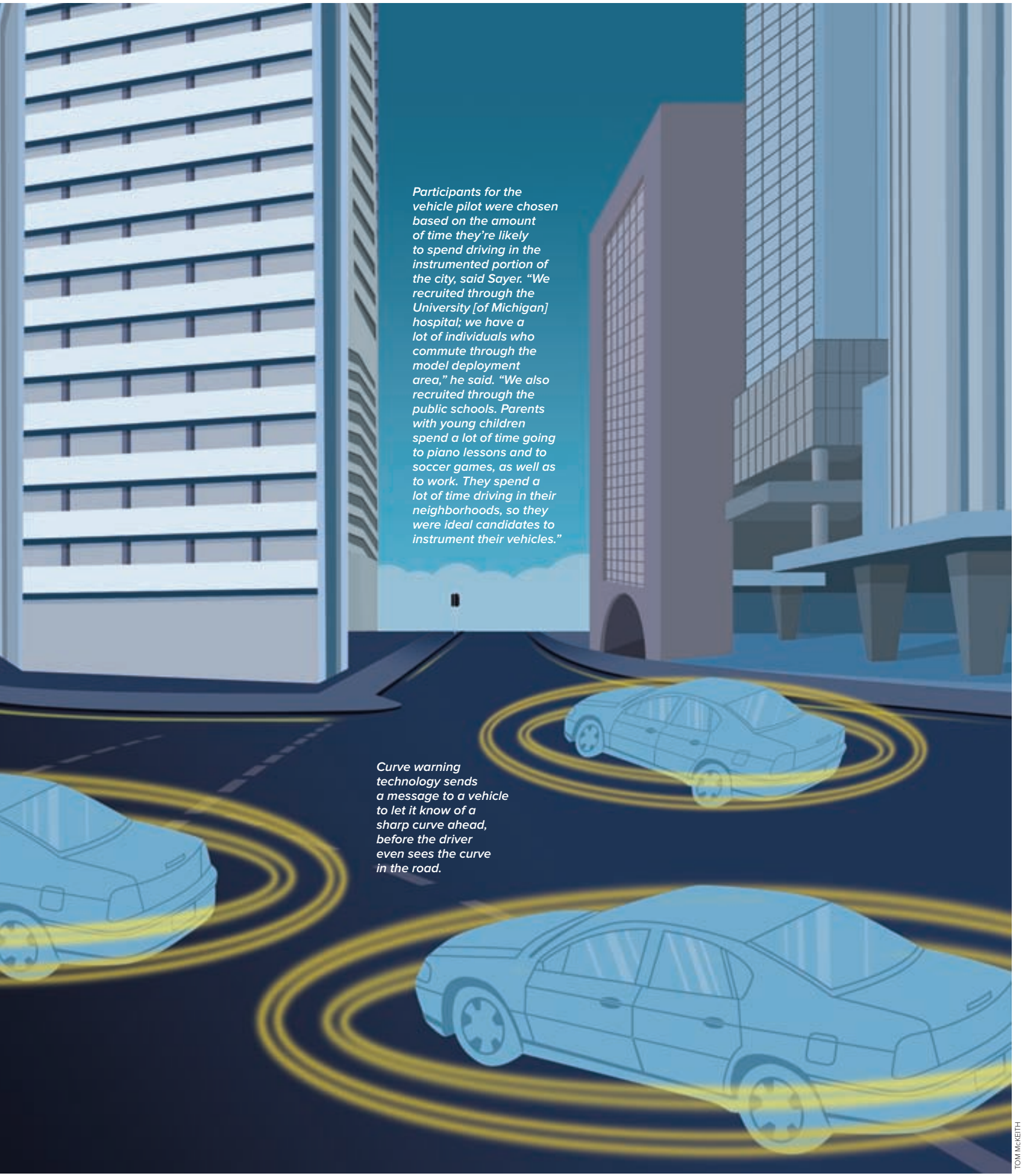
Sixty-four cars in the connected vehicle pilot are outfitted with even more sophisticated equipment that warns drivers of impending danger, said Farid Ahmed-Zaid, technical expert in Ford Motor Co.'s Active Safety Department. "They have cameras that are continuously recording the scene — inside the cabin looking at the face of the driver and on the side of the mirror that is also looking at the driver with some infrared illumination to see the driver's face at night," he said.

Twenty-nine of these roadside devices are located in northeastern Ann Arbor — along highways, at traffic signals and at curve-warning sites. Each device has dual radio systems that communicate with vehicles, along with a GPS antenna that tells the device its exact location. The devices are powered using power over Ethernet, and each device sends information to servers in real time for data tracking. Devices were required to have a range of 300 meters, but initial testing shows that they are reaching as far as 1,300 meters, says Ann Arbor traffic signal tech Kevin Braun.

Though it's not yet incorporated in the Ann Arbor pilot, eventually the technology could get traffic lights to turn green if no cars are coming in the other direction, improving the flow of traffic and ultimately a vehicle's gas mileage.

Vehicle technology used in the pilot varies depending on the participant. The simplest technology is just a transponder that broadcasts the vehicle's location so that other vehicles can recognize that signal, said Program Manager James Sayer, a research scientist at the University of Michigan Transportation Research Institute. "The more complicated systems not only broadcast, but also listen to the signals of all the vehicles that might just be broadcasting. The vehicles that are listening can also determine whether or not there may be a threat or crash, and can provide warnings to the driver." Of the 3,000 participants, approximately 10 percent — roughly 400 vehicles — have the more complicated technology with the warning system, Sayer said.

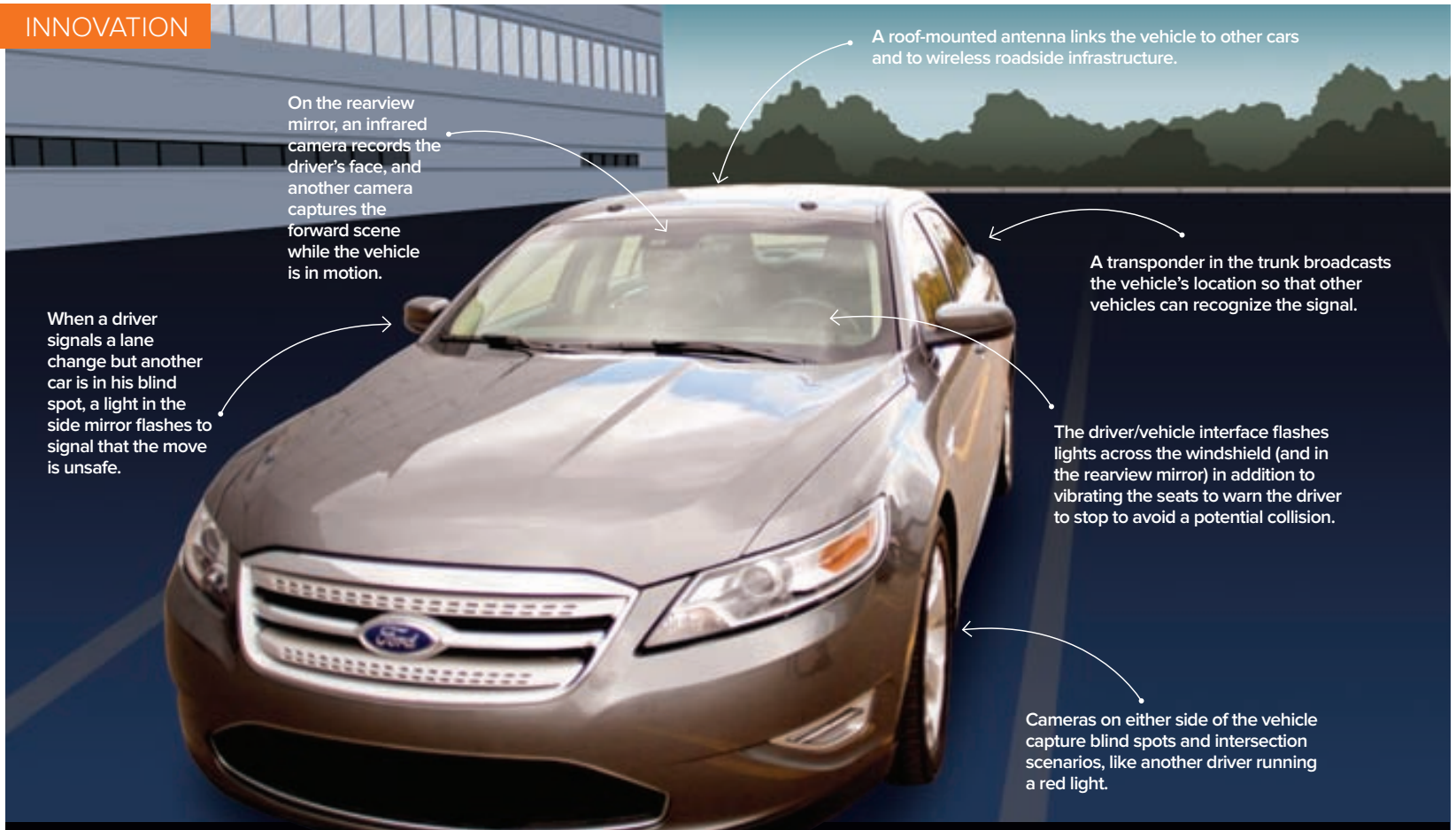
WATCH A VIDEO
Fasten your seat belt for a road trip to see what these talking cars look like @ **www.govtech.com/videos**



Participants for the vehicle pilot were chosen based on the amount of time they're likely to spend driving in the instrumented portion of the city, said Sayer. "We recruited through the University [of Michigan] hospital; we have a lot of individuals who commute through the model deployment area," he said. "We also recruited through the public schools. Parents with young children spend a lot of time going to piano lessons and to soccer games, as well as to work. They spend a lot of time driving in their neighborhoods, so they were ideal candidates to instrument their vehicles."

Curve warning technology sends a message to a vehicle to let it know of a sharp curve ahead, before the driver even sees the curve in the road.

TOM McKEITH



For cities, the implications of this pilot lie primarily on the traffic management side of things, said Ann Arbor IT Director Dan Rainey. "I see us being able to understand traffic flow, understand conditions of roads earlier maybe than we could normally so we could more effectively use our funds to maintain this infrastructure," he said. "It's better road management, and safer roads is a big deal — 38,000 people die annually in car accidents and 2.2 million are injured. With this kind of technology, cars are smarter and they are reacting to other cars sending out messages. So safer streets for us is probably another thing we're looking for."

The city is overseeing the deployment of wireless infrastructure in the northeastern portion of Ann Arbor that will be used to exchange data with the instrumented vehicles, Rainey said. The city also is a partner in the resulting downstream processes — essentially with the data collected during the pilot. "The cars equipped with new technology are going to broadcast information at 10 messages per second," he said, "and those messages will be collected by this infrastructure, and all this data will be analyzed." The purpose of which, he said, is to see if the vehicle-to-vehicle technology is viable as a safety protocol and if the manufacturing technology will work.

Ann Arbor expects the pilot ultimately to provide information that will help it manage traffic more effectively, said Les Sipowski, a senior project manager for the city. But it's also important that the test doesn't disrupt daily life for residents. "We have 270,000 [vehicles] crossing the border of Ann Arbor [every day], and we cannot in any way make traffic conditions worse," he said. "But if we can provide a good, safe environment for this project, that will be our goal from the city perspective."

The safety pilot is a contract with the University of Michigan, with 20 percent of the money coming from the university and 80 percent coming from the federal government, said Program Manager James Sayer, a research scientist at the University of Michigan Transportation Research Institute. He added that as of October, the project's funding sat at about $26 million.

During a demonstration of the equipment in Ann Arbor in October, the technology warned a driver of a car in his blind spot by flashing a light in the rearview mirror and by vibrating the seats. And when stopped at an intersection, the system used red lights flashing across the windshield and vibrating seats to warn the driver that an oncoming car had run the red light.

Eight auto manufacturers — Ford, General Motors, Honda, Hyundai-Kia, Mercedes-Benz, Nissan, Toyota and Volkswagen — are working to standardize the equipment and adapt it to their own particular vehicles. "You need to establish protocols and communication protocols," Ahmed-Zaid said. "All eight OEMs [original equipment manufacturers] need to work together and agree on what needs to be sent out so that each OEM can adapt their system and their application to using that same information. Once that's done, Hyundai, Kia, Volkswagen, Nissan, Mercedes, Toyota, Honda, GM or Ford can basically design their own competitive features inside the vehicle."

In early November, Volvo also pledged to implement vehicle-to-vehicle technology by 2016. GT

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Faces of Crime

Britain's Facewatch tool puts crime reporting and identifying suspects in the hands of businesses and citizens.

By Hilton Collins / Staff Writer

Simon Gordon (left) with Assistant Commissioner Mark Rowley of the London Metropolitan Police Service.

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Simon Gordon had a tough time protecting his livelihood at the turn of the decade. His business, Gordon's Wine Bar in London, experienced an alarming amount of theft that threatened its popularity with customers.

Shoplifting, pick-pocketing and other thefts plagued businesses in multiple industries at the time. In 2010, $1.7 billion worth of goods were stolen from retailers in the United Kingdom, and at one point, Gordon's Wine Bar was the scene of 80 handbag thefts a year.

"It's really bad customer service to have your customers come and their bag's stolen or whatever," Gordon said.

Established in 1890 by vintner Angus Gordon, the wine bar is a piece of London history and Simon's legacy. His father Luis Gordon (who's unrelated to Angus), bought the bar in the 1970s, and later passed the business on to Simon.

CHRIS CREEGAN

But the younger Gordon had a tough time maintaining a safe environment for customers, even with closed circuit television (CCTV) units installed. Police don't usually come to crime scenes for low-level crime, and when officers obtain recordings of incidents caught on camera, sifting through footage is often time-consuming.

It's even worse when footage from multiple cameras is involved. "They will pick up the disc, take it back to the police station, and try to look for an hour of footage from maybe up to 16 different cameras," Gordon said. "Obviously that's extremely inefficient."

To rectify the problem, Gordon launched Facewatch in fall 2010. Today the startup offers businesses and consumers free technical crime reporting tools of two types. The first feature developed was an online module for businesses to upload CCTV footage of crimes that occurred on their premises and input witness statements before sending the evidence directly to the police. The second, and most recent, is a native app on mobile devices that lets consumers search for images of suspects, and once they identify a culprit, file a police report from their phone or tablet.

After Facewatch's debut, thefts at Gordon's Wine Bar eventually dropped from 80 bag thefts per year down to roughly two a month. "There's a very powerful networking effect, which is basically people working together to stop crime," Gordon said. "It stops the whole thing from becoming out of hand."

Crime Reporting Mechanics

The Web-based system deployed in Facewatch's first phase, which is still used today, overhauls the crime reporting process

on business premises. If someone robs a business or customer, the tool allows both types of victims to join forces and notify the police without visiting the station.

Once a victimized customer notifies staff of a crime, the staff member takes down his or her statement and uploads still and moving CCTV footage of the incident to Facewatch's website, where it's received by police. The idea is that the workers and customers will find and deliver the right footage quickly and easily because they're the ones who experienced the incident.

Detective Chief Inspector Mick Neville of London's Metropolitan Police Service — who helped Gordon design Facewatch — thinks the technology is a boon to police officers who don't have the time or means to respond to every incident.

"The police do not have the resources to gather hours of CCTV for minor crime and view it and then try to find the suspect in a crowded bar," Neville said. "If victims see the footage, they will quickly pick themselves out and they can see when their bag is stolen."

Facewatch also helps victims move on after a crime has occurred. The system generates a crime reference number, which can be used for insurance claims, and victims can cancel their credit cards right after the theft.

"You can get back to at least enjoying your evening, because you know you've done everything you possibly can," Gordon said.

According to Neville, arrests are likelier to occur when Facewatch is used with CCTV footage. In some cases, he said, crimes are four times as likely to be solved when the system is used.

In fact, Facewatch has become popular with London businesses. In March, the National Federation of Retail Newsagents announced a three-year partnership with Facewatch that linked more than 16,500 businesses to the system. The media outlet, Info4Security, called the partnership Britain's largest crime reduction initiative ever.

The company's second major product, the Facewatch ID app for Android and Apple iOS, went live this summer, taking crime reporting mobile. Users enter a postal code, and the app presents them with images of suspects associated with the area. Users can input information about a person they recognize, including the suspect's name and address, and forward the data to police. Police supply Facewatch with images that populate the app, and it was only compatible with users in the London and Surrey postal codes as of October.

50

The number of people charged with a crime in 2012 from Facewatch ID identifications.

The app's popularity mirrors that of its sister product. Gordon's unsure of exact numbers but estimates that Facewatch ID experienced about 100,000 downloads within three weeks of its launch. Neville said the app's led to at least 50 people being charged in 2012, thanks to citizen identifications.

A Broad Horizon

Facewatch will likely spread beyond Britain. Gordon is targeting the U.S. market, and he spoke with interested American law enforcement representatives at a 2012 International Association of Chiefs of Police conference. Between these potential deals and the existing National Federation of Retail Newsagents partnership, Facewatch may grow considerably in the near future.

Gordon works diligently to network and expand Facewatch's reach. "That's my whole life now," he said. "I'm just doing it all the time."

He's come a long way since Facewatch's 2010 launch. The system, funded by business sponsors through the Facewatch & Partners nonprofit, is written in the open source application framework Ruby on Rails, and the application programming interface (API) allows people to write apps for it. Gordon plans for his company to receive a portion of the profits when developers generate revenue from apps they create from Facewatch's platform.

Gordon expects that police departments and security guard companies will develop products with his technology. And he's confident others will follow suit.

"It's an open platform with API that will enable people to write very clever apps and things for it that we couldn't possibly think of," Gordon said. GT

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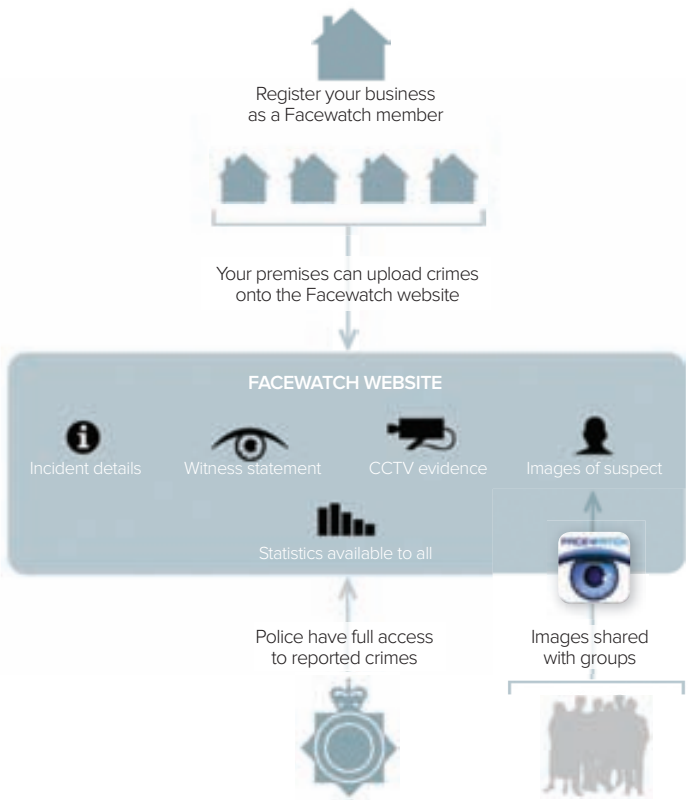
What is Facewatch?

- An online crime reporting system for businesses to report crime, providing the full evidential package required by the police.
- A way for businesses to deter crime by instantly sharing images of suspects between group members.
- A way to review statistics and assess success rates in solving reported crimes.

SOURCE: FACEWATCH.CO.UK



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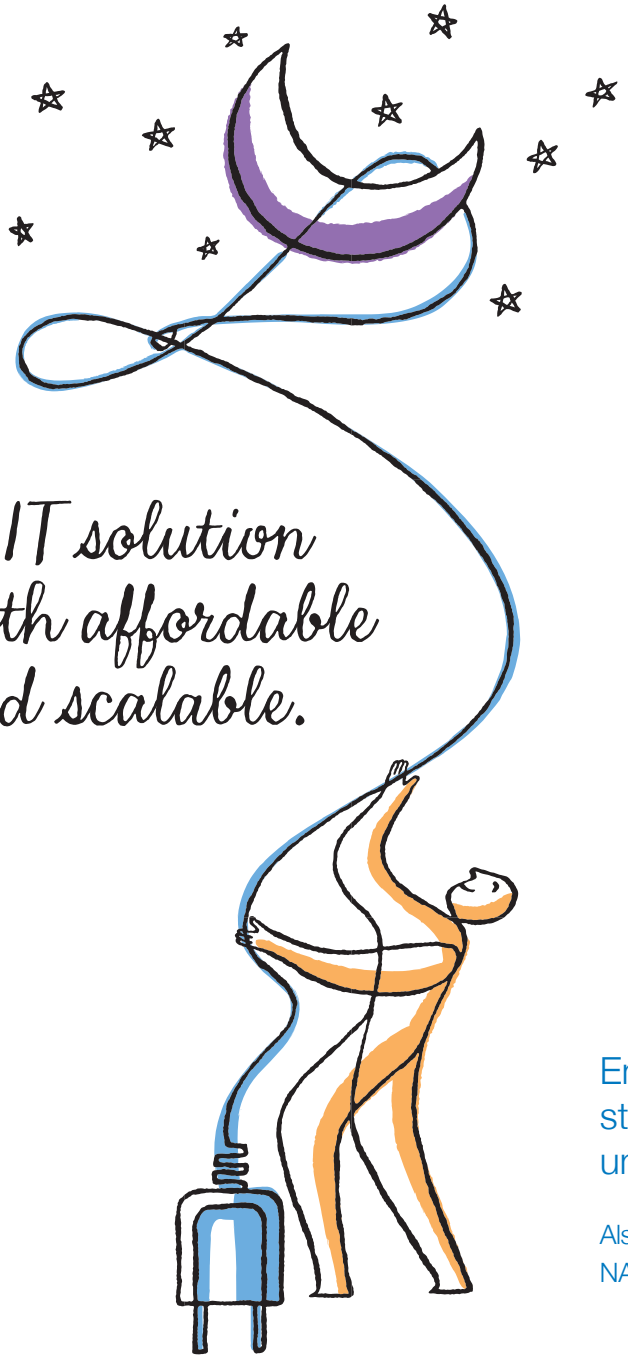

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HIGHLIGHTS FROM 2012'S COVERAGE

JANUARY

Michigan Chief Security Officer Dan Lohrmann discusses **2011's worst security threats** and says mobile security should be top of mind for security experts in 2012.

FEBRUARY

Google is named the **No. 1 most visited website** of 2011, according to a Nielsen survey.

A Canadian man crosses the U.S.-Canada border using a **digital copy of his passport** saved on his iPad. The custom agent made an exception because the man also had a hard copy of his birth certificate.

MARCH

Wikipedia shuts down its English language page to protest Congress' proposed anti-piracy legislation on Jan. 18, a.k.a. **Black Wednesday**.

Researchers find that molecules known as **Criegee biradicals** can cool the planet and clean the air by accelerating the formation of sulfate and nitrate in the atmosphere.

APRIL

The Defense Advanced Research Projects Agency hosts the **Shredder Challenge**, a $50,000 contest for computer scientists and puzzle fans to reconstruct five shredded documents. The goal: to detect vulnerabilities in shredding practices.

What did 2012 hold for **consumers' pockets**? According to Deal News, water and city-enforced fees would be more expensive while GPS units and e-book readers would be less expensive.

MAY

Twitter celebrates its 6th birthday!

The **jellyfish** inspires the creation of Robojelly, a robot that's powered by the chemical reaction between oxygen and hydrogen in water and the platinum on the robot's surface.

JUNE

A California woman finds a 17-gram **meteorite** worth $20,000 while walking her dog.

A study of 926 people says that people who use a computer and moderately exercise will less likely experience age-related **memory loss**.

JULY

A Ron Paul supporter gets Kickstarter money for an action adventure video game called the **Road to REVOLUTION.** The game lets players pretend to be Ron Paul who travels the 50 states to win delegate votes.

Government Technology polls the number of **Twitter followers** in mid-June for presidential hopefuls Mitt Romney (555,233), Rick Perry (140,233), Herman Cain (170,916) and President Barack Obama (16.6 million).

AUGUST

Rice University researchers develop a **spray-on lithium-ion battery**. The rechargeable batteries were used to light up 40 LEDs.

Madrid rolls out its Wi-Fi infrastructure with **iPavement,** smartly designed paving stones that deliver free Internet via 5 GB microprocessor chips.

SEPTEMBER

Newark Liberty International Airport introduces Libby, its friendly and eerily humanlike **two-dimensional holographic customer service agent** that greets people within a 30-feet proximity.

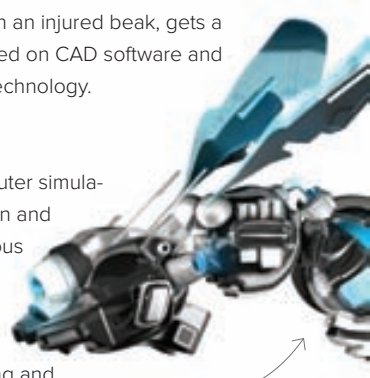
The University of Michigan develops **UMSkinCheck,** an iPhone app that lets users photograph their skin to check for abnormalities and create baseline images of their skin.

OCTOBER

A British bovine named **Lady Shamrock** is tattooed with a washable QR code so users can track her eating habits in an effort to educate consumers about the dairy industry.

Beauty, a bald eagle with an injured beak, gets a new prosthetic one drafted on CAD software and made with 3-D printing technology.

NOVEMBER



Scientists create a computer simulation of a honeybee's brain and upload it to an autonomous flying robot. **The Green Brain Project,** as it's called, received more than $1.5 million in funding and NVIDIA donated graphical processing units.

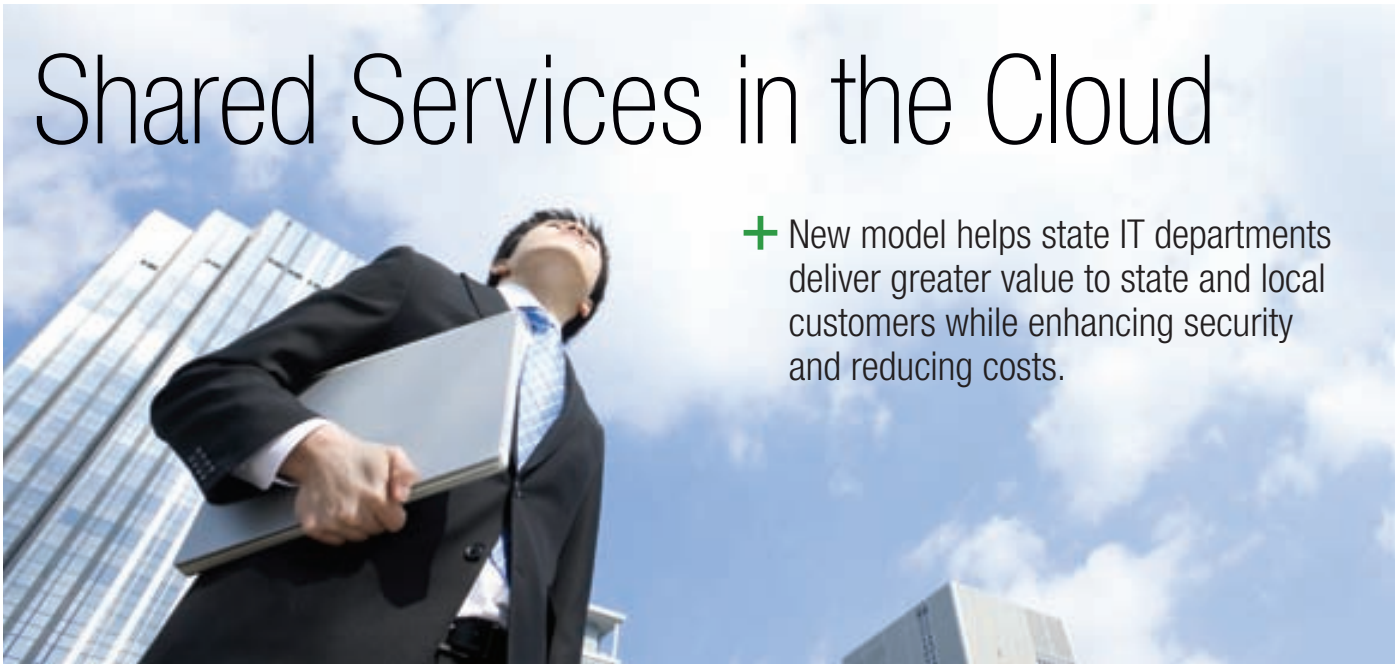
An Android project dubbed **MegaDroid** links 300,000 virtual handheld devices to help researchers understand the behavior of large-scale smartphone networks and will result in modeling software that helps the computer industry improve security for handheld devices.

DECEMBER

Happy holidays! We hope you've enjoyed this year's *Spectrum* coverage.

Send Spectrum ideas to Managing Editor Karen Stewartson, kstewartson@govtech.com, twitter@karenstewartson

Shared Services in the Cloud



+ New model helps state IT departments deliver greater value to state and local customers while enhancing security and reducing costs.

Shared Services: The Promise and Limitations

Even as they struggle with frozen budgets, or with calls to further cut their spending, state IT departments face ongoing demand to deliver more services. If they are to meet that requirement, government IT leaders must find ways to operate more efficiently.

One key to delivering more while avoiding new costs is to develop shared services in the cloud. A "shared service" is one that a central organization delivers to multiple customers. When that organization is a state IT department, the customers usually are other units of state government. They may also include local government agencies.

Traditionally, most shared software services have been large solutions for managing enterprise functions such as payroll, purchasing or email. A state IT department, for instance, would implement a payroll system in its data center, provide access to state and local government customers and store their data on its hardware. The IT department would administer and secure the system, troubleshoot when problems arose and manage upgrades.

Shared services eliminate redundant labor and unnecessary cost, because individual government entities no longer have to acquire and maintain their own solutions. Deploying one large system, rather than many smaller ones, also saves money by creating economies of scale.

The traditional shared services model works well for horizontal business applications that everyone uses in the same way. But it takes a different model to share the vast range of solutions that government agencies use — the ones designed for very specific applications, such as case management systems used by human services departments. Most local governments use case management software, but their needs for specific features can vary greatly. For such vertical applications, a new model — shared services in the cloud — provides a better answer.

Expanding the Possibilities with Shared Services in the Cloud

Although it's common to talk about computing "in the cloud," there actually is no such entity as "the cloud." But there is a technology strategy called "cloud computing." It's a way of providing computer services that, among other things, are:

+ delivered over a network;
+ available to many users, on demand, through a self-service mechanism;
+ provided on a pay-per-use basis; and
+ easily scalable, so that a user can employ as much or as little of the service as needed.

Cloud computing makes it possible to deliver any kind of application — large or small — to any number of users. Accessing a catalog through a central portal, users in state agencies and local governments can choose from a wide variety of services. The catalog might include applications developed by the state's central IT department, applications developed by state or local government agencies, and applications offered by third parties.

Say, for example, that a local school district develops software for managing its bus fleet. The solution proves so easy and effective, district officials decide to

CA Offers Distributed, Scalable, Secure Solution

CA's "Cloud in a Box" engine transforms any number of applications into a set of fully scalable shared services and delivers them safely over a network. CA provides the portal, catalog, distribution mechanism and metering functions needed to distribute and administer the services, and also to securely enable the online business. It protects systems and data no matter where an application originates, whether information travels over a public network, a private network or both.

CA's security strategy operates at three levels:

+ **It uses strong, two-factor techniques** to identify and authenticate each user while eliminating all chance of "man-in-the-middle" attacks.
+ **It establishes which applications and data** an individual user may employ, and then delivers any of those with a single sign-on.
+ **It provides the same data access control** across all computing platforms and manages security at the kernel level.

Recognizing the Potential: **Arizona's Vision**

AMONG THE GOVERNMENT executives who recognize the potential of cloud computing for shared services is Aaron Sandeen, Arizona's chief information officer (CIO) and deputy director of the state's Department of Administration. Sandeen heads the Arizona Strategic Enterprise Technology (ASET) office, which, among other responsibilities, runs the state data center.

ASET already provides a good many shared services, such as virtual machine infrastructure, Microsoft Sharepoint and email. Its customers include state government organizations and county governments. Many of Arizona's shared services are mainframe-based, but that's changing as the state replaces legacy applications with solutions that run on newer platforms.

CA has long served Arizona as a trusted technology partner. Currently, CA is working with ASET to transform the state's help desk into a broader service organization based on industry best practices. "We're trying to get back to basics and provide an organization that can support, monitor, manage, orchestrate and automate service delivery," says Sandeen.

Cloud computing will play a vital role in that evolution. In an era when many state agencies have been forced to cut their IT staffs anywhere from 25 to 65 percent, cloud-based service delivery may provide the key to continuing to operate and — crucially — to safeguard government IT systems.

"It takes a vast degree of different skillsets to run a good security organization," Sandeen says. "The sophistication of the attacks and the risk continue to get more difficult for state agencies." By sharing well-secured services in the cloud, agencies don't merely save money; they also reduce their own risk, thanks to shared expertise and technology that keeps systems running and keeps public data safe.

ASET's aim is to develop a shared services model that meets customers' needs and keeps customers in control, Sandeen says. "The question is, how do we build a platform that customers actually want, with capabilities they want? It has to be scalable, so it can grow to meet any demand they may have, and it has to offer more capabilities and controls than they can purchase on their own. That's what our organization is positioned to deliver."

AARON SANDEEN, CIO AND DEPUTY DIRECTOR, ARIZONA DEPARTMENT OF ADMINISTRATION

In partnership with CA, Sandeen plans to bring ASET's already-extensive catalog of services to an even higher level of excellence. "We're working with CA to figure out how we present this to our customers and empower them," he says. "'How do we give them more control to be able to provision what they're trying to do?' That is absolutely part of our next phase."[1]

share it. After the state IT department adds the solution to its catalog, a bus fleet manager from another district decides to try the software — but just for one month, and just for 50 buses. He likes the way it works, so after 30 days he upgrades the subscription to cover the whole fleet, and the monthly fee increases accordingly.

Services shared in the cloud eliminate labor and reduce cost not only for enterprise software, but for almost any kind of solution an organization might need. By allowing for widespread sharing, the cloud-based approach also provides a greater return on the investments that local agencies make when they develop solutions, and possibly new revenue streams for local developers.

In addition, the cloud computing model gives users a great deal of choice. After all, there's nothing to prevent a catalog from offering two, three or four different fleet management systems, each with features that appeal to a different set of users. Each government agency buys only as much of a service as it needs, and only for as long as that service continues to be useful.

State data centers gain new opportunities to serve their customers without launching costly new capital projects. And citizens benefit, as government agencies make better use of tax dollars to expand and improve public services.

Like in the example of ASET, other state IT organizations can use shared services in the cloud to increase the variety and quality of the services they provide. Employing this new model, they can manage costs and maintain security while delivering greater value to their state and local customers.

[1] Interview with Aaron Sandeen conducted on Oct. 31, 2012.

Year in Review

An Oprah-style review of my top 10 favorite government things in 2012.

Every year, the pandemonium begins now around Oprah's favorite things.

I'm no Oprah, but I thought I would take the time to reflect on my favorite government things from 2012.

There's no TV launch party, so let's just jump into my list:

1 / **Tablets as Input Devices.** I love the idea of using tablets as a way for government employees in the field to collect information. For example, the U.S. Food and Drug Administration ran a pilot using tablets to make inspection reporting easier and quicker. Instead of employees manually taking notes and inputting them once they get back into the office, they can pretty much complete the report by the time they leave the inspection site.

2 / **Clipperz.** Do you always forget your passwords? Do you feel uncomfortable sharing passwords across your team (but waste time when you don't)? This year, I've moved to using Clipperz to manage my personal and team passwords — all you need to remember is one password and then it has direct logins.

3 / **Government-Focused TED Talks.** I love TED talks, and I was so excited this year that there were three government-focused TED talks from Clay Shirky (author), Beth Noveck (former White House deputy CTO), and Jennifer Pahlka (Code for America). The more attention paid to solving government problems, the better.

4 / **Responsive Design.** Government information should fit every screen — mobile, tablet, laptop or desktop. That's why it's great to see the push toward responsive design where content automatically adjusts to the screen — MorrisHumanServices.org and RI.gov both did great responsive redesigns.

5 / **Civic Accelerator.** I'm excited about the Code for America Accelerator program for civic startups, especially its focus on sustainability. While hackathons are great, we need more individuals focused on building great innovative companies for government services such as accelerator companies like MindMixer and Measured Voice. This is a start.

6 / **BYOD.** Bring your own device became a huge trend in 2012. At the most basic level, I love the push to make sure our enterprise technology can match what we have at home. And, if it's not, let's just bring it in and secure it.

7 / **Unique Mobile Services.** My favorite mobile projects in 2012 are not just bringing Web content to mobile, but also delivering unique services that people only can do with mobile devices. I love Textizen where you text in survey responses while in public areas and the Chicago Transit Authority's Bus Tracker that uses texts to get estimated arrival times for buses.

8 / **Census.** I'm a sucker for census data, so it was great to see the U.S. Census Bureau launch a mobile app that provides updated economic indicators. The bureau also launched an awesome application programming interface that brings this data, which has been widely used by academics for decades, into the hands of developers.

9 / **HootSuite.** Social media studies found that the best time to post on Facebook is between 8 p.m. and 7 a.m., yet most government employees aren't working then. But there's a solution — I love using HootSuite to manage my social media accounts and automate my posting times.

10 / **Rethinking Forms.** We still spend too much time with hard-copy forms, signing and sending scanned PDFs. That's why I'm a fan of the White House Presidential Innovation Fellows MyGov project that tackled online form submissions as well as the U.S. Environmental Protection Agency's e-NEPA, an online system for users to electronically submit environmental impact statements versus hard copies.

Unfortunately, there's no studio audience so I can't give all of you my favorite things like Oprah. But I encourage you to check out my favorite things and share yours on Govtech.com. GT

Steve Ressler is the founder and president of GovLoop, a social networking site for government officials to connect and exchange information.

By Paul W. Taylor

2012 Observations

What Father Guido Sarducci would make of the year in public-sector IT.

The Internet and an old *Saturday Night Live* sketch have aged much better than we had any right to expect.

The former, the progenitor of which dates to 1969, is still changing everything. We couldn't be social, mobile, local or global without it, nor would there have been any need to create entirely new categories of things — apps and tablets most notably among them.

The latter, Father Guido Sarducci's five-minute university has been used in this column for the last dozen years to help clear the clutter at year's end. You can still find videos on YouTube of his five-minute university, the genius of which was to summarize what the average student would remember five years after leaving college.

In fact, our old friend Sarducci was ordained (in a manner of speaking) in 1973, complete with the long, black robe, a floppy wide-brimmed black hat and a thick faux-Italian accent that made him a favorite on *Saturday Night Live*.

Paul Taylor is the chief content officer for e.Republic, *Government Technology's* parent company.

Sarducci's unorthodox pedagogy helps make sense of a year's worth of headlines and hyperbole to place bets on a short list of things you, the above average readers of *Government Technology,* will remember five years from now.

It's the printing press all over again: The confluence of transparency, open data and mobile technology is to our world what movable type was to 15th-century Europe. It is democratizing information like nothing since the printing press — only faster and more widely. Yes, it allows people to interpret text, sacred or otherwise, for themselves. But government (like the church in an earlier era) retains unique authority (and responsibility) to provide context and a framework for creating meaning and understanding.

> "THE CONFLUENCE OF TRANSPARENCY, OPEN DATA AND MOBILE TECHNOLOGY IS TO OUR WORLD WHAT MOVABLE TYPE WAS TO 15TH-CENTURY EUROPE.

Day eight of creation: Big data gives us the power to (re)create earth, or at least know the one we have better. In November, the federal Department of Energy's Oak Ridge National Laboratory brought Titan online, reclaiming the title of the world's fastest supercomputer. Able to do 20,000 trillion calculations per second, Titan is intended to simulate the physical world in ways that make more accurate predictions about everything from hurricanes and typhoons to biochemistry and nuclear reactors — all of which can and should inform better public policy decisions.

This stuff can get you fired: The old axiom in purchasing circles that "no one ever got fired for buying IBM" is actually not in the Bible. Even if it was, cloud computing changes the game in ways that mean there are no more safe bets — only smart ones.

ROI is not an indulgence: To paraphrase the 16th-century preacher Johann Tetzel, as soon as a coin in the coffer rings, innovation springs. The Center for Public Policy and Administration at the University of Utah helpfully put some statistical rigor to quantifiable cost avoidance over five years through the operations of the state portal. Researchers examined the top 25 of the thousand or so online services offered through Utah.gov. Over five years, the study reports cost avoidance of $46 million. It also was able to calculate a comparison of the cost per unit of service done conventionally at $17 each, compared to $4 each when done online.

The always-frugal Sarducci has held to his original pricing scheme — 20 bucks, including diploma, cap and gown rental, graduation pictures and snacks. Ever mindful of the public-sector fiscal crunch, Govtech delivers its year-end *CliffsNotes* on IT innovation for free ... but without the snacks. GT

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