

GOVERNMENT TECHNOLOGY®

SOLUTIONS FOR STATE AND LOCAL GOVERNMENT

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APPLYING INNOVATION TO LEGACY MODERNIZATION IN THE PUBLIC SECTOR

Inflexible mainframes, vintage code, proprietary architectures, dinosaur technologies – all levels of the public sector depend on legacy systems to manage countless business-critical functions.

Enough legacy applications are expensive to operate and stand in the way of implementing the latest technology trends, many IT staff view replacing them as too disruptive, time-consuming and expensive. However, agencies can extend the life of their aging systems without replacing or rewriting them.

Legacy modernization is the process of renewing aging applications, rather than “ripping and replacing” them. Legacy modernization helps governments be more agile and efficient, enabling them to

deliver citizen services more effectively and (usually) at a much lower cost.

How Big is the Problem?

All levels of government rely on legacy applications, platforms and data archives to manage critical agency functions. At the federal level, 47 percent of existing IT applications are legacy-based, according to a recent MeriTalk survey. Four out of five IT leaders surveyed said that mission-critical capabilities were threatened if the agency did not modernize.¹

A review by the state of Texas found that 55 percent of its agencies had at least one mission-critical legacy application, and that 21 percent of its agencies classified all of their legacy applications as mission-critical. In addition, 27 percent of Texas agencies considered more than half of their applications to be legacy systems.²

Texas isn’t alone, according to the National Association of State CIOs (NASCIO), which surveyed 29 states about their use of legacy applications. The states told NASCIO that approximately half

of their IT systems are based on legacy technology and that half of these are considered business-critical. The states' biggest legacy-related challenges, according to the NASCIO survey, are enterprise resource planning (ERP) systems, including finance, HR and procurement, and federal program management systems, such as health and human services.³

What's Wrong with Legacy Applications?

Conventional wisdom suggests that doing nothing costs nothing. But legacy applications defy conventional wisdom, because they are so expensive to use and maintain. MeriTalk determined that federal agencies annually spend \$35.7 billion — almost half of the annual federal IT budget — to keep them running.⁴ And because many legacy applications rely on proprietary technology, customers get “locked in” to the vendors, who are able to increase licensing fees at will.

Another reason for high costs is the scarcity of support resources. Many vendors who produced these older technologies are exiting the market, leaving government agencies without ongoing support for the proprietary technology. Internal expertise, too, is disappearing, as employees with the knowledge to maintain these systems retire and are replaced with those trained in modern languages and technologies.

When agencies spend so much money merely to “keep the lights on,” they have fewer funds to devote to IT innovation. The agency becomes trapped by its legacy systems in a vicious cycle of spiraling maintenance costs and limited innovation.

In addition to their high operational costs, legacy systems often limit an agency's capabilities and prevent it from responding to evolving employee and constituent demands for services such as Web-based access, mobility and eGovernment services.

Because they're not based on open standards or newer technologies, legacy systems frequently lack basic requirements such as user-friendly interfaces, sophisticated security controls and the ability to integrate with other agency systems.

Legacy architecture too often limits agencies to clunky, inefficient workflows that drag down productivity levels and service quality. These applications are notoriously inflexible and lack the ability to integrate across government agencies — or even within the same agency. Antiquated hardware and databases don't mesh with relational and Web architectures.

Finally, as systems age and lose support resources, outages happen more frequently, limiting the agency's performance and preventing it from scaling to serve more citizens and employees.

Defining Legacy Modernization

When a working system is outdated but has business-critical functionality, replacing it completely is a risk — especially when an agency wants functional equivalency. In addition, system replacement is not always financially feasible. State and local governments that modernize instead of replacing their systems can realize dramatic cost savings, extend their functionality and increase their agility.

The legacy modernization process is a viable alternative to replacing systems by rewriting or acquiring new applications, thanks to the emergence of standard Web technologies, stable hardware and software replacement platforms, relational database technologies and updated programming languages. It provides functional equivalency to the old system using modern, flexible technologies, and can also provide new capabilities, such as business analytics, cloud-based tools and Web-based interfaces.

Legacy systems are comprised of many integrated parts, including old and new

mini-applications and lines of code, multiple purchased or licensed applications, various database management technologies and hardware components that support critical business processes. These systems can be transformed by applying modern programming languages, software libraries, protocols and standards, processes, database management systems and/or hardware and software platforms.

The modernization effort should be a tailored approach that combines appropriate off-the-shelf software (located on premises, in a data center or in the cloud), hardware, customized development code, and/or integration with other key enterprise applications. An analysis of an agency's legacy systems will reveal the most suitable modernization solution.

Benefits of Legacy Modernization

The need to continue to reap benefits from existing applications without incurring the time, cost and risk of a total replacement makes modernization an increasingly attractive option for state and local governments and agencies. Along with an ability to stretch taxpayer dollars further, the key benefits of a conversion to modernized technology include:

- **Reduced cost.** Code conversion projects cost about 70 percent less than a total re-design or re-write.
- **Access to new technologies and innovation.** Using up-to-date languages and platforms minimizes operational risk. Support periods go farther into the future and resource pools are greater.
- **Faster return on investment (ROI).** Delivering comparable functionality via code conversion is 30 percent faster than a total re-write.
- **Minimal impact to end users.** Unlike in a total re-write project, legacy modernization does not significantly

disrupt day-to-day operations. End users are only required to participate during the final testing phase.

- **Improved user experience.** Code migrations can extend the user interface to a thin client, browser-based system that provides easy access to data, enabling workflow improvements.
- **Reduced license fees.** Consolidating redundant, expensive legacy database licenses and proprietary hardware lowers operating costs.
- **Less hardware.** Modernization minimizes costly hardware.

A Hybrid Model for Approaching Legacy Modernization

Historically, legacy modernization approaches fell into two distinct categories — the tool-based model and the systems

integrator model. Tool vendors would sell suites of automated software solutions, typically convert the code and hand it off to the customer. Systems integrators would provide customized assessments and services, but they were (and still are) primarily proponents of the “rip and replace” model.

NTT DATA, an innovative IT services provider, has developed a hybrid approach to legacy modernization that saves state and local governments tremendous amounts of money and enables them to better meet the changing needs of their constituents and employees. Its innovative model combines the tool-based and systems integrator approaches by applying a systems integration methodology to tool-based legacy modernization.

NTT DATA’s approach is driven by quality. It ensures that most of the

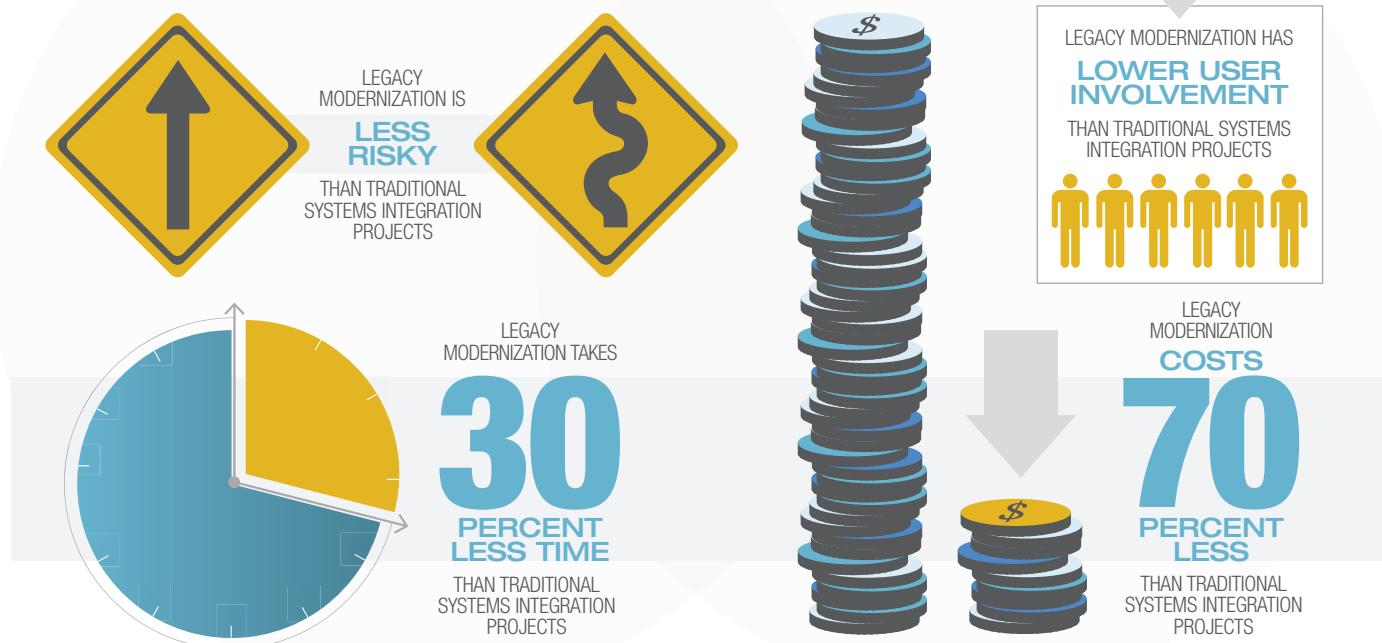
project effort is spent on quality and testing. The Quality Driven Modernization Methodology (QDM2):

- Extracts functional requirements, which reduces risk, time to production and impact on staff
- Uses the extracted requirements to develop test cases that are verified with an innovative quality assurance and testing process
- Transforms the application, instead of hand coding significant portions of it, which reduces development time and defect density

Legacy Modernization Best Practices

NTT DATA’s best practices for legacy modernization are drawn from its culture of practical innovation as a response to

FAST, AFFORDABLE, SAFE: THE BENEFITS OF LEGACY MODERNIZATION



client needs. NTT DATA uses its five-step QDM2 project management process to develop a customized assessment and modernization plan. It implements the plan using automated tools and manages the entire process as a systems integrator would. Besides the system analysis, this includes pilot design and testing, software renovation, validation and conversion.

1. Inventory scan and analysis includes an inventory scan, analysis of the application source code and the development of a customized modernization plan.
2. Solution testing involves data design, tool calibration and process testing to ensure the application is performing properly.
3. Software renovation includes dividing the inventory into manageable chunks, modernizing the source code and converting data.
4. Test data generation is the validation of an inventory group to ensure functional equivalency.
5. Data conversion is the final implementation of the modernization process, including change control and parallel, system and user testing.

NTT DATA'S FIVE-STEP METHODOLOGY KNOWN AS QUALITY DRIVEN MODERNIZATION METHODOLOGY



Conclusion

Used on a widespread basis in all levels of government, legacy applications are expensive to operate, difficult to maintain and are often accompanied by productivity-obstructing workflows. Frequently, they stand in the way of government IT innovation because they are unable to integrate with modern technologies and end-user devices.

Upgrading legacy applications doesn't have to be disruptive, expensive or time-

consuming. Legacy modernization allows governments to upgrade their legacy solutions, usually at a lower cost than "ripping and replacing" them. Using a hybrid model that combines the tool-based and systems integrator modernization approaches, state and local governments can modernize their legacy systems to save tremendous amounts of money, better meet their employee needs and deliver citizen services more effectively.

ENDNOTES

1. <http://www.Govloop.Com/profiles/blogs/federal-agency-missioncritical>
2. <https://www.Dir.Texas.Gov/management/strategy/ssp/pages/plega1.Aspx>
3. <http://www.Nascio.Org/publications/documents/nascio-digitalstatesatrisk.Pdf>
4. <http://www.Govloop.Com/profiles/blogs/federal-agency-missioncritical>

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Connected Raleigh

A look at one city's comprehensive approach to preparing its citizens for the future.

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Digital States: Making the Grade

In this issue, you'll find the results of our 2012 Digital States Survey, a comprehensive examination of how — and how well — state governments are using technology. The biennial survey, conducted by e.Republic's Center for Digital Government, draws wide attention by assigning a letter grade to each state. That's only natural — nearly everyone wants to know how well they're doing relative to their peers, and we think it's important to recognize hard work and good ideas.

The good news is that the number of states achieving A grades doubled from four in 2010 to eight in 2012. On the other hand, two states earned D grades this year, compared with none in 2010.

What separates high-performing states from struggling ones? The survey includes specific grading criteria (details on page 10), but more broadly, the top-graded states excel in a couple of areas.

First, they effectively link technology investments to the priorities of taxpayers and the elected officials who decide how to spend those tax dollars. Second, they view technology as a strategic investment in the state's future instead of a cost that needs to be cut.

How states approach the latter has had a huge impact during the nation's prolonged economic recession. This, perhaps more than any other factor, is widening the gulf between high- and low-performing states, according to Todd Sander, executive

director of the Center for Digital Government. "Some states are doing better, some states are doing worse — and it's often tied to how they look at this issue," he said.

Indeed, the survey shows that effective leadership can overcome economic hardship. States like Michigan, Ohio and Tennessee have faced severe challenges, yet they performed well. Top-graded states also found innovative ways to collaborate, adopting more flexible technology architectures designed to support society's move toward mobile devices.

Despite the progress, however, almost all states still struggle with measuring the return on investment (ROI) for technology deployments. "If there was a weak point in most state responses, it was their ability to demonstrate a hard dollar ROI," Sander said. "It's often very anecdotal."

That brings us to another objective of the Digital States Survey — shoring up those weak spots and spreading good ideas state to state. Perhaps even more important than the individual grades, the survey results are a basis for regular meetings of state CIOs through the center's Digital States Performance Institute. Sander said the group will meet several times in the next year to exchange best practices and tackle common concerns.

We'll also dig deeper into the results in print and at govtech.com to show other states how to move to the head of the class. **GT**

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

A N A W A R D - W I N N I N G P U B L I C A T I O N





Rethinking GIS for Local Government

For cities and counties, implementing GIS just got easier.

Governments have demonstrated the power of GIS technology for many years, and now even more value has been added to help public-sector agencies extend their reach with ArcGIS® for Local Government. ArcGIS for Local Government consists of a set of tools, application templates, and resources that are helping government agencies rethink how they extend GIS. Part of a solution initiative at Esri, these maps, applications, workflows, and other resources are available today to be customized and used for numerous departmental functions. Local agencies can now implement applications that enhance their existing GIS immediately and more easily than ever. Many are seizing this opportunity to create more efficient government, improve workflows, increase citizen engagement, and generate productivity gains.

More than 60 maps and applications are available, and more are on the way. There are customizable applications for service requests from citizens, public comment on land use, emergency management, property taxes, and numerous other local government activities. Configurable application templates are discipline specific for areas such as land records, public safety, water utilities, public works, elections, general government, and planning and development.

Basemaps—ready-to-use maps loaded with content—give local governments a solid foundation on which they can build their own maps. Imagery and road data, demographics, topographic information, and other features, are also available—and the list of tools continues to grow.

Ready to Go

ArcGIS for Local Government is a ready-to-go set of practices and resources that enable local governments to fully utilize GIS quickly and easily—potentially saving months of development work for cash- and time-strapped agencies. The maps and applications are organized as a set of modules that can be downloaded and configured individually. They can be localized and customized, and they come with ongoing support and development from Esri. And everything's built on the Local Government Information Model—GIS datasets, web services, and maps that work across numerous departments, making collaboration and sharing easy.

ArcGIS for Local Government is focused on customer success, helping to provide better services to Esri customers and the public. It aligns perfectly with five key areas of government activity: data creation, planning and analysis, field mobility, operational awareness, and citizen engagement. The application templates, resources, and tools available also integrate with ArcGIS™ Online, a popular mapping platform that enables the sharing of maps, applications, and geospatial data.

In addition to creating ArcGIS for Local Government, Esri offers several ways to implement these tools and resources. Organizations can customize the applications themselves, of course; or, they can also get assistance from a valuable network of experts, Esri partners and consultants, and Esri Professional Services.

However it's extended, ArcGIS for Local Government will make an immediate impact—and it couldn't be easier.



Charting a New Course

New map services increase efficiency, productivity, and collaboration.

Baltimore, Maryland's award-winning website has a View Maps button on its home page, attesting to the city's belief in the power of maps. Now more than ever, the city is leveraging GIS to provide better service for both citizens and its own agencies.

Many of the city's maps are created with Esri's ArcGIS for Local Government. With the tools included in ArcGIS for Local Government, the city makes it easy for citizens to find polling places and comment on its rezoning initiative. Baltimore also uses the Local Government tools to help its agencies respond to snowy weather conditions and manage public safety responses.

The maps and applications from Esri have made a big difference for the city's Enterprise Geographic Information Services (EGIS) division, which has a relatively small staff and limited funding. "It's been working out very well," said Brad Chranko, GIS systems manager for the city. "It has allowed us more time to focus on our data integrity, and it provides our constituents easy and straightforward ways to work with our data. All that we have created from ArcGIS for Local Government has been very well

received by city agencies and by the public. As a result, they are wanting more of it."

Great Results

The Local Government tools have allowed the city to rethink how it uses GIS. "It provides analytical capabilities of GIS data to a wider range of people," Chranko said. "When we offer these focused and easy-to-use applications, agencies have less need to worry about the technical side of GIS."

The city has found the Local Government templates to be very helpful. "We usually start with a template and then modify it to better suit our needs," said Chranko. "We are especially proud of our Community Topographic Basemap, where we have added painstaking detail to many of the city's special features like parks and campuses. It also provides all GIS users in the city a common map to start with, which has gone a long way in developing unity among users."

A common information model helps too. "Having a one-model approach will increase cross-agency collaboration and sharing. It adds meat to the 'enterprise' part of EGIS," said Chranko.

"All that we have created from ArcGIS for Local Government has been very well received by city agencies and by the public. As a result, they are wanting more of it."

— Brad Chranko, GIS systems manager, Baltimore

Citizens have responded well. The Polling Place application has seen significant use by residents looking for voting locations and other election information. The Public Comment application has been popular with citizens as they share their views on the citywide rezoning initiative. "It provides the public with an alternative way to voice their opinions on contentious issues such as rezoning. Such comments probably wouldn't be captured in the traditional community meeting approach," Chranko said.

Baltimore plans to expand its use of ArcGIS for Local Government in the future, but it's already become a part of everyday life for the city. "I believe it really enhances everything we do," Chranko said.

Transformation via GIS

Thanks to the latest tools, GIS plays a larger role in county government.

Sussex County, New Jersey, is providing better services, both internally and externally, thanks to Esri's ArcGIS for Local Government. Its new tools are being leveraged by the county's Office of Geographic Information Systems to create better efficiency, smoother workflows, and greater productivity for county government. The office has embedded GIS into agencies' workflows, speeding up the sharing of information. The GIS office is also helping agencies manage their own data so they will have quicker access to it.

ArcGIS for Local Government is also helping the GIS office transform itself into a more robust service provider. Previously, individual agencies had to rely on the GIS office for printed maps and data. "Now we provide dynamic, online maps where the information is not managed by the Office of GIS but it's managed by the business unit that deals with it," said David Kunz, GIS manager for Sussex County. "They (agencies) manage their information, and we're integrating it and providing it as a tool back to them. And that turns into

increased efficiencies; more outreach to the public; more transparency in government; and better, faster decisions."

Engineering, health, elections, and other departments now have GIS data they can access at any time. Consequently, agencies can work more quickly, and the GIS office can spend less time printing maps and more time providing data services and applications to help agencies achieve their goals. "It's moving us more toward being part of core government," said Kunz.

Process Improvements

With the easy-to-use templates, applications, and other tools from ArcGIS for Local Government, the county has more ways to serve the public and improve its processes. "Now we can quickly and easily roll out these template applications that are customizable, to provide this information out to the public or the individual business units," said Kunz. "We couldn't have done that before. We would have had to develop all that in-house, and that takes time."

With the tools in place, there have been many benefits. "We've seen improvement

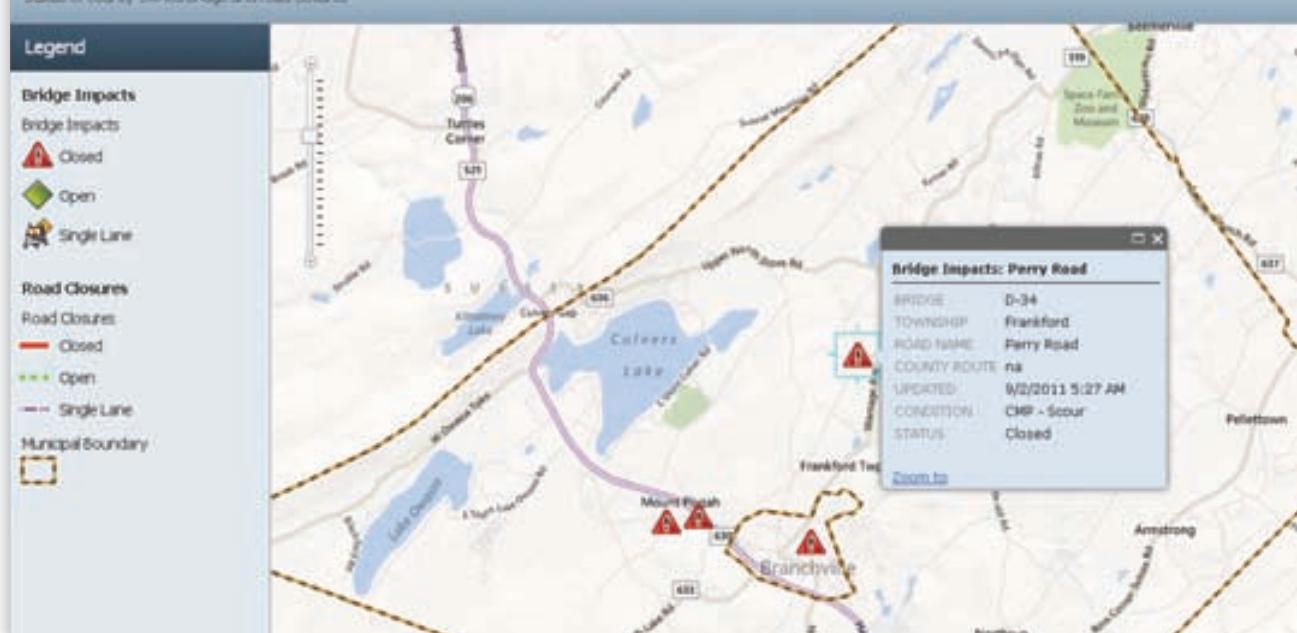
in getting our information out to the public, promoting transparency in government, and providing tools for county and local government to be more efficient," said Kunz.

With the Local Government tools, the county provides citizens with an application for finding polling places. There's also an application for finding government services such as libraries, police stations, and post offices. And the Local Government Information Model—a common database used by several agencies—creates greater efficiency. "Our county executives have found the Local Government Information Model and the web templates to be very beneficial for providing real-time information to the public as well as elected officials," noted Kunz.

ArcGIS for Local Government is helping Sussex County expand its use of GIS further across the enterprise. Subsequently, the GIS office is better able to help other agencies. "We've turned it all around," Kunz said. "We've provided them with GIS tools, and embedded the tools into their individual workflows, so they're managing their data. That's something that hadn't really happened before."

Sussex County Bridge and Road Closures

Status of county-owned bridge and road closures





Get Started with ArcGIS for Local Government

To support evolving government needs, Esri created ArcGIS for Local Government—a solutions approach to improving government processes. ArcGIS for Local Government helps public-sector agencies with data collection, planning and analytics,

field work force support, operational efficiency and awareness, and citizen engagement. It provides a platform for jump-starting new GIS projects with map templates, applications, and more. Esri provides the resources to get things started. With Esri's core offerings and

ArcGIS for Local Government, public-sector agencies can increase efficiency, productivity, and citizen engagement. Whether it's for public works, planning and development, or numerous other activities, ArcGIS for Local Government can help.



For more information and resources on ArcGIS for Local Government, please visit esri.com/govtechag.

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Spot and Swat

Technology is helping local officials target insect breeding grounds in Prince William County, Va. Workers in the county's **Gypsy Moth and Mosquito Control** program are using a custom-built, real-time data management system with a Web-based, GPS-enabled map interface. Accessed via an iPad, the mobile reporting tool lets field technicians find and mitigate insect sites more efficiently, as well as record when the area was visited and what chemical or method was used for treatment.



HOT OR NOT?

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7 Tips for Better Social Media Engagement	 85 tweets
APIs: 5 Government Success Stories	 49 tweets

WHO SAYS?

"I look at this technology and I go, 'Holy sheep-dip, Batman.' This is a game changer."

www.govtech.com/public-safety/Fire-Chief-Pushes-For-Super-Powered-Hose.html

Take Your Seats

Schools receive funding based on how many students are in the classroom. And as budgets get tighter, more schools are taking drastic measures to make sure children are present for roll call. This month, **Northside Independent School District** in San Antonio will begin tracking 4,200 students in two schools using RFID tags. Students will wear identification cards containing RFID chips, allowing administrators to track their location anywhere on campus. Privacy advocates are troubled by the plan, but the district expects it to generate an extra \$2 million this school year.

\$ **450 MILLION**

The amount the U.S. Department of Energy expects to spend on the development of small modular nuclear reactors over the next five years.

“ Not liking this. Our city page, although administrated by government personnel, was created to engage the community, and represent the community and its events, successes, failures and bring the community together as a whole — not just the government. Community-building, not government-building, is the vision. Many people shy from the government stigma.

DarkWulfe in response to Cities Must Change Facebook Page Names, or Else

“ Ten years ago state tax authorities were saying the same thing. We're all different therefore we all require a custom solution to modernize aging legacy systems. In 2002, Idaho became the second jurisdiction and first U.S. state to implement a COTS [commercial-off-the-shelf] tax administration package called GenTax. GenTax is now operating in over 15 states, three Canadian provinces, several local jurisdictions, and other vendors now offer COTS tax administration packages. While I agree the burden is on the vendor to prove the package is flexible enough to meet all the jurisdictions' needs, we in government need to get over this automatic 'we're different and require a custom solution' attitude.

Steve Wilson in response to DMVs Skeptical of Turnkey Business Operations Systems

“ How about ... actual mules? I'm guessing they come cheaper than the mule-bot, and the fuel is just lying around to be eaten.

Charles in response to DARPA Shows Four-Legged 'Pack Mule' Robots

“ Let's see, one group tries to make registration and voting easier for everyone, while another yells about statistically insignificant 'voter fraud' and develops a countywide effort to stop huge numbers of people from being able to vote. I wonder who is a bigger danger to our republic. Technology like this could help eliminate any fear, rational or irrational, of voter fraud if that was the real driving force.

Jerry M-S in response to Obama Campaign Adopts 'Wet Signature' to Entice New Voters



MARYLAND OFFICE OF INTEROPERABILITY

Ray Lehr is the interoperability director for Maryland, which this year began implementing the First Responders Interoperable Radio System Team (Maryland FiRST), a statewide public safety radio network. The project allows Maryland to meet a January FCC deadline for moving public safety and “business industrial” land mobile radio systems to narrowband channels, and at the same time connect state agencies and local jurisdictions onto a single radio network.

of your radios to be more compact in how you use the spectrum that you get from the FCC. It's an expensive upgrade from the regular systems.

So rather than have individual state agencies operating on different radio systems, and each one having a different life cycle and on different frequencies, Gov. Martin O’Malley put out an executive order that the state move toward one single radio system for all state agencies, as well as encourage local jurisdictions to join the state system.

2 Once the radio system is fully deployed, what kind of maintenance will be involved in keeping it operational?

Right now, a lot of the infrastructure we’re using — the radio towers and some of the buildings — are owned by individual agencies. So the state is working toward legisla-

Ray Lehr

interoperability director, Maryland

1 What does the rollout of Maryland FiRST mean for the state?

The first order of magnitude was to get the Maryland Transportation Authority Police and one of our counties, Kent County, on the system as the first users. That was driven by the FCC deadline. Both agencies had to narrowband, which essentially means you have to replace a lot of your equipment and all

tion that would create a state radio control board, which would create a governance body that would be responsible for the radio system operation and maintenance.

3 Are neighboring states able to connect to the system?

We've already engaged in discussions with Delaware and Virginia in two areas along the border of this first rollout. First responders will be able to communicate with surrounding counties for mutual aid events. We've also set wheels in motion to share interoperability frequencies with Washington, D.C., West Virginia and Pennsylvania, when adjoining counties come on in the next phase.

4 Do you think Maryland is ahead of the game in building out this statewide radio system?

Maryland was unable to deploy an 800 MHz radio system several years ago, but it continued to build towers in cooperation with local jurisdictions that are now available for this system. That forward thinking and the cooperation of the locals have made this deployment much smoother than if we were building new towers. **GT**

— Sarah Rich, Staff Writer



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GRADE B:

These states are trending up. They show results in many categories, and their leaders use modernization to change entrenched practices to prepare for more sustainable operations. Incentives for collaboration are in place, and performance measures are used in key areas. Budget cuts tend to be made across the board.

GRADE C:

These states are trending stable. They show results in some survey categories. Modernization is used to realize operational efficiencies. This grade level includes states that have launched reforms but where results have not been fully harvested. Organizational constraints limit collaboration, performance measures are uneven and budget cuts constrain progress.

GRADE D:

These states are trending down. They show results in at least one survey category, but modernization tends to be siloed and limited. There is little evidence of collaboration. They have implemented few performance measures, and budget cuts threaten operational viability.



HOUSTON'S
MARIA IRSHAD
SAYS LETTING
DRIVERS PAY
FOR PARKING
VIA CELL-
PHONE CUTS
THE AMOUNT
OF CASH
HANDLED
BY THE CITY.

Cashless Customers

Statistics say mobile payments may soon replace credit cards and cash. Will government ride the mobile payment wave?

BY JUSTINE BROWN | PHOTOGRAPHS BY OSCAR WILLIAMS



Mobile technology has changed how we work and play. Adoption rates grow each year as smartphones, tablets and other mobile devices are used to fetch directions, view weather information, peruse the news, and perform a wide range of other tasks. More and more, those tasks include financial transactions. Studies show that consumers have grown increasingly comfortable using mobile technologies to transfer money, purchase goods and engage in other types of financial dealings.

According to a study released in April by the Pew Research Center's Internet and American Life Project and Elon University's Imagining the Internet Center, swiping mobile phones could replace cash and credit cards both online and in stores within the next decade. The study reports that more than one-third of smartphone owners have already used their devices for online banking services like paying bills, checking a balance or making a payment.

In May, Gartner released a report predicting that worldwide mobile payment transaction values will surpass \$171.5 billion in 2012, an increase of nearly 62 percent from 2011. The report also predicted that the number of mobile payment users will reach 212.2 million in 2012, up from 160.5 million in 2011.

That's great news for the private sector, but what about government? International governments have adopted mobile payment capabilities much faster than the U.S. But things may be about to change. In May, President Barack Obama issued a memo titled Digital Government: Building a 21st Century Platform to Better Serve the American People. Among other things, the memo requires federal government agencies to make at least two public services available on mobile devices within 12 months. Some of those services may include mobile payments.

Meanwhile, the U.S. Consumer Financial Protection Bureau convened a panel in July to evaluate how government should regulate mobile payments, including transactions conducted via smartphones and other mobile devices. The panel agreed to reconsider how existing regulations apply

to a mobile environment and develop rules to keep pace with the rising use of mobile payment systems. If new rules and regulations are adopted, government agencies may become more open to adopting mobile payment systems themselves.

Arkansas Takes the Lead

Arkansas isn't waiting around to see what happens. In 2010, it became the first state to offer secure mobile payment processing specifically for smartphone users of e-government services, according to CIO Claire Bailey. Today people can use their smartphones for three high-volume online government services: inmate trust account deposits; probation and parole supervision and restitution payments; and property tax payments.

According to Bailey, the decision to offer mobile payments was based on the growing popularity of mobile phones in the state. A Centers for Disease Control and Prevention study found that Arkansas has the highest concentration of cell-phone-only households, at 35 percent. Nationally that number is 27 percent.

"Statistics show Arkansans are bigger users of cellphones and smartphones, and that they are increasingly using them for Internet access, conducting personal business and making payments," Bailey said. "When we saw that data, we wanted to make sure we used it strategically, so we came up with a plan to aggressively introduce new mobile-friendly online services that would work on a range of smartphone operating platforms. It was important that we offer not just mobile information and apps, but payments as well. This is a consumer-driven game changer for services in our state."

Bailey said the state's early adoption of mobile payments can be attributed, at least partly, to its approach to information technology. The Information Network of Arkansas is a board-led, public-private collaboration between the state and the Arkansas Information Consortium, a subsidiary of e-government firm NIC. Part of the Information Network of Arkansas' mission is to help state government entities Web-enable information services. And because the state had already set

up a secure back-end payment system for use with its new portal, enabling mobile payments was fairly smooth.

"The fact that we did so much work on our portal made it easier to move to mobile apps and payments," Bailey said. "Then it was just a matter of which service to implement first."

Thus far, the most utilized mobile payment system is the inmate deposit service, which allows friends and family to make secure deposits to an inmate's Department of Correction-managed trust or prepaid phone account in real time. Meanwhile, the Probation and Parole Supervision and Restitution Payments system makes payment of monthly supervision, drug court or restitution fees quick and easy for offenders supervised by the Department of Community Correction. Finally, the Pulaski County property tax payments system permits users in Arkansas' largest county to pay personal property and real estate taxes via mobile devices.

Statistics indicate that the number of mobile payments for e-government services made in the state has doubled each year since 2010. "We see this as a growing model in government," Bailey said, "and we are encouraging agencies to move to the mobile device and payment environment as a way to increase efficiencies."

Bailey said there has been little resistance from agencies so far. Rare objections most often involve the fee structure. Because Arkansas uses a self-funded model to offer mobile payments, a small fee is passed to end users. "Some agencies don't want to pass the fee on to their constituents," she said. "But we work hard to ensure we are supplying the most cost-effective service, that we negotiate reasonable fees and high security, and that the fees we collect are put to good use."

Bailey said the state is already looking into other ways to use mobile apps and payments, including mobile restaurant, cosmetology and school bus inspections.

Parking Made Easy

Cities may have an easier time moving to mobile payment systems than states or the federal government. Several innova-

“For many people,
their phone has
become their life
and their wallet.”





HOUSTON'S
MOBILE PARKING
APP WARNS
DRIVERS WHEN
THEIR METER
IS ABOUT
TO EXPIRE.

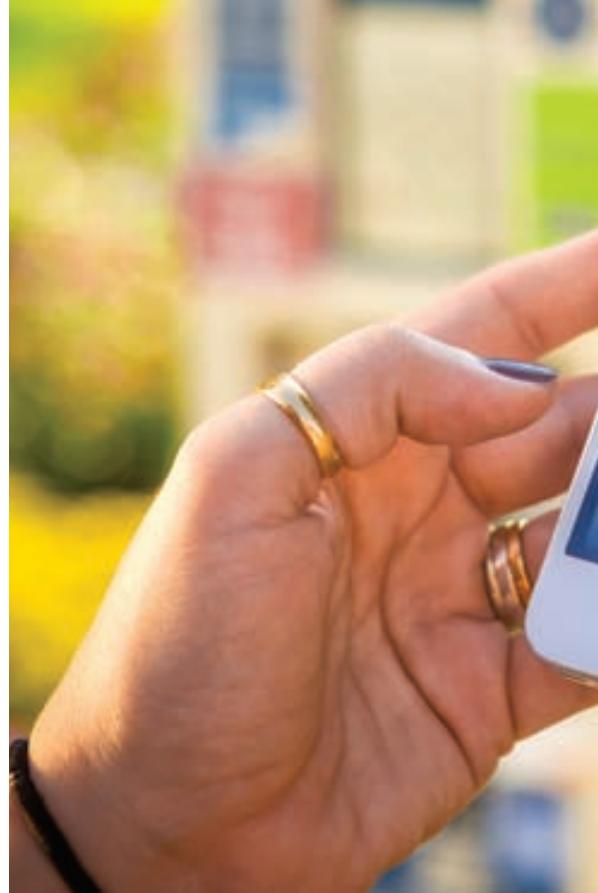
tive companies have developed mobile services that let cities improve efficiencies, as well as offer convenience to residents and visitors, often with little or no IT implementation or cost to the city.

In October 2011, Houston deployed a service from Parkmobile USA that allows the city's residents, workers and visitors to pay for parking at all of its approximately 7,000 on-street metered spaces using cellphones. Drivers sign up for the service online, complete a free one-time registration, and use a mobile app, the Internet or a phone call to make their payment.

"The system gives residents more options," said Maria Irshad, deputy assis-

tant director of Houston's Parking Management Division. "Citizens don't have to go near a meter if they don't want to."

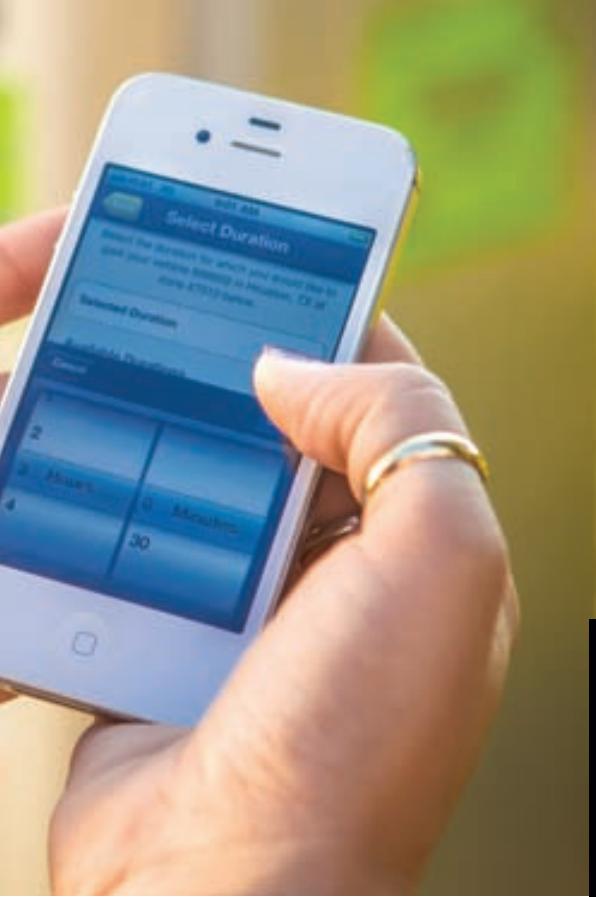
Irshad said the system has improved efficiency in the city by reducing the amount of cash city employees must handle and count each day. The bills and coins used to feed meters could previously add up to \$40,000 or more per day. "There is less risk involved when you don't have to handle and count such a large sum each day, and it saves us a great deal of time," she said. "We are finding that once someone tries it, they tend to continue to use it. The parker doesn't have to worry about finding coins to feed the meter. They also get a text when the meter is about



to run out of time. They can then add more time using their phone and avoid getting a ticket without having to leave their meeting."

Houston took the concept even further by integrating it with a parking permit and enforcement management solution from T2 Systems Inc., which the city implemented in 2009. The Parkmobile system is therefore fully integrated into the handheld devices the city's parking enforcement staff use. All transactions initiated by phone are communicated in real time to enforcement officers, enabling them to see that a parker has paid by phone. The integration also lets officers move more easily from the information provided in Parkmobile's pay-by-phone application to citation issuance. All lookups populate directly into the T2 handheld application, reducing errors and improving the efficiency of the city's enforcement officers, according to T2 Systems.

In addition to improving efficiency and lowering the operational maintenance costs, the system may help the city generate additional revenue. "Cities that use the system tend to see higher average payments, though we haven't quite figured out why," said Tim Maginn, chief operating officer of T2 Systems. "We are guessing that when a citizen gets a text that says they need to re-up, they do so. The tradi-



tional model might see the citizen's meter just expire and enforcement not arrive in time to issue them a ticket."

T2 Systems and Parkmobile set up the system for Houston and required no upfront payment from the city. Parkmobile collects a 35-cent convenience fee from users to fund the system.

"It was very easy for us — we just had to make sure Parkmobile had the right data on our meters," said Irshad. "We love it when vendors work together to bring us a solution and we don't have to spend time figuring out how to make it work."

The system also offers back-end reporting that can help a city evaluate parking patterns and usage. "They can see what the turnover rate is on spaces, what time of day an area gets the most traffic, etc.," Maginn said. "It can also improve enforcement. If there is a violation, an enforcement officer can be pinged on their handheld and can go directly to the vehicle in violation rather than wandering down the street looking for violations. It improves compliance, allows officers to make better use of their time, and could potentially reduce the number of officers needed."

Irshad said the adoption rate for the service has been growing each month, and the city is continuing to look at opportunities to employ additional mobile apps and payments

in the future. "For many people, their phone has become their life and their mobile wallet," she said. "Cities and governments overall need to be looking at mobile payments seriously to increase customer service and do things more efficiently and effectively."

Oakland, Calif., implemented a similar system from Parkmobile in May 2012. There, customers can not only pay for parking with their smartphones from anywhere in the city, but can also can pay with cellphones equipped with near field communication

year and a half ago because he recognized that the transportation industry was "fundamentally inefficient."

"Taxi drivers commonly have 30 to 50 percent downtime," Bregman said. "Every day in major cities around the world, people waste millions of hours hunting for taxis, and drivers leave tens of millions of dollars on the table due to inefficiency in the market. We created Hailo as both a toolkit and network for drivers to improve their efficiency and profitability, and as a consumer convenience application."

The toolkit portion of the application is designed to give taxi drivers a way to connect with one another and to help make shifts more profitable and efficient. Meanwhile, the consumer application uses GPS to allow users to see the real-time location of the closest cabbies, including how many minutes away they are. The user can then beckon the closest one, pay for the service using a preauthorized credit card, and be emailed a receipt.

Hailo launched in London in August 2011. By the end of this year it will launch in several large U.S. cities, including Chicago and Boston.

Like the Parkmobile system used in Houston and Oakland, Hailo requires little effort from the city in which it has launched, and it costs nothing. Instead, taxi drivers and consumers sign up for the service independently.

"We do engage with city government and try to understand what their needs are," Bregman said. "But other than that, it doesn't require much city involvement because it's a market-based solution."

So, at least for cities, mobile apps and payments may be just a matter of letting technology take its course. "Mobile technology is inevitable and can truly enhance urban life," said Bregman. "But cities may want to let the marketplace decide what solution is best rather than try to invent these things themselves. Instead of going through a lengthy RFP process, a city can let capitalism do its work. I believe that's the best way to maximize the value of new technology in their respective markets."



\$171.5 billion

Worldwide mobile payment transaction values will surpass this number in 2012.

212.2 million

The number of mobile payment users in 2012.

\$40,000

Daily amount of cash fed into Houston parking meters before mobile payments.

(NFC) by waving or tapping their phone on any of Parkmobile's NFC-enabled stickers.

The program is offered at all on-street parking meters in Oakland.

"Motorists can now pay for parking at a meter by utilizing their cellphone and seamlessly buying time to park at a metered space," said Noel Pinto, director of Oakland's Parking Operations. "No more digging for coins, no more frustrations and no more stress. Parking in Oakland is no longer an adventure, but rather as easy as parking at a meter, making a phone call and walking away."

Hailing Convenience

Other cities are implementing mobile payment apps to manage taxi services. Hailo is a UK-based company that soon will offer U.S. residents the ability to download an app to request rides from taxi drivers and pay them automatically by credit card.

Jay Bregman, founder and CEO of Hailo, said he launched the company a

Justine Brown specializes in technology and education. justinebrown@comcast.net



WATCH A VIDEO

Take a look inside the Center for Internet Security's CERT lab and security operations center. www.govtech.com/videos



STRENGTH

IN THE WAR ON CYBERCRIME, THE CENTER FOR INTERNET SECURITY — A SHARING GROUP — MAY BE STATE AND LOCAL GOVERNMENT'S SECRET



ANALYSTS IN
THE CIS SECURITY
OPERATIONS
CENTER WATCH
FOR CYBER-
ATTACKS 24
HOURS A DAY.

By Steve Towns | Editor

IN 2010, police investigating what appeared to be a relatively minor case of financial fraud made a startling discovery: The case they were working on — which involved \$30,000 stolen from a local college — was linked to a worldwide crime ring that was using malware to harvest personal data from infected computers and then sending it across the globe.

The larger implications of the case came to light after forensic images from college servers were examined by the Center for Internet Security (CIS), a New York-based nonprofit that acts as a hub for sharing cyberthreat information and security best practices among state, local and tribal governments. CIS analysts discovered that the servers were infected by a nasty piece of computer code called Qakbot, which opens a back door into compromised computers, allowing cybercrooks to steal confidential information.

NONPROFIT INFORMATION WEAPON.

NUMBERS

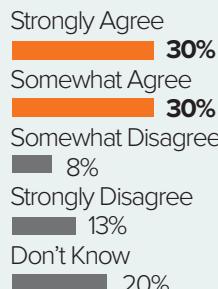
By examining file transfer records from the college, the analysts determined that 17 states were victims of the crime ring, and they tracked down an IP address in Russia that was downloading the stolen information. With the permission of police investigators, the CIS quickly contacted states that were impacted and organized a conference call for members of its Multi-State Information Sharing and Analysis Center — known as the MS-ISAC — to warn others of the danger and tell them how to block it.

The incident, in a nutshell, demonstrates why the CIS may be one of the most

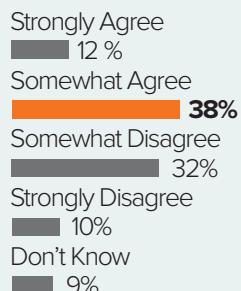
Security Challenges

We recently asked members of the Gov-Tech Exchange, our online community of senior IT professionals, a series of questions around cybersecurity. We found that many of them have experienced some form of cyberattack, and a good number struggle for security resources (based on 101 survey responses).

Our agency/department has experienced some form of cyber-attack intrusion in the last year.



We have sufficient resources to effectively protect our agency against cybersecurity threats.



potent weapons that states and localities can bring to bear against increasingly sophisticated cybercriminals and terrorists. Every state in the union now shares cyberthreat information through the MS-ISAC, and the CIS is working to pull in more local governments. The organization also has formed key relationships with the Department of Homeland Security and others, allowing it to tap into federal funding and cyberthreat intelligence.

Most of what the CIS provides comes at no cost to public agencies. Membership in the MS-ISAC is free, as is access to a storehouse of best-practice information, including standard templates that show agencies how to secure their computers, and shopping lists for the types of tools needed to lock down government systems and data. The CIS also offers an expanding number of paid services and programs that give agencies access to more sophisticated security capabilities at steeply discounted prices.

The seeds of what is now the CIS were planted in the years immediately after 9/11. The country was scrambling to safeguard its critical infrastructure, and Will Pelgrin, then director of the New York State Office of Cyber Security, saw the need to strengthen cybersecurity in the nation's 50 state capitals. The best way to do that, he recognized, was for state governments to share with one another information about the cyberattacks hitting their computer networks.

Pelgrin talked 10 states into joining the fledgling MS-ISAC. That number grew to 15 before the group's first official meeting, an event that drew a visit from Howard Schmidt, who was then in his first tour of duty as White House Cyber Security czar.

"It wasn't your typical government meeting. Our attitude was, 'Let's don't talk this to death; let's get something done,'" Pelgrin recalled. "I remember Howard sitting next to me, and he just leaned over and said, 'This is a good meeting. Can you do this for the rest of the country?'"

And that's what Pelgrin did. Somewhat miraculously, he built and maintained support for the multi-state information sharing group under five New York gov-

ernors, running the organization within the state cybersecurity office. Eventually he coaxed all 50 states to voluntarily join the MS-ISAC, along with a number of local governments and territories.

Pelgrin is quick to credit MS-ISAC members for the group's success. But industry veterans say Pelgrin is the driving force. A trained lawyer, former state CIO and passionate security advocate, he has a nearly perfect skill set for leading the organization.

Michigan Chief Security Officer Dan Lohrmann has worked with Pelgrin since the early 2000s and spent five years on the MS-ISAC board of directors. He describes Pelgrin as "relentlessly positive."

"What he does is focus on the pieces of the puzzle that we can agree on," said Lohrmann. "He fixes those and then moves onto the next thing."

In addition, Lohrmann describes Pelgrin as a master networker, easily rubbing elbows with federal lawmakers and unafraid to testify on Capitol Hill. And, in an industry that's often obsessed with secrecy and legal protections, Pelgrin tends to cut through bureaucracy. For instance, Lohrmann says the MS-ISAC was built on a foundation of trust, common purpose — and very little red tape. "Will's approach was, 'Send me an email and you are in.'"

Pelgrin may be a lawyer himself, but he admits to steering clear of legalities — at least as much as possible, given the sensitive nature of the group.

"For the longest time I kept lawyers away from the table," he said. "I didn't want nondisclosure agreements; I didn't want contracts. I wanted people to come in with a common passion and a common understanding. It was very informal within a formal context. We developed a code of conduct that you respect the other person's information and you don't use it without their approval — and that we're all in this together."

One fundamental goal of the MS-ISAC was lifting the shroud of secrecy that surrounds information security breaches so that states could learn from one another.

"In the past, people just hid it. You didn't know that you had a breach because the person who is responsible probably fixed



What he does is focus on the pieces of the puzzle that we can agree on. He fixes those and then moves onto the next thing.

WILL PELGRIN,
CEO OF THE
CENTER FOR
INTERNET SECU-
RITY, LAUNCHED
THE MS-ISAC
CYBERTHREAT
SHARING GROUP
AFTER THE
9/11 TERRORIST
ATTACKS.

it really quickly and didn't say anything," Pelgrin said. "We can't have a culture that feels that way. We need this to come to the surface; we need to be able to talk about it."

That starts with a painful admission from Pelgrin. Years ago, his own home computer was infected by a virus. He still keeps the compromised PC in his basement — a reminder to stay vigilant — but said he intends to take a sledgehammer to it someday. "I start out a lot of my speeches by saying, 'Hi, I'm Will Pelgrin and I've had a security breach,'" Pelgrin said. "If I'm not going to say it, who is?"

Desire for better information sharing drove the biggest change in the MS-ISAC's existence — a shift to nonprofit

status in 2010. After nine years of operation within New York state government, the MS-ISAC joined with the Center for Internet Security, a nonprofit group that had been providing checklists for securely configuring computer systems since 2000. The combined organization, which retained the CIS name, moved into a state-of-the-art facility just outside of Albany, N.Y., and Pelgrin became its CEO.

The move to nonprofit status eases turf disputes with other government entities, Pelgrin said. And positioning the MS-ISAC as a trusted third party opens the door to greater information sharing between the public and private sectors, as well as new types of partnerships.

"We're doing things now that I don't think would have been possible as a for-profit or government entity," he said.

The heart of the CIS is the Security Operations Center (SOC), where teams of analysts monitor customer networks and scan the Internet for emerging threats 24 hours a day. In the room's dim light, banks of monitors glow with news coverage and maps showing cyberalert levels for all 50 states. MS-ISAC members agree to follow a standard color-coded, five-level alert protocol. During a recent visit, most states on the map were shaded blue,

indicating a “guarded” condition. The rest were green, signifying low threat activity.

Analysts in the SOC receive an alert when state conditions change. Should a state move to one of the higher alert levels — signifying a possible attack or data breach — the facility springs to life. CIS analysts and senior executives immediately contact the impacted state, gathering information and tracing the source of the problem. And within hours of the first notice, a team of CIS executives conducts a 50-state confer-

to identify malware and figure out how to stop it. “We can reverse engineer malicious code. We can do computer or network forensics,” said Adnan Baykal, director of the CIS Computer Emergency Response Team. “If the state or local entity is not mature enough from the incident response perspective, we can handle the entire incident for them and tell them the steps they need to take so that it doesn’t happen again.”

The lab also gives the CIS a unique ability to connect the dots on complex

In 2005, while still part of the New York state government, the MS-ISAC broke more new ground by offering low-cost network monitoring and related services to other governments. Alaska was the first customer, according to Darrell Davis, Alaska’s chief security officer. Davis says the deal literally was worked out on a napkin, although he and Pelgrin spent another year getting approval from their respective state management.

Today, Alaska remains a CIS network monitoring client, and Davis says collaborative efforts such as these hold the key to improving information security. “I’m a firm believer that leveraging our talent and leveraging our services is the only path to success,” he said. “We all have declining budgets and declining staff. We can’t afford to stand alone.”

Davis adds that Alaska was a natural first customer for the new services. “We have a built-in culture to want to promote this. We are isolated and our resources are limited, so we always look to partner with different entities for the greater good.”

Davis may have been first, but he’s not the only one buying into the concept. Bob Cheong is the chief information security officer for Los Angeles World Airports, the city agency that operates three Los Angeles-area airports, including LAX. Like Davis, Cheong is a member of the free MS-ISAC and a customer of CIS paid services.

Even though Cheong has a top-notch security staff and an airport workforce that is extremely security conscious, he uses CIS services to augment his internal resources. “I need 24-hour network monitoring, but my crew is 8-5,” Cheong said. He relies on 24-hour monitoring from the CIS for after-hours protection, and those services provide an extra level of safety during the business day. “Because we’re an airport, we need multiple layers of protection,” he said.

CONTINUED ON PAGE / 44



PELGRIN AND HIS STAFF HOLD MONTHLY CONFERENCE CALLS TO UPDATE MS-ISAC MEMBERS ON SECURITY ISSUES.

ence call to alert the rest of the country to the danger and how to prevent a similar attack.

“We’ve done it time and time again. It’s really a tribute to how the states work together,” said Brian Calkin, assistant director of the SOC. “We’re able to reach out to them and have everyone come together in a short amount of time.”

A fully equipped computer lab located a few feet from the SOC also can be called in

incidents. Inside a room crammed with high-powered computer hardware, agents from local police; the FBI; Secret Service; Customs; and Alcohol, Tobacco, Firearms and Explosives work shoulder-to-shoulder to unravel cybercrime or terror cases. Since 2010, a CIS analyst also has been embedded in the National Cybersecurity and Communications Integration Center, the federal government’s cyber-operations center.



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The Springs Preserve in Las Vegas shows desert-dwellers how to live in harmony with their environment @ www.govtech.com/videos



THE SPRINGS PRESERVE'S
ARCHITECTURAL BEAUTIES
INCLUDE THE OUTDOOR
WIREFRAME ROTUNDA
IN THE DISTANCE.

LIVING GREEN

U N D E R T H E S U N

Technology at the Springs Preserve in Las Vegas teaches people environmentally friendly habits in harsh environments.

Aaron Micallef has a keen awareness of sustainable technologies, but he wonders sometimes how well he spreads it. As the curator of exhibits for the Springs Preserve in Las Vegas, he conveys the facility's message of eco-friendly desert living to visitors, yet they often misunderstand the true nature of the green marvels before them.

BY HILTON COLLINS / STAFF WRITER

[PHOTOS BY HILTON COLLINS]

\$235
million

The cost of creating
the preserve, which
opened in 2007.

need for conventional air conditioning. According to Micallef, these “modern” innovative towers have a lot in common with minarets, towers in the Middle East that have funneled out hot air through their ventilated tops for thousands of years.

“It’s actually not contemporary technology,” he said. “It’s more ancient and older technologies that we have re-adapted for our own personal use.”

In fact, many technologies are borrowed techniques from elsewhere. “There was a lot of research done [on] what other people are doing in other warm environments to figure out what we can use,” Micallef said.

Crafting a Green Culture

Micallef spreads the green gospel, so to speak, on preserve grounds, which include seven Leadership in Energy and Environmental Design (LEED) platinum-rated buildings. They’re built with sustainable architecture, and just outside are beautiful nature scenes and biofiltration irrigation. They exemplify the preserve’s mission of living in harmony with an arid climate. People with open eyes and minds will see environmental history everywhere in the preserve’s architectural technology and components.



MULTIPLE EXHIBITS REVEAL WHERE GARBAGE ENDS UP.

LEED certifications are awarded for structures that incorporate green design elements, and the nature park has earned two. One is for the five-building Desert Living Center (DLC), a campus that includes exhibits, meeting space and classrooms. The second is split between two others: the preserve’s guest services building and the Origen Museum, which contains more exhibits and an indoor theater. The LEED buildings comprise nearly 150,000 square feet of space that conserves energy and reduces the site’s carbon footprint.

Case in point: Buildings have evaporative cooling towers that pass hot air over moist pads inside them to cool the air, reducing the need for conventional air conditioning. According to Micallef, these “modern” innovative towers have a lot in common with minarets, towers in the Middle East that have funneled out hot air through their ventilated tops for thousands of years.

These energy-saving features include radiant floor heating, a technique that dates back to the Roman Empire. Back then, Romans built spaces under floors that were heated by fires or furnaces, creating warmer air in the rooms above.

The preserve’s radiant floor heating system is similar. “We have solar-powered heat to heat water to 140 degrees, and then that water gets circulated through tubing in the floor,” said Jeff Roberts,

architect with Lucchesi Galati, one of the firms responsible for the LEED ratings.

Hot water warms concrete in building foundations and turns the floors into giant radiators. “It’s more conducive to comfort because it starts at your feet level and kind of radiates up through your body,” Roberts said.

Though that’s a slick way to generate heat, it seems strange to incorporate dynamic heating in a hot place like Las Vegas – but this feature was built for the city’s drastically different winter temperatures.

“The winters get pretty cool,” said Dawn Barraclough, a public relations representative for the preserve. “We can actually get snow here in Las Vegas Valley.”

But come snowfall or heat wave, the park has additional tools for weather relief. Walls with special windows absorb heat when it’s cold and reflect heat when it’s warm. The surfaces of the low-emissivity (or low-e) glass windows are laced with microscopically thin metallic layers. On hot days, regular windows reradiate absorbed heat into a room, but low-e glass blocks most of it from entering. And on cold days, low-e glass reflects segments of sunlight into a room and keeps it inside.

PPG and Cardinal Glass first offered low-e glass in 1983, and other manufacturers have adapted it since.

A computer-controlled energy management system monitors the preserve’s power consumption. Operators use software to see how much lighting and air conditioning is being used. In addition, panels with red and green lights mounted on buildings tell occupants what energy consumption mode the park’s in.

“When we’re in red light mode, it’s the computer telling everybody who’s occupying the building that the computer has complete control of all of our heating and cooling systems,” Roberts said. “Our temperature is based on thermostats, and this can change from room to room and building to building, so it varies.”

In green light mode, the system has determined that the outside weather is mild, so mechanical heating and cooling technology is unnecessary. That means it’s up to the people inside to open doors and windows as necessary so nonmechanical heating and cooling factors, like ventilation, natural sunlight and shading, can take charge.

“The building becomes a living, thinking thing,” Roberts said. “Human occupants can make the building perform better by acknowledging the red light/green light system, with green light telling them to open the building up and let it breathe and naturally cool itself by using outdoor environmental conditions.”

Sustainable Power

Solar power is crucial to the preserve’s functionality. A solar-powered hydrogen fueling station serves utility vehicles running on hydrogen power. Solar panels



VISITORS WRITE
DOWN PERSONAL
SUSTAINABILITY
GOALS, AND THEIR
PLEDGES BECOME
LEAVES IN THIS
TREE EXHIBIT.

THIS PHOTOVOLTAIC ARRAY IN THE GARDENS CONVERTS SUNLIGHT INTO ELECTRICITY.



generate more than half of the power onsite, and according to Roberts, the DLC is designed to avoid using any electrical lighting during daylight hours.

The bulk of photovoltaic power comes from solar arrays constructed over parking spaces in the parking lot. In 2005, the Public Utilities Commission of Nevada approved a major \$23.4 million project to build an expansive photovoltaic system at water distribution sites throughout the state, including those at the Springs Preserve parking lot, which sits atop an underground reservoir.

These arrays, engineered by PowerLight Corp., generate power that supports onsite operations, including water pumping and treatment processes, while shading the parking spaces.

"The Las Vegas Valley Water District is one of the biggest consumers of electricity in the state to move water, so they're putting these photovoltaic power stations at most of the reservoir sites to save their electrical consumption load," Roberts said.

PowerLight designed a 378-kilowatt alternating current system for the parking lot with an effectiveness that relies on the number of sunny days Las Vegas receives. The array produced 900,395 kilowatt hours of power in 2008 and 868,407 kilowatt hours of power in 2009.

Preserving a Future

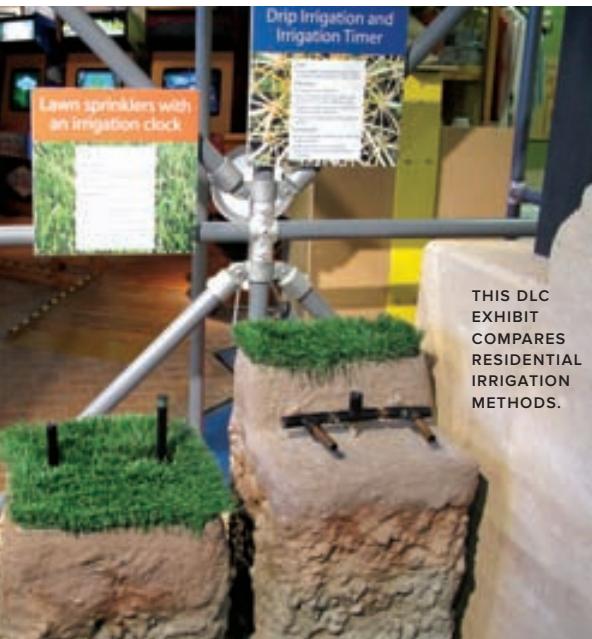
The people who keep the Springs Preserve going will continue spreading the message of green living indefinitely, but there will be roadblocks.

Micallef is passionate about his role as an overseer of the park's message, but his work's not always easy. People enjoy the preserve while they're there, but they don't often have the patience to read exhibit literature or retain the information once they leave.

"You have a very low percentage of people who actually read your labels, and even then, those who do might spend anywhere from three to 30 seconds at something," he said.

When the message sticks, that makes his efforts worth it. Micallef's seen visitors take water conservation classes and ask for organic gardening tips, so something must be getting through.

However, the preserve's goals aren't so unique anymore, which presents another challenge. Conservation promotion has become so mainstream that it can be hard to stand out. "I think sustainability and the term 'green living' are thrown around so nonchalantly these days that what we've tried to do is make those ideas into something solid to people," Barraclough said. "Something they can put their hands on [and] utilize on a day-to-day basis."



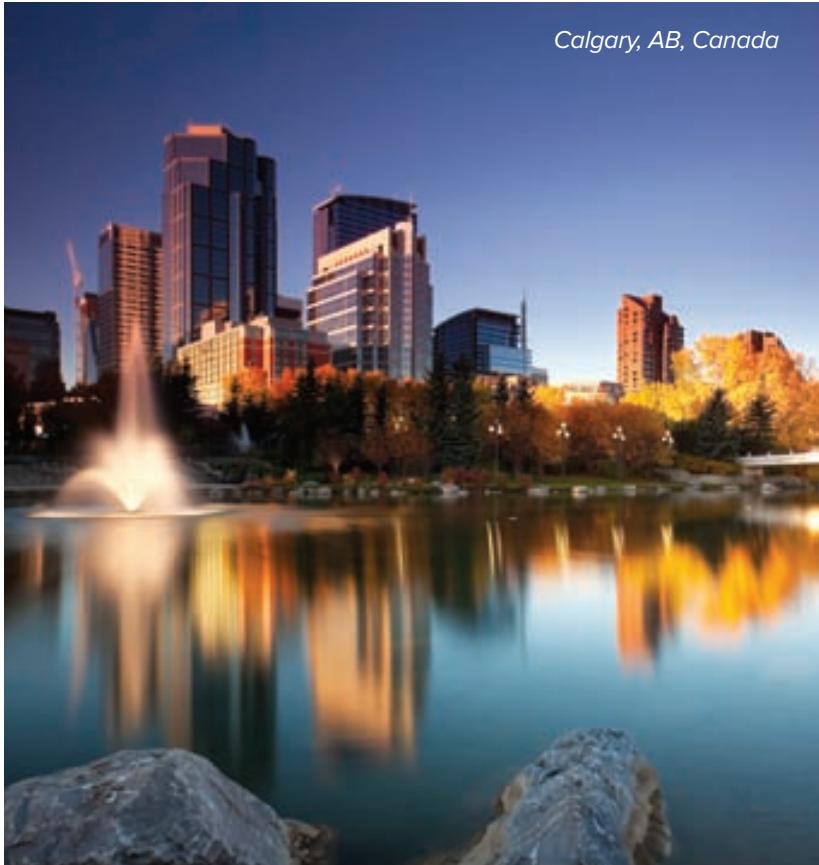
THIS DLC EXHIBIT COMPARES RESIDENTIAL IRRIGATION METHODS.

The fact that the preserve features so much evidence of nature's benefits solidifies that message, but in Roberts' opinion, human nature still gets in the way periodically. "You can design the most cutting-edge, high-performance building that you want, and it can be environmentally, fiscally responsible. The hardest thing to change is human nature," he said. "People still, at times, want to come in and turn on the lights. People still feel that if they're hot, they need to turn down the air conditioner instead of learning to dress in layers."

But the Springs Preserve will undoubtedly thrive despite these hurdles. The park's newest attraction, the Nevada State Museum, opened in October 2011, after Gov. Brian Sandoval and the state budget committee approved the move earlier that year.

The city may be famous for the excitement of the casinos and shows on the Las Vegas Strip, but the preserve is crafting a sense of the area's history and cultural identity beyond the noise and bright lights. "It's really important that we provide Las Vegas with a community gathering place," Barraclough said. "That's not something most people think about when they think of Las Vegas." **GT**

CASE STUDY



The City needs to manage its mission-critical operations.

Forward Progress

Over the past few years, Calgary's existing network had started to show its age. Rapid increases in demand, combined with simple wear and tear, were stretching the network to its breaking point.

"We were definitely at end-of-life on our existing network infrastructure," says Doug Hodgson, The City's Chief Information Officer.

In consultation with Alcatel-Lucent, City officials put their heads together to determine the best way to make Calgary's network viable in the next generation of telecommunications. An MPLS setup, it was decided, would fit the bill. "We wanted to bring on a new state-of-the-art design," says Hodgson. "A new MPLS carrier-class network seemed to be the way to go."

The MPLS upgrade would provide several advantages over The City's current network. For one, it would greatly ease the strain placed on the network by years of escalating usage, which the old system simply wasn't equipped to handle.

"Fiber exhaust is always one of the issues when you own a fiber plant," says Dave Basto, Network Infrastructure Leader for The City. "Without a network to multiplex that traffic, you're always going to encounter it. This [MPLS network] will help us in that regard tremendously and allow us to expand our fiber plant more efficiently."

Core Strength

The primary phase of the MPLS upgrade was the creation of an MPLS core between The City's data centers, providing a high-capacity backbone to improve network redundancy and security. It was completed in June 2012. With it, says Hodgson, "we've really stepped up in terms of our capabilities around business continuity."

Until recently, all of Calgary's major data operations were housed downtown at City Hall — "not the ideal place to host a data center," says Hodgson. The creation of a new data center, away from the downtown

Innovation Agenda

Calgary keeps progressing with its new MPLS network.

Recognizing the critical role that technology plays in improving quality of life and supporting the economic development of a city, The City of Calgary is putting a major emphasis on innovation. Not content to sit on the sidelines and watch the world pass it by, Calgary has begun acting on a broad, forward-thinking vision to become an innovation leader and respond to the needs of its progressive citizenry.

"We've obviously seen the demand for IT services go up in the last decade, and we're assuming that curve keeps going," says Heather Reed-Fenske, Manager of Innovation & Collaboration for The City.

Calgary kicked off its forward leap with a core switch upgrade, which was completed in October 2011. The switch upgrade provided the foundation for the next items on The City's innovation agenda. The first of these steps was the implementation of a City-wide Multi-Protocol Label Switching (MPLS) network, a cutting-edge upgrade that dramatically improves City network capacity and communications speed.

With the future IP/MPLS network Calgary is putting in place, it can realize economies of scale and drive down costs. The upgraded network will also provide the level of security and reliability

CASE STUDY

core, made the upgrade to MPLS that much more attractive. Data can quickly travel between the centers, maximizing failover and disaster recovery capabilities.

"Getting this first phase done is quite significant for us, and really helps with our momentum going forward," says Reed-Fenske.

Future phases include, among other things, an expansion of the MPLS network along The City's fiber optic backbone which spans Calgary's geographic boundaries. Officials are excited about the improvements in communications, efficiencies and opportunities the new network will bring.

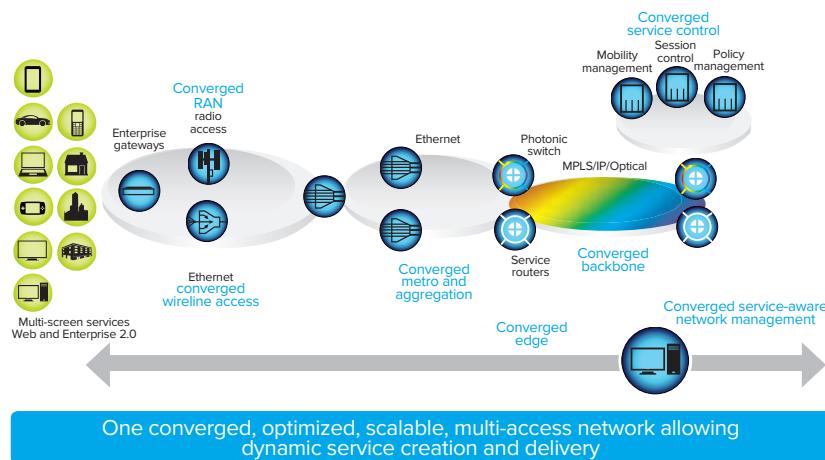
"Having an MPLS transport architecture allows for all our business units to operate on a common infrastructure even though they have separate networks," says Hodgson. "It allows our business units to connect more easily than they can today. When you have disparate networks, it's more difficult for information to flow between units."

MPLS also positions The City to effectively meet its future data needs. "There are some definite benefits in this shift in architecture for meeting future demands for video, security, operations costs and more," says Hodgson.

Savvy Thinking

A well-connected metropolis with a technologically literate citizenry, Calgary is determined to continue evolving to meet the demands and desires of its people. "Calgary's a very wired city. Our citizens are very tech-savvy," says Hodgson. "People expect our City to be wired."

More importantly, the future phases of the network will help City workers operate



more quickly out in the field, in turn making The City even more responsive to citizen needs. "Our business operations want to be able to work out in the community where citizens are and be able to answer problems, service requests, work orders, that kind of thing," says Reed-Fenske. "They want to have anytime, anywhere access, which in turns helps our citizens."

Delivering real-time applications is a priority today for The City of Calgary. Voice-over-IP (VoIP), video, social media, customer service and collaboration suites are fast becoming essential tools for users to interact effectively and stay engaged in the digital age. These next-generation applications require levels of performance from the network infrastructure far beyond the needs of typical networks in terms of throughput, latency and application awareness.

The Alcatel-Lucent Highly Leveraged Network (HLN) is an all-IP infrastructure that delivers very high bandwidth and a rich user experience for residential, business and mobile customers, and can

help operators monetize their networks more effectively.

Application fluency represents a unique approach to networking design. In Alcatel-Lucent's view, the application fluent network possesses broad knowledge of both network devices, end terminals and the applications to which they are connecting. Most importantly, the application fluent network understands the context of the conversation between device and application — and makes decisions based on that understanding.

This converged network brings significant benefits to The City of Calgary, including a high-quality user experience, lower network administration costs and a better return on investment (ROI).

Above all, City officials stress that implementing an MPLS network is about much more than saving a few dollars. "It's not just about looking to plateau our operating expenses," says Basto. "It's about building the capabilities we need to meet the current and future demand for long-term sustainability."

Alcatel-Lucent

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46%

of state and local government leaders expect **cyber security threats to rise** over the next year.*

What is your organization doing to protect itself?

Coming in November

Government Technology and **Emergency Management** will release an in-depth report that will help provide potential solutions for the cyber and physical security threats state and local government leaders face today.

This report will highlight agencies that have created a path to protect themselves, data on the biggest security challenges government leaders are facing today, and the technologies and best practices that can save your data – and protect your people.

*This data is based on a Center for Digital Government survey conducted in August 2012.





BY NICOLE BELBIN AND PAT NEWCOMBE

FAB LABS AT THE LIBRARY

COMMUNITY ‘MAKERSPACES’ GIVE ACCESS

THERE'S SOMETHING UNUSUAL



THE TEKVENTURE
MAKERSTATION
PARKED AT THE
ALLEN COUNTY
PUBLIC LIBRARY.

sitting in the parking lot of the Allen County Public Library in Fort Wayne, Ind. Pay a visit to the 50-foot trailer and you might be surprised with what you find. Inside are various tools for cutting and shaping wooden objects, an electronics work bench, an injection molding machine and one of the most advanced gadgets for inventors, a 3-D printer.

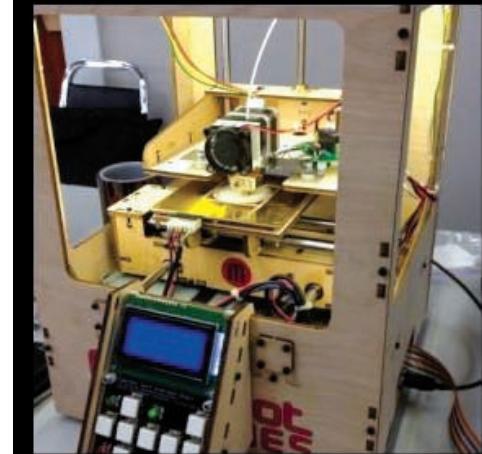
Allen County is one of just a handful of public libraries that have set up multi-purpose workshops for patrons who want to share and collaborate in order to create and build things. The terms used to describe these spaces include "makerspaces," "fab labs" or "hackerspaces."

So why does the Allen County Public Library have a high-tech lab for would-be designers, engineers and inventors? "The library is in the learning business, not just the book business," said Director Jeff Krull. "Anytime libraries come across an opportunity for people to learn and grow, they should do it."

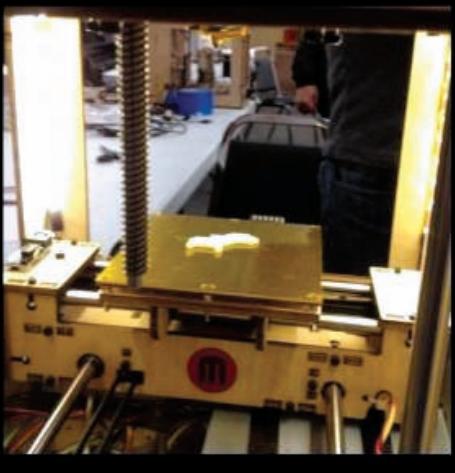
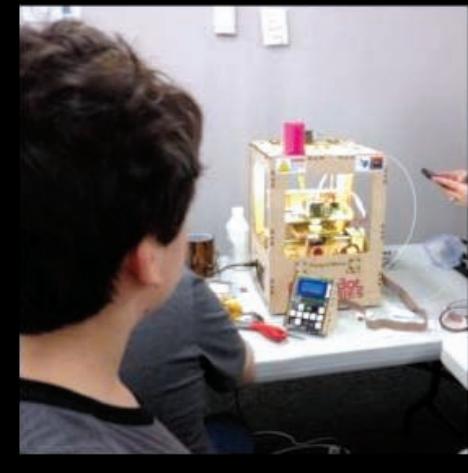
There are nearly 10,000 public libraries in the U.S., and patrons increasingly rely on them for access to technology. More than 90 percent of public libraries offer formal or informal technology training, according to a recent survey conducted by the American Library Association. Much of that training relates to instruction for computer skills, general software applications and Internet use.

Makerspaces and fab labs cater to a particular type of library patron: inventors, artists, entrepreneurs, crafters and youth groups. The technology used in these workshops can revolutionize the manufacturing process, allowing designs and creations that can be modified to suit individuals in ways not possible with mass production.

Take the 3-D printer: It uses spools of coiled plastics — the same materials used to make Lego blocks — that are strong, nontoxic and available in many colors. The printer creates an object based on a digital design by melting the plastic and extruding it to form the shape of the object it is printing. The object may even have movable parts. Once expensive, these high-tech printers are now available for \$2,000.



PATRONS AT THE FAYETTEVILLE FREE LIBRARY USE THE FAB LAB'S 3-D PRINTER.



FAYETTEVILLE FREE LIBRARY

Allen County collaborated with TekVenture, an educational nonprofit specializing in makerspace technology, to create the lab. Working off a simple one-page agreement, TekVenture agreed to provide the trailer, along with the equipment and some free programming, and Allen County offered free parking.

The Fayetteville Free Library near Syracuse, N.Y., also has set up a special lab using similar technology services for its patrons; it is referred to as a “fab lab.” Instead of housing it in a trailer, it’s the first public library to build and house the lab inside the library and is run by staff, along with volunteers. The equipment includes a 3-D printer, which was donated by a local computer business.

The Fayetteville lab and its open approach to learning grew out of a relationship the library has with the School of Information Studies at Syracuse University, according to the library’s executive director, Sue Considine. She compared the pool of students at the School of Information Studies to a big incubator. “The students help us to develop ideas and are forward thinking,” Considine said. “This gives us a successful model — a

team that knows public libraries must evolve and develop new services.”

Unlike Allen County’s approach where there were no upfront costs, Fayetteville sought grant money to fund its lab. Starting with a \$10,000 innovation grant it received in 2011 at the Contact Summit, a social technology event in New York City, the library also raised additional money through Indiegogo, a crowd funding website. “Donors are coming from all over the world and not necessarily library folk,” said Considine. “Individual pledges have been as high as \$5,000.” The library also received a \$20,000 New York state construction grant, which will be used to create a permanent space for the fab lab.

The two approaches involve different levels of staff support. Allen County’s setup required little to no library staff involvement. Volunteers from TekVenture conduct training programs and maintain the makerspace equipment. The open hours during which people can wander in have been very popular. Other offerings include Maker Meetups, which are geared toward the technologically savvy. Like-minded people who share in this collective approach, including

communities of makers, inventors and do-it-yourselfers, all come together to support this unique makerspace.

Volunteers are the lifeblood of makerspaces, because they share their expertise and skills with novices. While Fayetteville utilizes some staff, it also has many volunteers, including a professor from Syracuse University who gave his time to put the MakerBot 3-D printer together. The library has engaged many volunteers to develop and run lab programs. “There is no pressure on staff to become experts in this technology; we have a core group of experts to help out,” Considine said, adding that the library relies on peer-to-peer training to assist lab patrons.

Staff members, who are comfortable with the technology, participate in the Borrow-a-Bot program, where a librarian works with a patron for one hour to create an object. Fayetteville has open houses that attract up to 75 people. Community members can learn and do hands-on maker activities; the library provides lots of staff and outside help for these programs.

“Money is not an essential ingredient for a successful makerspace. People are far more important in this venture,” Considine said. “People who identify with a space or project — not money — will help to sustain these spaces and projects.” She recommends working closely with staff members, explaining that they do not have to become experts in order to sustain the lab. “Staff attitude matters more than staff expertise,” she said.

Krull believes that the lab at the Allen County library has worked out well, but for libraries looking to bring members of the community into their physical space, the county’s approach may not be the best option. “While the trailer is located right across the street from the library building, it is not drawing patrons inside,” Krull said. He thinks it would be advantageous to move the space into one of the library buildings. Currently, with the relatively small size of the trailer, makerspace programs must be limited to 12 users at a time.

Looking ahead, Considine would like to offer the Fayetteville fab lab to youth camps with a nominal fee for materials. On previous trips to the library, elemen-

TERMINOLOGY

tary-schoolchildren have shown interest in the possibility of making missing game and Lego pieces. She also plans to showcase the wide variety of patron creations.

Krull's plans include extensive programming over the summer — some free, some with a modest charge. He is also looking at bringing the space into a larger, permanent location.

Allen County and Fayetteville have created quite a buzz among librarians interested in offering nontraditional services that use cutting-edge technology.

Both Krull and Considine feel that creating access to emerging technologies is completely in line with the needs a public library serves.

Many libraries view these projects as test beds for other communities to embrace the future, according to Marcia Warner, past president of the Public Library Association, a division of the American Library

Association. "Libraries have always been about books, information and an educated citizenry," she said. "It seems like a natural progression to move into an area of facilitating information and material creation."

The librarians offering access to the first makerspace and fab labs agree about their impact. "By providing access and opportunity to experiences, libraries provide a pathway for transformation," Considine said. "Technology is not the death of the public library today. It will, however, change libraries as they rethink their space and role."

Libraries, historically, retool continually, and the pace of evolution of the library promises only to move more quickly. **GT**

Pat Newcombe is the associate dean for library and information services at the Western New England University School of Law Library. **Nicole Belbin** is head of access services at Western New England University School of Law Library.



TEKVENTURE'S MAKER STATION OFFERS ACCESS TO SOPHISTICATED EQUIPMENT LIKE 3-D PRINTERS AND INJECTION-MOULDING MACHINES.

MAKERSPACE:

A makerspace is a location where people with common interests — often in computers, technology, science, digital or electronic art (but also in many other realms) — can meet, socialize and collaborate. Makerspaces incorporate elements of machine shops, workshops or studios where hackers can come together to share resources and knowledge to build and make things.

MAKER MEETUPS:

A maker meetup is where groups of people with similar interests meet to work together, collaborate, create and share resources.

CONTACT SUMMIT:

The Contact Summit bills itself as a "working festival of innovation where the Net's leading minds and entrepreneurs can connect with the people who are building the social technologies of tomorrow." Held in different cities, the event focuses on peer-to-peer solutions in technology, business, arts, education and government.

FAB LAB:

The term "fab lab" traditionally refers to fabrication labs, which began as an outreach project from the Massachusetts Institute of Technology's Center for Bits and Atoms. These fab labs share core capabilities, so that people and projects can be shared across them. In New York, the Fayetteville Free Library's fab lab doesn't emulate these fab labs exactly, preferring to call its lab a fabulous lab and leaving specific capabilities up to the needs of the community it serves.



Austin Goes Carbon Neutral

By 2020, the Texas city expects to create as much renewable energy as it consumes, and it's well on its way.

By Creighton Welch / Contributing Writer

In 2007, the city of Austin, Texas, set out to accomplish a lofty goal — become 100 percent carbon neutral by 2020.

With eight years until its self-appointed deadline, the city continues to make strides to not only reduce its energy consumption, but also — and perhaps most important — create a culture of sustainability and conservation among its 12,000 city employees and the larger metropolitan area.

“Everything has evolved since we initiated the plan in 2007, which has been an interesting part of the whole process,” said Zach Baumer, Austin’s climate protection program manager. “The City Council and the mayor have changed, but the city remains committed, and has raised the importance level of the resolution. It is becoming ingrained in the culture of the city.”

In 2012, Austin checked off one of its milestones, which was to power all city facilities

using renewable energy, and is now the No. 2 city on the U.S. Environmental Protection Agency’s Top 20 Local Government list of green power purchasers, which is ranked by annual green power usage.

Austin sells more renewable energy through a utility-sponsored, voluntary green-pricing energy program than any of the 850 other programs in the nation. City officials are quick to point out that Houston ranked No. 1 for purchasing 438 million kilowatt-hours (kWh). However, that represents only 34 percent of the city’s energy usage. Austin’s purchase of 406 million kWh represents 100 percent of municipal energy usage.

Making the push to 100 percent renewable energy came with a price though: The *Austin American-Statesman* reported that using renewable energy cost an additional \$8.5 million for the city during the first year.

While the fuel charge rose from roughly 3 cents per kWh to 5.7 cents per kWh with the

renewable energy program, GreenChoice, the city is locked into that rate for the next 10 years, thus reducing its risk of exposure to rising fossil fuel prices.

“It did cost more in the short term,” Baumer said, “but the analysis was done, and we expect it will save us way more over the long term.”

Given the tough budgetary climate for municipal governments, and the price sensitivity many households are facing, making the push to carbon neutral is going to be a delicate balance of sustainability and affordability.

“We’ve set some very ambitious policy goals for our utility as it relates to utilizing renewables,” said Austin Mayor Lee Leffingwell during his 2012 State of the City Address. “As we move toward that goal — and as we transition to using more and more clean energy — we will always, always do so with affordability as core value.”

Thus far, though, the Austin community seems committed to the plan.

"The community keeps saying, 'do it' and we keep saying, 'OK.' Our citizens are going to hold us accountable, and there is constant pressure from the community, which is a good thing," Baumer said. "There's no question that climate change is real, so why would we not meet our commitments? It's not just a question of 'should we do it,' it's 'we have to do it.'"

Convincing all city employees that energy conservation is a priority can be challenging, Baumer said, especially when they have important priorities of their own. For example, the fire department and emergency medical services are going to place saving lives ahead of saving gas.

"We continue working to incorporate it into the organizational culture, because the kinds of things we're changing have to go all the way through the system to every employee," Baumer said. "We are constantly working on our outreach within the organization. We always try to tie what we're doing back to innovation and sustainability."

In addition to instilling an attitude of sustainability, specific goals for the city include converting its entire fleet of vehicles to renewable or hybrid consumption and achieving 700 MW of new savings through energy efficiency and conservation — both by 2020.

In 2011, the city emitted 183,000 metric tons of CO₂, marking the fourth straight year of steady declines since the city's climate resolution was introduced. In 2007, that number was nearly 300,000 metric tons.

As of 2011, 65 percent of vehicles used alternative fuels or were hybrid vehicles, up from 60 percent the year before.

That includes more than 200 gasoline/electric hybrids, more than 500 flex-fuel ethanol vehicles, more than 200 propane vehicles, more than 30 all-electric vehicles, and more than 1,800 diesel vehicles and equipment using B20 biodiesel blend. While the city doesn't have as much control over outside contractors, such as the public transportation system, it's working with them to promote and encourage renewable fuels.

Since 2007, the city has increased its purchases of E85 (ethanol) fuel to more than 220,000 gallons per year and B20 to more than 1.7 million gallons per year. In 2010, E85 and B20 replaced traditional gasoline and diesel purchases by 300,000 gallons and 2.4 million gallons per year, respectively.

The city also performs a life cycle cost analysis to ensure that a certain vehicle makes the most sense over the long term.

"When looking to purchase a vehicle, we typically analyze four vehicle choices and compare them based on lifetime cost of ownership and environmental performance," Baumer said. "The lifetime cost includes a 10-year time horizon, lifetime maintenance and fuel usage along with the up-front purchase price in our analysis. We also calculate lifetime [nitrogen oxide] and CO₂ emissions for each vehicle. These are all compared, and the vehicle with the lowest cost of ownership and lowest environmental impact wins."

Though the goal is to become carbon neutral by 2020, part of that push will likely require the purchase of carbon offsets.

"Our approach is that we reduce our positive carbon use as much as we can, and then we offset whatever's left," Baumer said.

The purchase of offsets will fund a range of greenhouse-gas-reduction programs that over time will also help improve the environmental quality in central Texas.

There certainly will be infrastructure challenges, such as large construction vehicles, in which there is no viable electric or hybrid option at this time, and other large equipment, such as generators or refrigerants, that will continue to emit some greenhouse gases.

"We're trying to do everything we can to minimize usage and switch what we can," Baumer said. "We are finding ways to increase efficiency, and all of that will help."

The push for all city operations to become carbon neutral is just one component of the city's larger climate protection plan, however. While it's not necessarily part of achieving their goal of carbon neutrality by 2020, city officials are working diligently with citizens and local businesses, as roughly 70 percent of Austin's electricity is used by homes and businesses.

"We are working to inspire businesses to commit to the plan as well," said Baumer. "We can only do so much as a city, but if you look at the million people who live and work here, they can make a large impact as well. We are always rethinking our public education programs."

The city created the Austin Green Business Leaders program, an ongoing program open to businesses of all sizes and

industries. The program's central tool is the green business scorecard, which helps businesses assess and implement sustainable practices.

Companies earn points for taking actions listed on the scorecard, and depending on their score, can progress through Silver, Gold and Platinum levels of recognition. After completing the scorecard, businesses are provided recognition and a toolkit to promote their company as an Austin Green Business Leader.

"I've often said, 'What is good for our environment is good for our economy,'" Leffingwell said. "It speaks to our values as a city that we have such vibrant and socially responsible businesses here in Austin, and these folks are setting an example in sustainability for businesses of all shapes and sizes to follow."

The 2012 Austin Green Business Leaders include Fortune 500 companies, such as Dell and Whole Foods Market, as well as local independents like Buenos Aires Café and House+Earth, a building material supply company.

"Not only does the Austin Green Business Leaders program provide an effective barometer for measuring the sustainability of a business's operations, it also serves as an educational and motivational tool for implementing more sustainable actions," House+Earth Principal Scott Kuryak said. "With the current scorecard, large corporations and small companies alike can participate on a level playing field, which should encourage companies of all types to participate."

Though there is still much work to do, and there will likely be unforeseen challenges and obstacles, Austin will remain committed to its climate plan through 2020 and beyond.

"The bottom line is that if we will proceed carefully at this crossroads," Leffingwell said, "we can continue to benefit from a utility that's a national leader on green energy and conservation; that helps attract sustainable economic growth to our area; that helps support our special quality of life; and that delivers reliable and affordable service." 

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Between the Lines

Will QR codes become the next tool in the fight against child abduction?

By Hilton Collins / Staff Writer

On March 9, 2009, Stephen Watkins' children never showed up to their school in Newmarket, Ontario. During a weekend court-ordered visit, his ex-wife Edyta Ustaszewski, the noncustodial mother of their sons, Alexander and Christopher, took them and fled the country. She escaped to the U.S. before heading to Europe, sending authorities on her trail for more than two years.

But Watkins was proactive, using modern technology to bring international attention to the incident. He created custom quick response (QR) codes, 2-D bar codes people can scan with smartphones once they've installed a free code reader app. The scan takes users to websites, videos or whatever content the code maker desires. In Canada,

missing kids' pictures are printed on bills and bank statements, but Watkins went further.

Many of Watkins' codes took viewers to a mobile Web page loaded with information about the case. The page, which is still up today, has the boys' photos, dates of birth and physical descriptions, as well as videos of news coverage about the investigation. Links abound on Watkins' Facebook, Twitter, YouTube and blog accounts with abduction details. There are also phone numbers to missing children's hotlines and links to organizations' websites where people provide data about the boys' whereabouts.

Watkins put his codes on press releases, fliers, posters and websites.

"My objective was to try to give my sons a fighting chance to be found by littering the Internet world with as many links to their photos as possible," he said.

Authorities found Alexander and Christopher in Poland in 2011. Watkins doesn't know if QR codes led to the discovery, but he thinks they can make an impact elsewhere. He creates codes and



Stephen Watkins created the QR code at left and placed it on press releases, fliers, posters and websites to direct people to a site dedicated to finding his sons, who were abducted by their mother in March of 2009.

campaigns for cases in other countries, hoping to capitalize on widely available technology. In America, for example, 14 million people scanned QR codes in June 2011, according to a comScore report.

"QR codes are still probably the best way of getting people off the page and online to a direct site," Watkins said.

Going Mobile and Global

Watkins helps organizations and families use QR codes to make missing person's posters portable. People can write information on paper posters and memorize children's faces, but it's easier to share the information virally if they scan a code that puts the data in their phone.

He's partnered with Child Quest International to help the Santa Clara County Sheriff's Department find Sierra LaMar, a 15-year-old who disappeared in March 2012 on her way to a bus stop in Morgan Hill, Calif. They put QR codes on posters and fliers to take the search beyond county borders.

"If my flier's just posted in San Jose, is it going to reach L.A.? With a QR code, it will," said Anthony Gonzalez, Child Quest's senior operations director. "It increases shareability, awareness and time-efficiency when reporting a sighting."

In LaMar's case, the code takes visitors to a mobile Web page similar to the one Watkins created for his sons, but with one crucial difference: Users can tweet the page or "like" it on Facebook, extending the search to social networks. The page also has LaMar's physical description along with photos, videos and phone numbers.

Watkins used the uQR.me service to create the code and landing page for free. Users create an account to generate QR codes with adjustable appearances called vanity QR codes. People can change the color or embed photos if they don't like the default black-and-white QR code.

Watkins embedded photos of LaMar and his sons on their QR codes to give the two campaigns a personal touch. He thought standard QR codes look too dehumanizing for missing children's cases.

"They have a level of humanity in them because they actually have a picture of a missing individual," Gonzalez said. "It means a lot to the searching families, but it also is very distinguishing between each one and the normal marketing QR code."

uQR.me's user interface allows the Web page owner to change site content without modifying the QR code itself. These are called dynamic QR codes because people can alter the connected media without having to discard the code, which is what's required with static code. Many QR code generators create code permanently linked to content at the time of creation, so new code is needed if content changes. uQR.me is one of several generators with the dynamic option.

Is the Battle Uphill?

Watkins creates QR codes for cases for free and hopes to educate the world in the process. He sometimes encounters organizations that don't know what those QR codes are, and there can be complications when they do.

Problems can arise even when law enforcement wants to use QR codes, Watkins said. "They're not techies," he said. "so we want to make it as simple as possible for them."

The resources to deploy campaigns aren't always there either. In California, for example, Gonzalez said budget constraints impede viability.

"They don't have the personnel and time to put somebody in a position to do it, whereas nonprofits and secondary agencies can fill those gaps for them," he said.

Additionally, people like Watkins and organizations like Child Quest International have more freedom to try unconventional strategies that government either doesn't have time to experiment with or doesn't see the value in.

Despite such issues, however, police have used QR codes successfully. The Vancouver, British Columbia, Police Department printed them on crime alert posters

in 2011 to spread information about murder suspects, and the Portsmouth, N.H., police used QR codes that year to link residents to information about police programs. Portsmouth Police Chief Lou Ferland told Seacoastonline.com that the codes' possibilities were endless.

Watkins hopes working with high-profile cases will teach the world about QR codes' benefits. "The more the media reports it, the more society will know what QR codes are," he said, adding that years ago, he decided to use the technology when he saw people pass missing persons posters in Walmart without paying much attention.

QR codes, he said, seemed like a good way to enhance traditional methods in the search for his sons. His professional background in corporate advertising helped him understand the technology's usefulness in outreach.

Watkins says he's the first person to use QR codes this way, and wants the trend to pick up. According to Gonzalez, the movement hasn't spread far beyond a few jurisdictions and organizations like the Laura Recovery Center's campaigns in Texas.

Conflicting data on QR code adoption and awareness paints a murky picture of how much work Watkins and his allies must do to promote the technology's application in abduction cases.

These studies provide insight on QR codes' popularity in North America:

- In May 2011, a Mobio report said QR code scanning increased by 4,549 percent in the year's first quarter on a year-over-year basis.
- But a 2011 study of 500 students from 24 U.S. universities found that nearly eight in 10 didn't even know what to do with a

ENDANGERED / MISSING: SIERRA LAMAR



ENDANGERED / MISSING JUVENILE



CRIME TIPS LINE: (408) 808-4431

SANTA CLARA SHERIFF: (408) 808-4500

California teenager Sierra LaMar disappeared in March 2012. Prosecutors recently charged a 21-year-old man with her murder.

QR code, and 75 percent said they were unlikely to scan one in the future.

- And in March 2012, Forbes downplayed the importance of the 14 million Americans in the comScore report who scanned QR codes in June 2011, claiming they represented a mere 17 percent of the 82.2 million Americans who had smartphones in July 2012.

The story differs elsewhere. In Japan, for instance, 76 percent of those surveyed in 2009 said they knew what QR codes were and could scan them.

Despite the conflicting data, Watkins isn't slowing down. He wants to create software that automatically generates QR codes and campaigns for North American groups like the National Center for Missing and Exploited Children in a centralized fashion, though he's a long way from getting there.

"I'm prepared to build the software program," he said. "I can't fundraise and get in all that stuff until we get more of the media and society to know what QR codes are." **GT**

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Finding Fido

Dynamic QR codes also exist to help people find lost pets and luggage. People can create a free account at Dynotag.com and choose their tag type, then upload a photo, and either fill out a form describing their pet or luggage or leave a general text message. All information is stored in the cloud. Users press a button to create a QR code

that they print on a sticker to attach to a bag or pet collar. If either is lost, someone scans the code with a phone to generate data to locate the owner. The free accounts offer 4 MB of storage per tag, and \$4.99 accounts offer 50 MB. Stickers with codes, which customers activate online, also can be bought through retail outlets.

Users edit the information stored in the tags online without needing to create a new tag. "We are giving, essentially, everybody a piece of cloud," said CEO Murat Divringi. "They enter information and update it anytime. It's under their control, and we wanted to make it easy to use, like postage." Online pet tracking with QR codes is relatively new, but

there's already competition. Pet Hub, which allows similar functionality, launched in fall 2011 around the same time as Dynotag. Divringi expects QR code use to expand past typical corporate use. "They are going to go from being a curiosity to being a utility item," he said.



One Feed at a Time

More governments use Facebook to deliver services.

By Hilton Collins / Staff Writer

Steve Craig, the 311 director of Somerville, Mass., believes that social media is a handy delivery tool for city service — but it's technically one that jurisdictions can do without.

Somerville isn't one of those jurisdictions, though. "I don't think you absolutely need it to make a system work, but it just makes sense," Craig said. "It's something that there's a high demand for, so I don't see the reason someone would go down the path of 311 and not factor this into their overall plan."

Residents submit work orders through Somerville's 311 Facebook page, a popular addition to other work order gateways like the city's Web page, Twitter feed and call center.

Evidence suggests that the investment has paid off. As of early September, the Facebook page had 5,248 likes, which Denise Taylor, Somerville's new media manager, believes has contributed to a 15 percent reduction in calls to the 311 center.

Used by 26 city departments, Facebook is the most popular social media platform with the Somerville government, and according to a 2010 NASCIO survey of 43 states, it is the most popular social media platform among state governments, too. The primary reason for going social? Citizen engagement.

Countless governments nationwide use Facebook primarily for disseminating general information



on public walls — it's department-specific service delivery that's unique.

For Arkansas CIO Claire Bailey, who co-chaired NASCIO's surveying group, it's a general communication tool that lacks uniform adoption. "Everyone is embracing it, but maybe not in a standard way, whether you're city, county or state," she said. "In our own state, it's more of a communication tool right now."

Despite this, however, Bailey said she feels Facebook's best application for direct service delivery is in the 311 environment, just as Somerville is doing. "I think that's where people are trying to use these tools to say, 'I took a picture of this pothole. Can you fix it?'" she said.

A Service Delivery Network

On Somerville's 311 Facebook page, citizens submit work orders, comments and suggestions in two

ways. Option one is an in-line Web app that's a simple contact form with fields for a person to type his or her name, email address, phone number and a detailed message about a municipal concern. The person clicks a button to send the message to the city and automatically receives an email confirmation. After that, it's up to Somerville employees to investigate and resolve the issue.

The second option is a download link to the iTunes page for Somerville's free mobile 311 app. The app allows users to input the same information they do on the Facebook contact form, with a few key enhancements: They can attach a picture, select preloaded location information, and there are additional fields to type more specific information about the issue.

Citizens also tweet concerns to the city through Twitter, but the exact method of 311 communication isn't a huge factor for Somerville.

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The number of state governments using **Facebook to reach citizens**, according to a NASCIO survey.

"It doesn't really make a difference to us either way. We're happy to take it," Craig said. "We do find that a lot of constituents find it easier because they're busy. If they're at work or on the bus or whatever they're doing, it's easier for them to pull up their Facebook page or Twitter account."

In San Francisco, the situation is similar. The city-county jurisdiction has a 311 Twitter account and a Facebook app for the public to submit service requests. It used open application programming interface technology to develop the Facebook app within the Open311 specification standard, and receives work orders through other Web apps that are integrated with Open311, including SeeClickFix and CitySourced.

But unlike Somerville, the Facebook app isn't a hit with San Francisco citizens, according to Andy Maimoni, the city's deputy 311 director. "We haven't gotten a lot of requests from there because I don't know that people go to Facebook to do that kind of stuff," he said.

Recent figures support his observations. In June, San Francisco only handled 182 cases through its Open311 channel out of more than 18,000 cases total. The government's central 311 Facebook page

had a mere 337 likes as of late August, compared to Somerville's 5,246. Somerville's in-line Facebook app alone has more than 44,000 likes, which is a substantial number for a city that had a population of 76,519 in 2010.

The disparity between San Francisco and Somerville suggests that Facebook's usefulness for 311 service delivery may not be uniform. Regardless, San Francisco

in Winter Hill. The 3-year-old gray-and-white terrier's pictures adorned Somerville 311's Facebook page, with links to similar posts on the "Annie is Missing" page. City employees planned for the digital images to enhance the neighborhood search, where physical signs had been posted around the area.

Stacy Landau, Annie's owner, undoubtedly felt comforted by the support expressed

“It’s something that there’s a high demand for, so I don’t see the reason someone would go down the path of 311 and not factor this into their overall plan.”

government encourages departments to use the platform for individual purposes, and many oblige by posting general information on their walls.

"We've distributed out the Facebook presence so people can specialize on what they are really interested in," Maimoni said, noting that residents friend specific pages to receive information that's tailored to them. "They're getting the feed from the sites they've linked up to."

Still, some public employees don't see Facebook as a mechanism for dynamic service delivery in many cases. "Most folks tell you that people don't go to Facebook for apps," Maimoni said, "they go for games."

Reaching the People

Facebook comes with a bevy of slick features and functionality, but in Taylor's opinion, government's ultimate goal is simply better civic engagement, a realization she hopes jurisdictions remember when they go social.

"Social" is half of 'social media,' and I think sometimes it gets forgotten," she said. "You can think of social media as sort of an online billboard, but just remember that you have this incredible potential for it to be a forum, a place for civic engagement as a community space."

Somerville government and its taxpayers certainly capitalized on Facebook's two-way communication capability, and it proved a great help when Annie the dog went missing the night of July 12

on Somerville 311's wall. People shared the original post 49 times on their own walls, and one commenter wrote, "Wishing you the best of luck, will keep my eyes peeled for this sweet looking pooch."

An unnamed resident found Annie weeks later, and 248 people liked an Aug. 1 post of a photo of Landau holding the dog. "Great news!" and other celebratory comments abounded.

Taylor, who trains Somerville departments on social media deployment, said he feels that social media's basic benefits can also be the most rewarding from a public service perspective: Residents post opinions on city projects and become more invested in community activities and meetings.

"We have seen attendance at meetings increase significantly because of it," she said. "We're receiving volunteers [and] including commission members we weren't reaching before."

Though social media is great for connecting with citizens, Arkansas' Bailey said it may need to mature as a service delivery tool. However, she said 311 applications exemplify a type of government-to-citizen communication that could grow more sophisticated in time and spread to other types of services, independent of the platform. "I think that's the evolutionary point for us." 

Government Utility

States reveal the primary reasons for use of social media technologies.



SOURCE: NASCIO

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QR Code Blue

The Marin County, Calif., Fire Department pilots quick response codes that provide secure medical information about residents.

By Sarah Rich / Staff Writer



Every second counts during medical emergencies, and quick access to medical information can be the difference between life and death.

Marin County, Calif., located just across the Golden Gate Bridge from San Francisco, is working to ensure first responders have access to this crucial information. In early June, the county's fire department began piloting a yearlong project that offers residents tech-enhanced stickers that link to an online health profile.

Partnering with Lifesquare, a startup company located in Menlo Park, Calif., Marin County is distributing free QR code stickers, which when scanned by a camera-equipped mobile device, direct emergency responders to the resident's online medical profile. As of August, the county had 1,100 enrollees in the program.

"We've utilized the Lifesquare technology, and it has worked well," said Mike Giannini, Marin County's emergency medical services battalion chief. "We've been able to get patient information and use it to our advantage."

QR codes — which resemble a bar code — gained attention in city government in 2009, when Manor, Texas, CIO Dustin Haisler led efforts to have them placed throughout the city so residents and visitors could learn more about a location that held a QR code.

These codes aren't typically associated with capturing medical information, but more for disseminating information about historic landmarks and commercial products, such as in Manor. This is changing, however.

Marin County residents can participate in the program by creating a free online account on Lifesquare's website. From there, they create a profile that includes essential health information such as allergies, medications and emergency contacts — whatever medical details they want to divulge. Information entered into the profiles is stored securely in Health Insurance Portability and Accountability Act compliant servers, according to Lifesquare.

Once a medical profile is created, Lifesquare mails the participant a package of stickers that feature their unique QR code. The idea is to place the stickers in convenient locations, such as wallets, bike helmets, refrigerators and car keys. If an individual is unconscious or incapacitated, paramedics can easily locate the sticker and scan it to bring up his or her medical information, said Ryan Chamberlain, spokesman for Lifesquare.

To access the medical information using the stickers, the county's fire-fighters and emergency responders scan the QR code with a mobile device — and Lifesquare gave the county 50 iPhone units for use in the trial.

Currently, medical information can only be accessed by medical personnel participating in the pilot who have the Lifesquare EMS application on their mobile device.

Chamberlain said unlike static medical information alerting methods like brace-

lets, the company's QR code proprietary technology is cloud-based so users can update their online profiles at any time.

"[The QR code sticker] can go anywhere with you and it's secure," Chamberlain said. "If you're sitting in a coffee shop, nobody can look over and read what your medical history is. It's just a code, and only the professionals can get to that."

Vial of LIFE

Before experimenting with QR code technology, the county implemented a similar program — called Vial of LIFE (lifesaving information for emergencies) — to make medical information easily accessible to emergency responders, Giannini said.

According to the county fire department website, Vial of LIFE provides residents with kits that contain materials — like a refrigerator magnet, sticker for a front door and medical information form — that would help emergency responders find their medical data in the event of a crisis.

Giannini said that because the fire department's Vial of LIFE program is similar to the idea behind the stickers printed with QR codes, the department was a big proponent of working with Lifesquare to use the technology. Giannini said he'd like to see information

“ IF YOU'RE SITTING THERE IN A COFFEE SHOP, NOBODY CAN LOOK OVER AND READ WHAT YOUR MEDICAL HISTORY IS. IT'S JUST A CODE AND ONLY THE PROFESSIONALS CAN GET TO THAT.

gathered from Lifesquare integrated into reports that responders must complete.

"We're looking for them to create a bridge that will take all of that information from Lifesquare and populate the pertinent fields in our electronic patient care report," Giannini said. "So that will provide us with not only more accurate information, but it will save us a significant amount of time during the course of patient care and over the long term."

The Tech Next Door

So why is Marin the first to pilot Lifesquare's medical QR code program?

Chamberlain said a combination of community interest and need were factors.

The county — a mountainous landscape and home to sites like film director George Lucas' Skywalker Ranch — is also home to a vibrant senior citizen population and many cyclists. Chamberlain said these two populations alone made Marin County a good fit for the pilot's launch.

Marin also is a stone's throw away from Silicon Valley, a factor that could be seen as advantageous for bringing technology to the community.

Chamberlain said the next step to expanding the Lifesquare technology

would be to connect it with an electronic patient care reports system as a way to simplify how the medical information is transferred for a patient. If paramedics process the scene of an accident by first scanning a person's Lifesquare QR code then directly upload that information to an electronic patient care reports system, the information is more accurate.

"You don't have people trying to write out a long form of medications, prescriptions and medicine names, or misspelling a person's name and things like that," Chamberlain said. "So not only is it quicker for paramedics, it also removes that element of human error."

Chamberlain said Marin County has just finalized a contract with an electronic patient care records company. Once a system is implemented, the Lifesquare technology will be synced with it.

So far, the program has only been deployed in Marin County, but Lifesquare ultimately plans to expand the QR code stickers to other counties. Chamberlain said for the technology to have optimal utilization, it will be important for major health-care providers to participate as a way to target critical mass.

"I think the bigger picture is it needs to be adopted in large scale," Chamberlain said. "Marin County was a great test of how it works, but for it to really work well, we need to have everyone on board." 



QR codes, like this, take users to a designated landing page.



The Big-I Icon
walls enliven
Albuquerque
freeways.

PHOTOS COURTESY OF THE ALBUQUERQUE PUBLIC ART PROGRAM

The Digital Museum

Albuquerque, N.M., makes public art accessible to taxpayers via common Web tools and social media.

By Hilton Collins / Staff Writer

Experience has taught Sherri Brueggemann that beauty holds power: Dynamic sculptures and murals on city buildings may please the eye, but they also motivate the community.

"The indigenous peoples and the people that came afterward have always sort of found this place spiritually inspiring for art and creativity," said Brueggemann, manager of Albuquerque, N.M.'s Public Art Program. "Funding it through a municipal program really supports the whole image."

Thanks to the Art in Municipal Places Ordinance, which passed in 1978, 1 percent of city construction bonds have since been earmarked to finance the program. Brueggemann estimated that it totals roughly \$1.5 million every two years.

Art from the program has adorned fire stations, libraries and parks, with more than 650 pieces scattered across the city.

Brueggemann and her colleagues manage and promote the public art program with everyday technology. They track artwork locations in a FileMaker Pro database, and marketing efforts include posting images and videos to Flickr and Vimeo, as

well as displaying art locations on an interactive map.

Art and Data Management

The program is a rewarding effort to bolster Albuquerque culture. "It's an added benefit," said project coordinator Brendan Picker. "Say you build a new library, we can also commission a nice sculpture to be in front of the library. It's about place-making — enhancing the built environment and creating opportunities for the public to engage with art."

Software tools help Brueggemann and Picker inform taxpayers about elements that transform their neighborhoods into a citywide museum.

The Albuquerque Public Art Program's Web portal is a directory of links and services for residents and tourists searching for municipal elegance. Most of them point visitors to city-specific artwork, but others are gateways to national and global art.

The city has capitalized on popular video and photo sharing resources to reach the public. Its Vimeo feed includes interviews and documentaries where artists reveal how they created their pieces,

and Albuquerque's Flickr account showcases paintings, drawings, murals, pottery, jewelry, statues and sculptures, many which come in extraordinary shapes and forms. *The Fish Globe* at Tingley Park, for example, is a giant sphere composed of brown, interlocking trout.

The Vimeo documentary about the Flyway sculpture on Coors Boulevard exemplifies the uniqueness of Albuquerque's art — and the artists' pride. The structure comprises 16 rows of six painted angle irons welded to an earthen mound. Artist Robert Wilson made the irons point to the sky at an angle to symbolize birds launching themselves into the air, an instance where art reflected local life.

"When those birds fly over, I want them to be looking down on this piece and see that it's right in their pathway," Wilson said in the footage. "The idea that they will be flying exactly in the rows that are created by Flyway is really appealing to me."

Albuquerque's Web portal links visitors to the

Fish
Globe at
Tingley
Park



interactive public art map and a printable PDF map of a walking tour. The interactive map is a simple GIS Web application that marks art locations with orange dots. Users customize the interface via a dropdown menu where they select an interface type, including street view and topographical view.

The FileMaker Pro database helps staff sort and track artwork, so creating maps and walking tours is much easier than it would be otherwise. Brueggemann started the database in 1995 because she'd found FileMaker Pro useful for data management at jobs she had prior to joining the Public Art Program.

"The importance of the database is for us to protect the public investment, to know where every single piece of art is, and what condition it's in," Brueggemann said. "Every public artwork in our database has its own ID number, and we have used that number on all our promotional material, so just about anytime we use a picture of one of our pieces, we use a number to identify it."

Eagle-eyed viewers will notice those numbers under photos on the program's Flickr page. For example, the Center of the City Centennial street art photo is tagged with the number 618, which corresponds with the artwork in the database.

This system simplifies marketing efforts. The database numbers are printed on brochures and trading cards, and city staff members explain their usefulness to residents.

"When we go into the schools and we give workshops, we hand out a batch of trading cards, and they all have a number," Brueggemann said. "We explain to them how the number can help lead them to get more information on our Web page."

Challenges Ahead

Technology and public art are integrated nationwide. The Public Art Archive, for example, is a searchable database of descriptive art media in the United States and Canada, which couldn't exist unless jurisdictions like Albuquerque offered their information electronically. The archive is currently accepting submissions from participants.

Similarly, CultureNow's Museum Without Walls project offers data and images on thousands of artistic creations

to the public via a suite of Web and smartphone apps. The iPhone app contains a searchable database of photos, an interactive map and podcast interviews with artists, curators and others with art-related careers from about 55 public art collections from around the country.

These modules are impressive at large scales, but some people feel there's room for improvement at the local level. Helen Lessick, an artist and public art consultant, believes many governments should offer more detail in their online data.



Albuquerque's Art

Many of the more than 650 pieces of art in Albuquerque, N.M., are fashioned in the land art style, a movement incorporating man-made structures with natural environments. Nearly all have been designed to capture the vibrancy of the indigenous peoples of the Americas who embody the Southwestern spirit.

Strangely beautiful metal flowers and other growths sprout from the ground at **Tingley Aquatic Park**, sculpted animals are frozen in time at the city's aquarium, reverse reliefs are mounted on the workforce development building downtown, and colorful murals spice up pillars in town. Even freeway intersections are beset with stylized glass, steel and stone pylons, as well as walls glowing with LED light.

"Go online and you'll find some public art programs do a really underwhelming job of representing the diversity of public art in the region because we don't put metadata in our works," she said. Metadata refers to data describing information in a system.

"We don't describe the innovations the artists are doing, and we don't describe the partnership and the philosophy of what art in public places brings to civic life."

There's a story behind every piece of art, and Lessick thinks that the story isn't always fully told, if at all, when the information is disseminated on the Web.

In Albuquerque's case, online Vimeo interviews provide crucial insight into artists and their creations, but more work could be done in additional areas to ensure that taxpayers know why their art is important and how it came to be.

Lessick is a project manager for Web Resources for Art in Public (WRAP), a project focused on exposing artists and their work to the public in a way that's often limited to the confines of museum walls. Since 2010, WRAP has educated public art groups about how apps, blogs, video and other Web tools further this goal.

"I am eager to make sure that our field is accurately well represented," Lessick said.

Technology may pose another challenge to governments as it changes how artists create and how audiences experience their work. Digital art encompasses pieces printed or projected on video screens, still 2-D and 3-D images that shift or change form, and interactive still and moving images.

If technology modifies how people relate to art, public art groups may have to adjust how they offer it, whether they're ready or not — a challenge that Albuquerque faces today. According to the 1978 ordinance, the city must use these funds to pay artists to create permanent art, like traditional paintings and sculpture, yet most digital creations are considered temporary.

"Technology changes faster and faster," Brueggemann said. "In some ways, we just sort of have to adapt technology to promote our permanent collection instead of the other way around. We can't really incorporate the digital medium as an art form itself" **GT**

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Cheong has been a CIS services customer for three years, and he intends to sign up for another five years when his current contract ends in 2013. "Their service is really good and so is their pricing," said Cheong. He's also a fan of information provided by the MS-ISAC. "They work closely with Homeland Security to give us inside information about any threats coming at us, so we can block them before they happen."

Despite its move into paid services, the CIS isn't viewed as a competitor by one of the nation's biggest security vendors. Mike Maxwell, director of Symantec's state and local government organization, said the company shares cyber-threat information from its massive global intelligence network with the CIS under a partnership that goes back some 10 years.

Although both Symantec and the CIS sell security services, the CIS offerings tend to be aligned much more closely to public-sector needs. "CIS covers a much broader range of requirements, capabilities and specialized information," Maxwell said. "Whereas Symantec has managed solutions targeted at some very specific areas."

Maxwell said free and low-cost services from the CIS play a vital role in improving information security for state and local governments. Those efforts, he adds, often can generate interest in private-sector offerings. "The intelligence that state and local agencies get from CIS can be the foundation for enhancing their cybersecurity programs," Maxwell said. "Our experience is that they see with a new set of eyes some of the threats they need to manage, and they might need hardware or software tools from the private vendor community."

Making some of that hardware and software more affordable is the newest mission for CIS. In April, the organization launched a program designed to drive down the price of security products by combining state and local government purchases into bulk buys. The Trusted Purchasing 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.

The alliance already offers deals on several categories of security products and is soliciting vendor proposals for mobile device management, two-factor identification, and hardware and software encryption. The approach already appears to be working. L.A.'s Cheong noted that the alliance lets him buy popular training programs from the SANS Institute at prices that are "five to 10 times cheaper" than he can get on his own.

Kristin Judge, a former county commissioner in Michigan, was hired by the CIS earlier this year to be executive director of the alliance and to expand local government participation in the MS-ISAC. Judge said one of her tasks is to raise local awareness of CIS resources. Another is to improve understanding between elected officials and IT departments.

"It's easy to cut an IT budget because you can't really see the impact of it as clearly as feeding or sheltering the homeless," said Judge. "Elected officials making those decisions need to understand cyberthreats and the role they play in keeping residents safe."

Pelgrin agreed that information security still struggles for executive attention, despite evidence that cybercrime is growing both in sophistication and severity. Years of economic recession hasn't helped the cause either.

"We need to get beyond the point that this is the first place to cut in bad fiscal times," he said. "I don't think security wins out on everything, but there is a risk/benefit analysis. The people making decisions need to hear from the cyberpeople about the potential consequences of those decisions."

One of the biggest mistakes officials can make, Pelgrin added, is to cut cybersecurity spending because they haven't had a



KRISTIN JUDGE, A FORMER ELECTED COMMISSIONER FOR WASHTEENAW COUNTY, MICH., NOW RUNS THE CIS TRUSTED PURCHASING ALLIANCE.

security breach. Just because you haven't seen a breach, he warned, doesn't mean you haven't had one. "A lot of this is happening under the covers. The bad guys may be in your system at this point watching everything you're doing, and your system still looks and acts as if it were OK."

On the other hand, the news isn't all bad. State and local governments have dramatically raised their awareness of cybersecurity over the past several years. And a majority of cyberthreats can be defeated through basic steps like requiring strong passwords and clicking the right boxes when setting up computer equipment.

"I think we're doing a lot right, and there's a lot that we can do to move forward," said Pelgrin.

Thanks to the growing array of services available from the CIS, state and local agencies don't need to figure out their next steps by themselves. "I think the message out of all this," he said, "is that you're not alone." **GT**

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BYOB: BUILD YOUR OWN BOT

Do it yourself will soon become easier for aspiring roboticists. Popular crowdfunding site **Kickstarter** now features **Multiplo**, a kit that allows users to build their own bots. The kit, priced at \$85, includes all the necessary mechanical parts and open source software for DIYers to assemble and program their own creation. Although aimed at educators, this bot-in-a-box may be a viable solution for cities looking to incorporate robotics in their operations on the cheap. SOURCE: KICKSTARTER



'Beakause' 3-D Can.

Beauty, a bald eagle with an injured beak, now has a new one thanks to 3-D printing technology. A prosthetic beak was sketched with **CAD software** and printed on nylon polymers, courtesy of a collaboration among researchers, engineers and even dentists. Beauty's fitting took two hours.

SOURCE: DIGITAL JOURNAL

Meet Lady Shamrock

Lady Shamrock is a British bovine beauty emblazoned with a QR code, which when scanned, takes users to a website where they can see Lady Shamrock's daily eating habits and milking patterns. The idea behind the high-tech makeover is to educate consumers about the dairy industry. The QR code — which links to www.thisisdairyfarming.com — is specially designed for animals and can be brushed off at the end of the day.

SOURCE: MAIL ONLINE



Happy Belated Birthday, Disk Memory!

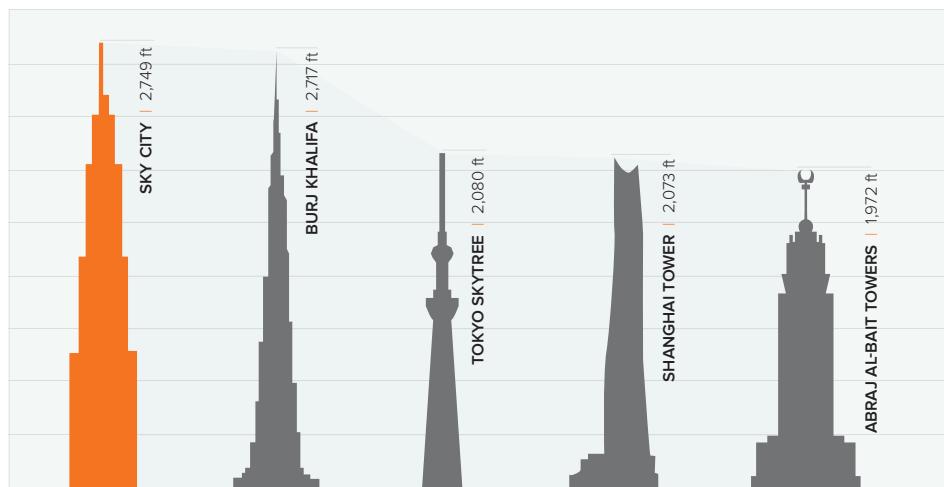
September marked the 60th anniversary of computer disk memory. As it turns out, the good old disk drive, which has been surpassed by other fancier storage devices, has something in common with another icon: the **Golden Gate Bridge**. The metal oxide paint used on disk drives is the same coating used on the bridge, except for the consistency.

SOURCE: THE WALL STREET JOURNAL



Tower Power

The **Burj Khalifa** in Dubai is the world's tallest building, standing majestically at 2,717 feet. But its dominance is being threatened by a Chinese development company that wants to take the record. The Chinese company, Broad Sustainable Building, hopes to dethrone the Burj Khalifa by building Sky City, a 2,749-foot-tall skyscraper. Work on the 220-story tower will begin in November, and the company intends to complete the project in 90 days by using prefabricated materials that can be assembled like a 3-D puzzle. Sky City will house 100,000 people and use one-fifth the energy of other buildings, according to the developer. SOURCE: INHABITAT



Send Spectrum ideas to Managing Editor Karen Stewartson, kstewartson@govtech.com, [@karenstewartson](https://twitter.com/karenstewartson)



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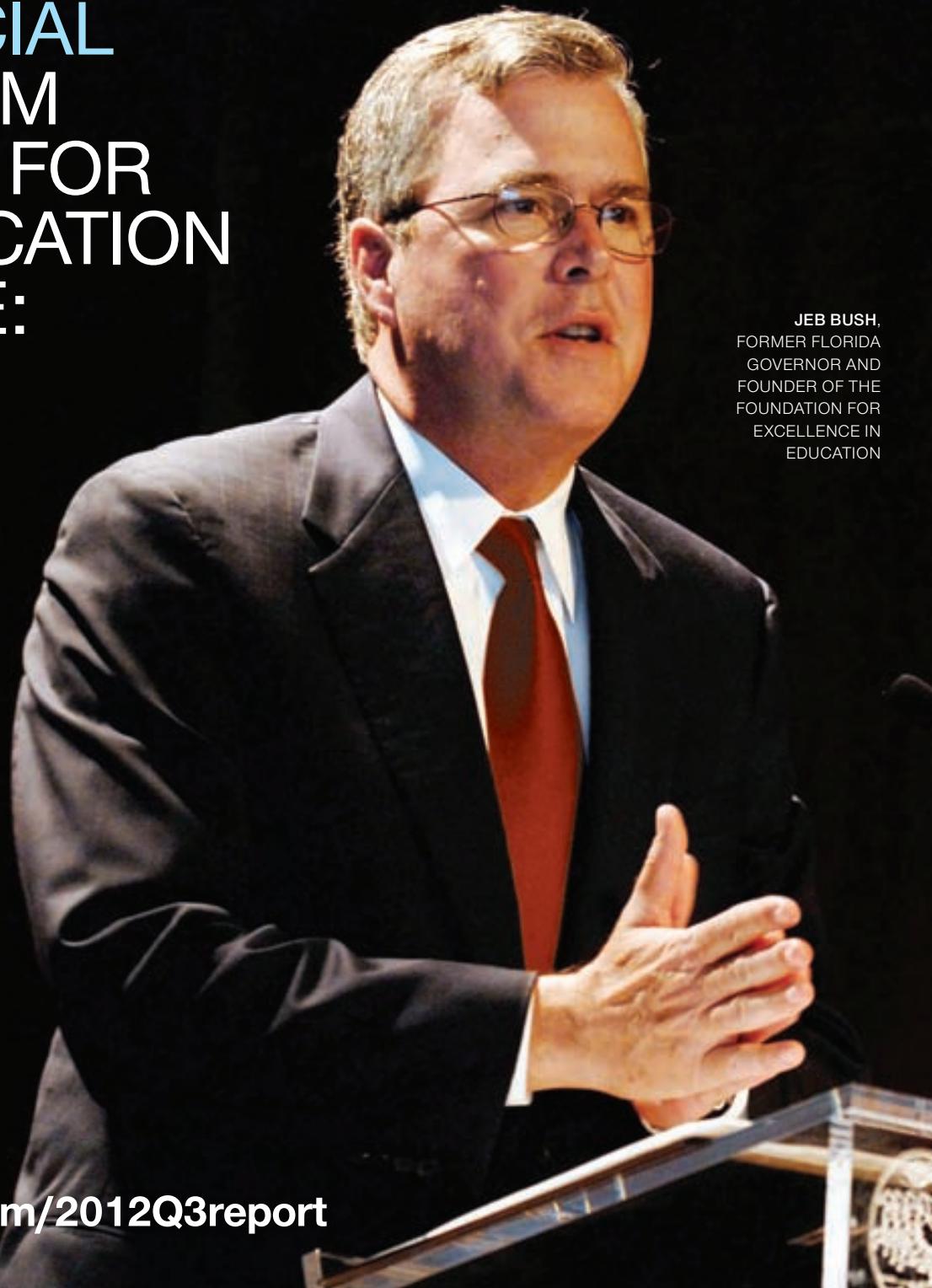
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▲ Stretch Stylus

The TS-01 telescoping stylus from IPEVO is designed for touchscreen devices such as the iPad and other tablet computers and combines a stylus and pointer in a single compact device. It measures 5.4 inches and extends to 15.2 inches. The stylus is made of bronze, weighs 21 grams and has an omnidirectional rubber tip that's specially formulated for touchscreens. www.ipevo.com



▲ Field Force

The Getac E110 rugged tablet PC includes an Intel Atom N2800 1.86 GHz processor. Users can hot-swap the battery — switch a battery out quickly for another while the tablet is still running. Housed in magnesium alloy, the tablet runs Windows 7 Professional and an integrated GMA 3650 graphics processor. The 10.1-inch high-definition display is anti-reflective, making it more sunlight-readable. The E110 can survive three-foot drops, vibrations, and can operate in temperatures from -21 degrees to 60 degrees Celsius. <http://us.getac.com>

Eye Up High ▲

Canon VB-H41 is a pan/tilt/zoom IP security camera with a 20x wide-angle zoom lens. It includes a privacy mask function to block sensitive locations (such as ATM keypads or computer monitors) from the cameras' view while still allowing for a full range of motion. The lens offers 12x digital zoom, a wide 60.4-degree viewing angle and can capture potentially crucial image detail in low-light environments. A built-in SD memory card slot — which supports SD, SDHC and SDXC cards — lets users record still images or video during network outages, scheduled event triggers or manually through Admin viewer (VB Admin Tools reside on each camera's Web server). www.usa.canon.com/rss

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Action Leaders

Defining the next generation of government leaders.

What does the next generation of government look like? What are the major challenges in government, and how do we recruit, retain and train the next generation of leaders to solve these problems?

Lucky for you, I have answers.

I recently spent two days with 600-plus government leaders at the Next Generation of Government Training Summit co-hosted by GovLoop and Young Government Leaders. With speakers like White House CTO Todd Park, sessions on topics such as analytical insights and more, the audience was engrossed and focused on how to make big change in government.

I took away five key themes about the next generation of government leaders:

1 / Action-oriented. Throughout the Q&A sessions, these rising leaders framed most of their questions on how to actually make a new idea happen. Instead of just focusing on the new interesting idea, they were focused on implementation tips and real return on investment.

2 / Finding their purpose. Two of our most popular sessions were Lara Galinsky from the nonprofit organization Echoing Green on “Work on Purpose” and former White House official Frank DiGiammarino

on “Framework of Managing Your Career.” In these sessions, the speakers told attendees to focus their questions on their career and define their purpose. This message resonated, especially among audience

members who came to public service to improve society.

3 / Multisector problem-solving.

Attendees led overflow audiences to sessions like cross-sector collaboration, Code for America’s Abhi Nemani on tech tips, and WordPress Founder Matt Mullenweg on social entrepreneurship. Further, during breakfast conversations, many leaders said they want to focus on public-sector problems, but don’t see themselves as just a government employee for 40 years.

4 / Good rebellion. Carmen Medina, who worked for the CIA before joining Deloitte, kicked off the event with an amazing presentation on being a “Corporate Rebel – How to be an Intrapreneur within Government.” She focused on how to properly rebel to make change, the need to learn how to be uncomfortable, and how the power of optimism is the greatest act of rebellion. The next-generation leader may rebel against the status quo, but is learning how to do it with style and political savvy.

5 / Hungry for new approaches.

Attendees were eager for new ways to solve problems. This generation has an analytical bent, which led to overflow sections on data and analytics. In addition, the Stanford Design School made its way into government with a session on design thinking that required the exercise to spill out into the hallways.

So how can you make the most of this next generation of government leaders?

Provide them with problems to solve. Participants got revved up about problem

solving. There was overwhelming attendance for three problem-solving sessions, during which senior leaders gave examples of problems they faced and teams had 60 minutes to solve them. Attendees felt they made an impact, and senior leaders came away with new possible solutions. It’s a great way to match the action-oriented focus with your need for potential solutions to real problems.

Leverage their curiosity. As next-gen government leaders seek new approaches like design thinking, encourage this exploration and provide a funnel for these ideas. Have leaders organize brown bag lunches on new ideas and best practices. Allow one of your meetings to be facilitated in a new way or a small project managed in a new approach.

Reconnect to the purpose. The work of government matters, and as government employees, we work every day to deliver for citizens on important issues. Remind folks of the impact they are making — collect and share testimonials and encourage staff to visit their impact area. For example, if employees worked on an IT project that delivers food stamps, they should visit a grocery store to see how their job made it easier for food stamp recipients to make purchases.

The next generation of government is here, and we need to harness the new energy and approaches if we are going to solve the large public-sector problems we will face over the next decade. 

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

ENERGY STAR LOW CARBON IT CHAMPION: Dan Hoyt and University of Wisconsin Oshkosh Academic Computing Department colleagues.

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