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SOLUTIONS FOR STATE AND LOCAL GOVERNMENT

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Can we trust smart cities?

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RAPID APP DEVELOPMENT IN GOVERNMENT

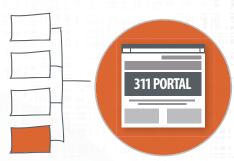
Traditionally, when government agencies wanted to develop an application for something like an online help desk or 311 portal, they were limited to two options. They could build it themselves, which enabled the customization needed but was costly, potentially risky and required IT expertise, or they could purchase a less costly, custom-off-the-shelf (COTS) solution that lacked capabilities. Now government agencies have a third option that combines the best of both worlds.

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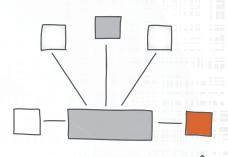
percent of IT professionals said custom building an app in house generally took more than 3 months.

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CIOs Await E-Rate Changes

he federal E-Rate program has pumped billions of dollars into new technology for schools and libraries since its creation in 1996. And its impact has been dramatic: When the program launched, just 14 percent of K-12 schools were connected to the Internet, according to the FCC. Today, virtually all schools and libraries have Internet access.

But after nearly 20 years, the program is showing its age. The FCC is updating E-Rate to phase out support for outdated tech like paging. In addition, the commission intends to streamline the review process for E-Rate applications, increase the use of bulk purchasing to drive down prices and refocus the program on broadband connectivity.

That final point is crucial. While E-Rate has done well connecting schools to the Web, most campuses lack the bandwidth

> they need, especially as e-learning technologies place greater strain on school networks. When the FCC surveyed schools and libraries in 2010, half of them reported connection speeds slower than the average U.S. household.

State CIOs are optimistic about the proposed E-Rate changes, but also wary of unexpected surprises con-

"For us, one of the biggest things that we want to see coming out of the reforms is additional funding for broadband availability, especially to rural areas and underserved inner city communities," said California CIO Carlos Ramos.

CIOs also want the FCC to make it easier to use E-Rate-supported broadband infrastructure to improve Internet access beyond the classroom. Montana CIO Ron Baldwin said FCC commissioners seem to be leaning in that direction. "One focus for them is - while serving anchor institutions first — to leverage that infrastructure which was music to my ears," he said.

edged that many of the proposed changes are beneficial. But she's also keeping an eye on revisions that could hurt her state, which relies heavily on the program. "We're seeing some of the lowest costs for Internet in the country in the state of Nebraska," she said. "We could lose that for our local

With billions of dollars at stake, Decker won't be the only CIO watching E-Rate revisions closely.

nected to the nation's largest funding source for education technology. A group of state CIOs - in Washington, D.C., for the NASCIO Midyear Conference - met with FCC representatives in May to hear about the changes.

to increase capacity for the state as a whole, Nebraska CIO Brenda Decker acknowl-

schools if E-Rate is changed significantly."

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Say What?

When people go online to vent about the government, they probably don't expect to get a response — but in South Carolina, some did. The state's Department of Health and Human Services (DHHS) contracted with the Social Analytics Institute at Clemson University to find people who were talking about its Medicaid services online. The SAI scanned websites like Twitter, Facebook and blogs to help the agency improve its customer service. All the comments had to be put into the proper context, said DHHS CIO John Supra, but once completed, the department was in some cases able to fix the issues that people had.

WHO SAYS?

"Kim Kardashian has 20.6 million Twitter followers. ... That means 20.6 million people out there have the ability to intersect and interact with one another on one sort of existing platform."

www.govtech.com/quote-June14



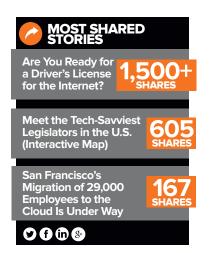
The age of Utah's incomplete municipal broadband network (some place the network's status at about 40 percent complete). The state is considering leasing the network to a private company for 30 years while the company builds it out and takes on the financial responsibility.

Move Over, Don Draper

As government agencies face the economic reality of generating alternate revenue streams, formerly nontraditional methods are becoming common civic strategies. Since 2011, the Washington State Department of Transportation has conducted a pilot project to allow advertising on popular online traffic and traveler information pages. During its first three years, the pilot generated \$168,177. The Legislature provided \$75,000 in start-up costs, which were paid off by early 2013.

But today? The project produces about \$7,000 per month, said Tonia Buell, the department's project development and communications manager for public-private partnerships.





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reader/comments:

66 While in the 'real world,' new and change drive innovation, many government IT departments seem so focused on dotting I's and crossing T's, they are either unaware or don't want to notice that the landscape changes in months, not years, as they are set up to do. They know how to make large, bulky front-end systems and complex data architectures, but don't seem to understand that being data-driven is not large-project-driven anymore.

BobbyTyson in response to Chief Innovation Officers in State and Local Government (Interactive Map)

66 Before you get your undies in a bunch: The Internet has never been anonymous. Each packet of data has to know exactly which physical location to get to and which physical location to return a result to. Without specific user identification, it has frequently been of poor cost effectiveness to track a person down without strong motivation. Google, Facebook and any other search or social media knows who you are, what you do online and where you are physically, even if you don't log in. Credit card companies and cellphone providers do the same.

Guest in response to Are You Ready for a Driver's License for the Internet?

66 I'll bet anyone \$1,000,000 there are more successful muni networks than unsuccessful ones (using any fair objective measure). The win column keeps piling up while the loss column remains static (some have even hopped over from the loss column to the win column). UTOPIA is not like most other muni networks, it has been hogtied by state law passed as a favor to cable/telecom lobbyists. Where muni networks are allowed to compete fairly, they are doing great and saving their communities tons of money. Competition is a beautiful thing. It should be encouraged, not mischaracterized.

MusicImissionry in response to Now 10 Years Old, Utah's UTOPIA Tries to Beat the Odds



Can Analytics Help Curb Violence?

Promising public safety initiatives are helping make city streets safer for all.

n April, the National League of Cities'
Big Ideas for Cities conference brought
together some of the country's most innovative mayors to address the problems
that keep them up at night, and violence
topped many of their lists. Mayor Michael
Nutter of Philadelphia identified the city's
murder rate, and the outsized effect it has on
its African-American male population, as a
public health crisis.

The question is: What data and tech tools might help the city address this crisis?

In his speech, Nutter laid out the basic data available: In 2013, 77 percent of Philadelphia's homicide victims were black. Of these 191 victims, 179 were male.

"Under any other set of circumstances — under any other measurement — this would be considered a public health crisis," said Nutter. "The No. 1 cause of death for black men and boys between 10 and 24 is homicide." Nutter recalled the advancement of safety technology in cars — from seatbelts to airbags to automatic braking for a distracted driver — and asked why there hasn't been a similar comprehensive technological response to the gun violence epidemic.

There is not yet a far-reaching, data-driven tech solution that addresses all facets of the crisis identified by Nutter, but there are promising public safety initiatives that are making many city streets safer for all.

For two decades, police departments have led the way in the use of data to drive performance. Beginning with New York City's CompStat, police departments across the country have been using statistical analysis to identify and respond to crime hot spots and criminal patterns.

More recently, technological advances involving sensors give police better real-time situational awareness. For example, ShotSpotter provides instant alerts to law enforcement when gunfire is detected.

But perhaps the true tech breakthroughs will be those driven by a combination of software and hardware. Predictive analytics generally offer better approaches to complex, systemic problems.

66 When combined with community policing, predictive analytics will greatly augment public safety.

In recent years, the Santa Cruz, Calif., Police Department has deployed a predictive policing program that uses a mathematical formula to assign risks of future crimes in areas as small as 150 square meters. The program initially focused on property crimes, and it has been hugely successful: In its first six months, it reduced burglaries by 14 percent. As the department gradually expands the program to analyze gang activity and street crime, it may prove to be a model for deterring violent crime in the streets of any city.

When combined with community policing, predictive analytics will greatly augment public safety. This can be seen in Chicago, where network analysis has helped the police move beyond hot spots to identify "hot people," or individuals who are likeliest

to be involved in future violence. Officers can then reach out to the most dangerous and vulnerable individuals to deter violence.

Philadelphia's own predictive probation program may show a way forward. A forecasting model based on machine learning assigns each of the city's probationers a risk of committing a violent crime. Based on this forecasting, the agency can better assign staff and other resources.

While the predictive models in Santa Cruz and Chicago provide the departments

> with the resources that help strategists identify places and people of interest, the next wave of enhancements will push those decision support tools to the field.

In March, Commissioner Bill Bratton announced a pilot program equipping New York City Police Department officers with tablets connected to its Domain Awareness System. This system keeps officers connected in real time to arrest records, transcripts of 911 calls, gun permits and other data relevant to their location and

the task at hand. This development turns officers in the field into sensors and head-quarters into a nimbler central nervous system.

Our country's epidemic of violence will be difficult to solve, but applying predictive analytics to both public safety and social service initiatives provides a start.

Stephen Goldsmith

is the Daniel Paul Professor of the Practice of Government at Harvard Kennedy School and directs the Innovations in Government Program and Data-Smart City Solutions. He previously served as mayor of Indianapolis and deputy mayor of New York City.





Can you describe your approach to security? The president's executive order really [got things rolling with] the National Institute of Standards and Technology's (NIST) Cybersecurity Framework, which was announced in February. Along with that, the National Governors Association (NGA) recently announced a call to action for states for security. We're aligning with the framework and the NGA's call to action, and implementing certain things. So we're taking a snapshot of where we are from a maturity standpoint, and saying here's how we align and here's how we're going to further mature what we're doing. We're looking at implementing things like enterprise governance, risk and compliance platforms to get a risk model and scorecard electronically of where agencies are from a risk standpoint. We're going to put that up on a dashboard so our governor and all the IT staff can see how

each agency ranks from a security standpoint and how agencies can improve.

Does working with the National Guard fall into any of your initiatives? We're looking to partner with them, and we've had some internal meetings. What we see the guard eventually getting the capability for is to conduct risk assessments at the various agencies, which aligns with the NGA's call to action because one of the things they talk about is risk assessment.

Have you already started identifying the security environment in state agencies?

We're doing that now but because of the manpower associated with that, a lot of the agencies are getting third-party risk assessments. We also have a selfassessment requirement for each agency and recently completed the National Cyber Security Review that went out to all the states. We had all our agencies fill out that survey to give us a baseline from a self-assessment perspective. Going forward we want to get the guard or a third party to do real assessments to score against where they assess themselves.

changing the scope of cybersecurity?

I am trying to align with all of those initiatives from the fundamentals — the strategic plan, the NIST framework, the NGA

How are these nationwide initiatives

strategic plan, the NIST framework, the NGA call to action and what NASCIO is looking to do — and put those things in place to build momentum. One of the great things with the NIST framework is it puts everybody on the same path of what to do for cyber and that's really going to build momentum for all the states to further mature where they are.

- Elaine Pittman, Associate Editor



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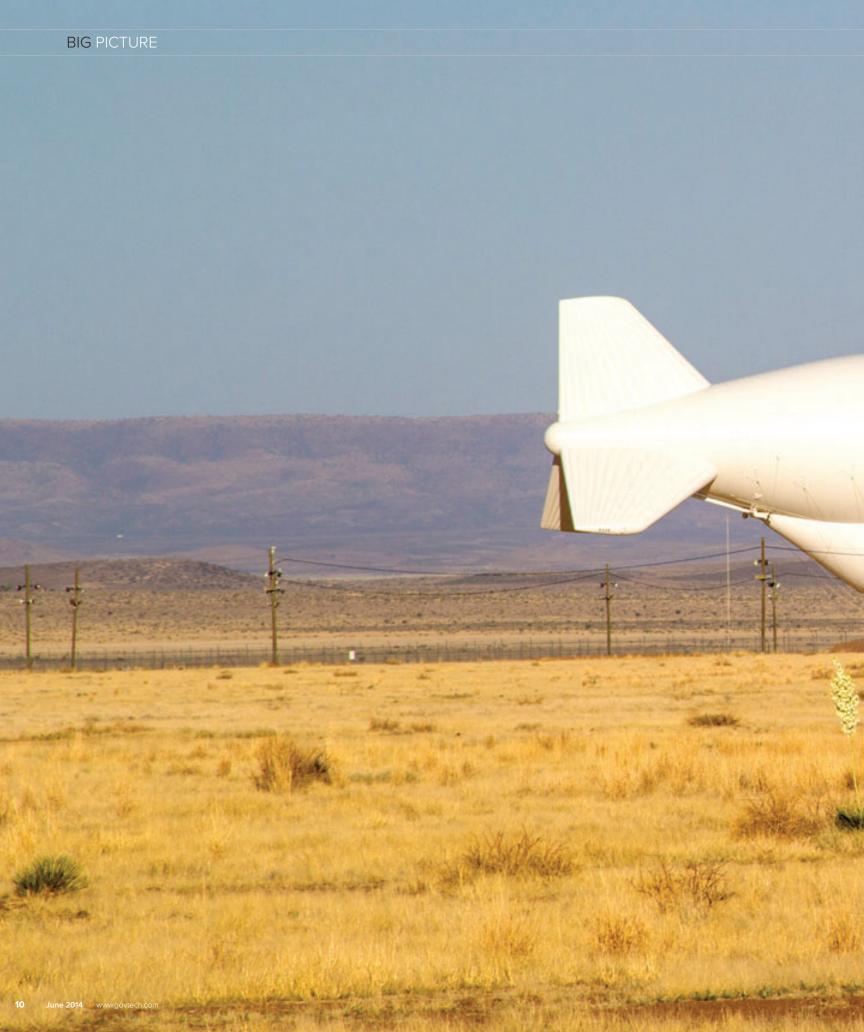
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BY JUSTINE BROWN / CONTRIBUTING WRITER

RISE OF THE PRIVACY OFFICER

Chief privacy officers are common in the commercial world and at the agency level. Is there a role for a statewide CPO?





s we become an increasingly data-based society, security breaches and the associated legal risks have escalated. According to the Identity
Theft Resource Center, 233 data breach incidents took place this year as of April 14, representing an increase of 18 percent over the same time period in 2013.

Companies like Target, Michaels and

Companies like Target, Michaels and Neiman Marcus know firsthand the reputational and financial damage that occurs when customers' private information is compromised. As a result, private-sector demand for data

security and privacy professionals has grown exponentially. Today many large corporations employ a chief privacy officer (CPO) to manage data protection and privacy concerns.



n the public sector, however, only a handful of statewide CPOs exist today. But as big data, Internet-based everything and mobile technology grow, the CPO role could become more commonplace in the public sector.

In the United States, the CPO position was reportedly first established in 1999 when Internet advertising firm AllAdvantage appointed privacy lawyer Ray Everett-Church to the newly created role. The move sparked a trend that quickly spread among major corporations. But the CPO position was truly solidified within the U.S. corporate world in November 2000 when Harriet Pearson was given the role with IBM.

"In late 1999 several of the large IT companies began hiring CPOs," said Trevor Hughes, CEO of the International Association of Privacy Professionals (IAPP), an organization of privacy officials that was formed in 2000. "There were very few of us then. But as the issue of privacy has grown and technology and business practices have created more and greater risks, the demand for privacy professionals has exploded."

Today, IAPP counts more than 14,000 members in 83 countries. And while the private sector leads that growth, government employees now represent a fair number of IAPP members, according to Hughes.

"We have over 1,500 public-sector members in the U.S. working in the field of privacy, and those numbers are growing," he said, adding that the typical CPO role includes elements of law and compliance as well as technological understanding and operational management skills. "More and more state agencies are recognizing the need to better manage privacy, to examine how they handle data within their organization, and to embrace the idea that someone needs to lead this responsibility."

Many states have employed privacy officers at the agency level for years. The Health Insurance Portability and Accountability Act (HIPAA) was a significant driver of those efforts, as it required states to appoint a privacy officer for each HIPAA-covered entity within a state. The federal government has also helped set the pace. Mary Ellen Callahan served as CPO of the U.S. Department of Homeland Security (DHS) from 2009 until August 2012.

"The DHS position was the first statutorily created CPO role in the federal government," said Callahan, who is now chair of Jenner & Block's Privacy and Information Governance Practice.

The DHS CPO reports to the department's secretary and can approve all required privacy documentation,

oversees the department's privacy practices and maintains an investigatory role.

In 2005, the Department of Justice followed the DHS' lead and created a CPO position as part of post-9/11 legislation. Its CPO reports to the deputy attorney general.

Soon after, the White House mandated that every federal agency have a senior agency official in place with responsibility for privacy. But Callahan said the CPO role and its effectiveness within a federal government agency varies significantly, depending on how the agency structures the role. For example, some federal CPOs sit within the office of legal counsel, while others are housed within a CIO or policy office.

"They tend to be scattered around a bit," Callahan said, "and the approach can be very different from one place to the next."

The same can be said for state government. Some states integrate the privacy officer role into the CIO's job, while others create a statewide privacy officer position or a CPO role within a specific agency like health, education, DMV or tax. But the majority of state government privacy officials today sit at the agency level rather than the state level.

"There are a number of privacy officials in state government, but there are very





few state CPOs," said Hughes. "When you think about it, it makes sense. There are not many state-level human resources officers either — many of the agencies within a state have their own version of that function. We see a proliferation of privacy professionals at the agency level, certainly within administrative units and within specific agencies like health and higher education. But in terms of a single CPO at the state level, that can be tough given the incredible complexity of issues that a single state sees."

hio, created one of the first statewide CPO positions in 2007. Daren Arnold, who worked in IT law and policy issues at the time, supported the state's first CPO. And when the original CPO left to take a job in the private sector, Arnold stepped up to replace him.

Arnold works in the Office of Information Security and Privacy, a division of the CIO's office. He said one challenge of the job is helping people understand what he does versus what Chief Information Security Officer (CISO) David Brown does.

"There are distinctions in the security and privacy areas that people often confuse," Arnold said. "I work closely

with our CISO and rely on him to work on the information security part of privacy as well as all the other information security pieces. He relies heavily on me to help him understand compliance requirements, breach identification, identify theft protection services, etc."

Under Ohio law, each state agency must have a data privacy point of contact. Those individuals coordinate their agency's privacy efforts and ensure compliance with Ohio laws around privacy and access to personal information. Each agency must also complete an annual privacy impact assessment. Among other things, Arnold's office helps agencies assess their risks and identify privacy protections they need to take.

"Privacy professionals are really here to help state government navigate the waters, whether it's on the compliance side or just pointing out big issues and guiding them in making decisions," Arnold said. "There is a misconception there sometimes, sort of a reputational problem. We aren't there to always say no, but to help agencies complete the work in a way that respects people's privacy and their personal information."

In West Virginia, Sallie Milam serves as the first statewide CPO. Milam started

out as CPO of the West Virginia Health Care Authority leading compliance efforts for HIPAA. But in 2013, Gov. Earl Ray Tomblin asked Milam to expand her role and lead the privacy-related activities of the executive branch departments. In addition, each department was assigned a privacy officer to communicate policies with their agencies and employees, and to further operationalize the program. An enterprisewide Privacy Management Team was then established to promote privacy protection. The team comprises privacy officers from each executive branch department, the state CISO and others.

"The CISO role and the CPO role go together," Milam said. "Without good security, you won't have privacy. Security is an essential part of the equation; it's the other side of the coin. So we are a tight partnership — we collaborate, we attend each other's team meetings and we support each other's priorities."

Milam's office and the Privacy Management Team work together to develop privacy policies and procedures for the executive branch departments, while the CISO and other subject-matter experts lend their expertise to support the team's objectives.

"In government, you are bound by laws — what you can disclose and to whom,"

Milam said. "Changes often require updated policies and training. We do that on a yearly basis. We set policy and issue it. Then the departments implement it and we assist them with implementation. We also provide online privacy awareness training that's delivered to every employee during the onboarding process."

gies; promoting smart online behavior by offering timely resources for consumers, parents and educators; working with companies on privacy trends and best practice guidance; and advising the attorney general on privacy matters. McNabb's role therefore focuses on consumer privacy, individual privacy and

"More and more state agencies are recognizing the need to better manage privacy, to examine how they handle data within their organization, and to embrace the idea that someone needs to lead this responsibility."

Milam's office also assists agencies with incident response, helping them evaluate an incident and determine the type of response warranted.

"Continual assessment and refinement is key to the CPO role," she said. "The laws change, the technology changes, needs change and people's expectations change. At one level it's about compliance to law, but at another level it's managing risks and trying to meet the public's expectations for the privacy of their data."

alifornia originally started down the statewide CPO path, but has since changed course.

The state's standalone office for privacy protection became an independent agency 12 years ago, but was absorbed into the attorney general's office as part of 2012 budget cuts. Its original CPO, Joanne McNabb, is now the director of privacy education and policy within the Office of the Attorney General in the California Department of Justice.

The California Privacy Enforcement and Protection Unit has multiple missions, including: enforcing state and federal privacy laws; empowering Californians by showing them how to better control their personal information when they use innovative technolo-

civil liberties rather than ensuring state compliance to privacy regulations like the CPO roles in Ohio and West Virginia.

While California's statewide CPO role was eliminated, the state simultaneously stepped up efforts to place privacy officers at the agency level. "In the last four years or so, policies have been developed and resources provided to give more training and more guidance to the privacy coordinator program in California," McNabb said. "By policy, not by law, agencies are now required to have privacy coordinators responsible for coordinating privacy programs within each state agency. This includes making sure key privacy elements are in place throughout the agency."

ome believe the low number of statewide CPOs is due primarily to limited state budgets over the last several years. Now that budgets are improving, the position may grow. South Carolina, for example, is searching for a statewide privacy officer.

"The budget situation hampered states in terms of appointing CPOs, as new positions were hard to come by," Arnold said. "But in addition to that, I think state and local government tend to be just a little bit behind the curve. The CPO role by and large was developed in the private sector

and to a certain degree in the federal government. The potential for it to catch on at the state level is certainly there."

Milam thinks the statewide CPO role will grow due to changing and evolving technology. "As more data becomes electronic, the risks get vastly greater, and that can trigger a lot more laws that govern the data," she said. "At the same time, the public's expectations are growing and compliance obligations are expanding. I imagine state governments will respond by putting more CPOs in place."

Regardless of whether governments employ a statewide CPO or keep the privacy coordination and compliance function at the agency level, the bigger issue is ensuring that states have experienced privacy professionals in place to incorporate privacy protection into the earliest stages of planning, also commonly referred to as "privacy by design."

"With big data and the use of both government information and private-sector information, it's really important to have clear privacy guidelines," Callahan said. "The critical issue is making sure privacy issues are integrated into the program life cycle — developing and integrating privacy throughout the agency and throughout all the decision-making processes. In a bureaucracy, that's the whole goal: If you integrate good privacy practices into your processes from the get-go, it's difficult to unintegrate them."

Meanwhile, Hughes said the unprecedented growth of IAPP demonstrates the enormous demand for privacy leaders. He recommends that any upwardly mobile person ensure they have a strong base of knowledge in privacy as it becomes increasingly important to the private and public sectors.

"We see privacy as not only an area of growth, but [also] an area of need," he said. "Today there is recognition in the market-place that privacy knowledge is an absolute mandatory skill set in order to manage the risks of the information economy. If organizations are not immediately demanding this today, we are very confident they will be in the near future."

justinebrown@comcast.net

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ENHANCED CYBERSECURITY SERVICES (ECS) PROVIDE AN EXTRA LAYER OF PROTECTION

CenturyLink offers a new tool in the fight against cyber attacks

Intensified media attention and public outcry around recent data breaches have heightened public awareness of the real impacts and costs of inadequate IT protection, making many organizations question their own networks' immunity and unknown vulnerabilities. And while people tend to blame the perpetrators for other criminal acts, the invisibility of cybercriminals can cause people to blame the victims for having ineffective cyber protections.

MITIGATING GOVERNMENT-TARGETED THREATS

One of the most insidious of all cyber infections is something called a "bot" that can execute tasks on behalf of cybercriminals whenever they want. Despite having security protocols in place, a bot can gain entrance to an organization's network by hitching a ride on a link or email attachment and then sit undetected on a computer for minutes, months or even years. Once activated, a bot can reach out from a commandand-control master location and allow criminals immediate entry into an organization's internal network.

Unfortunately, government organizations are not immune to this sort of cybercrime and repairing cyber damage can be a time consuming and very expensive process. Even cyber intrusions that aren't highly sophisticated can take up to 120 days to detect. And once threats have been embedded on a network, the cost to mediate them can add up to millions of dollars.

CenturyLink, the country's third-largest telecommunications company and a leading network provider, is helping spearhead the fight against cyber intrusions into the IT systems of government agencies and enterprise organizations. CenturyLink's extensive work in the cybersecurity space has led it to form a valuable relationship with a powerful ally in the nation's struggle against cybercrime: the U.S. Department of Homeland Security (DHS).

PRESIDENTIAL MANDATE: PROTECT CRITICAL INFRASTRUCTURE

DHS has a presidentially mandated mission to protect critical infrastructure sectors that, should they be negatively impacted, could threaten national security and prevent our government and citizens from conducting normal business.

Those 16 critical sectors include the broad building blocks of our nation's infrastructure and economy, such as state and local governments, the defense industrial base, energy, healthcare, communications, financial services, food and water, and transportation sectors. You can see the federal government's full list at www.dhs.gov/critical-infrastructure-sectors.

CenturyLink is one of only two commercial service providers authorized by DHS under an innovative public-private partnership to provide Enhanced Cybersecurity Services (ECS) to organizations within these critical infrastructure sectors. The ECS program's mission is to enhance the sharing of sensitive, government-furnished information with ECS providers and participants to help protect America's critical infrastructure sectors from advanced cyber threats. ECS is one of the federal government's weapons of choice in America's battle against cyber attacks.

As an original provider under the 2010 pilot program that became ECS, CenturyLink has been involved from the start, which gives it the industry's highest level of ECS technical and operational expertise. Through its long-standing relationship with DHS, CenturyLink is able to provide ECS customers with exclusive security information and powerful protections that are unavailable in the standard commercial marketplace.

"Part of the underlying requirement that allows us to operate in this space is our security infrastructure," says CenturyLink Government's Senior Vice President and General Manager Diana Gowen. "DHS knows it can trust us with sensitive ECS information and that it will be handled appropriately when inserted into our service offerings for customers."

HOW IT WORKS - THE ECS ADVANTAGE

The path from threat indicator to threat eradication begins with DHS, which works with agencies across the federal government to gather a broad range of sensitive cyber threat information. On a frequent basis and during sudden emergency windows of action, DHS supplies those detailed threat indicators to CenturyLink, which integrates that data with its own threat indicators into the ECS operational system.

Through the use of threat indicators, CenturyLink provides ECS customers with network-based inbound email filtering that neutralizes dangerous email strings or attachments, notifies network administrators and prevents harmful code from becoming embedded into an organization's IT infrastructure. The company also provides ECS customers with Domain Name System (DNS) protection and notifications, which prevents users from accessing malicious DNS sites and provides protection from infected machines establishing command-and-control links to external entities.

Protecting critical infrastructure against evolving cyber threats requires a layered, dynamic approach – one that evolves to confront new technologies and threats. ECS isn't a silver bullet that deflects all cyber hazards, but it is an enhancement that is meant to work in tandem with the standard security protocols agencies should already have in place. "Organizations should do everything to protect every security layer," says Gowen. "This exclusive content from DHS enables us to see things

Is Your Agency Vulnerable?

Certain government sectors maintain data files of particular interest to cybercriminals who share, buy and sell blocks of this personal data internationally. This can take the form of a mosaic effect, whereby small bits of seemingly innocuous data are pieced together from different sources to tell a bigger story.

Government agencies should consider whether they have adequate security protections in place for these types of data, which include public records from:

- Departments of motor vehicles
- Franchise tax boards
- Departments of veterans affairs
- State medical facilities
- Departments of public health
- Mental health services
- Departments of correction
- Divisions of human resources and employee benefits
- Public employee retirement divisions
- Social services divisions
- Public K-12 schools and universities

others can't, to defend against things that others are unaware of and to provide specific protections that can't be delivered any other way."

TRANSCENDING STANDARD SECURITY

CenturyLink has a full complement of augmented cybersecurity services for a well-rounded security posture, as well as a broad array of ECS engineers, software programmers, threat analysts, subject matter experts and trainers. This formidable partnership between CenturyLink and DHS provides state and local government ECS customers with 24/7, state-of-the-art defenses against network intrusions and cyber attacks.

Gowen says, "Given the ever-growing sophistication of malware and criminal operators, now is a smart time to reach out to us for a conversation on the sensitive records your agency needs to protect."

Learn how CenturyLink ECS can complement your existing security portfolios to protect against cybercriminal activity in the government environment – and protect the constituents who count on you for safety – at www.centurylink.com/gov or email the CenturyLink ECS team at ecs@centurylink.com.



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REBECCA JESCHKE

Digital Rights Analyst, Electronic Frontier Foundation

EXPERTS SAY
TECHNOLOGY HAS
OUTPACED POLICY,
BUT THAT'S NO
REASON TO GIVE UP.

RETHINKING PRIVACY

PRIVACY ISN'T DEAD, IT'S JUST GOING THROUGH AN IDENTITY CRISIS. AS POLICYMAKERS STRUGGLE TO DEFINE A MEANINGFUL ROLE FOR THEMSELVES IN ONE OF THE MOST CONTENTIOUS AREAS OF AMERICAN POLITICS, THE ADVANCEMENT OF DIGITAL TECHNOLOGIES ONLY MAKES THE ISSUE LOOM LARGER. EACH CONVENIENT NEW FEATURE DEVELOPED BY APPLE, GOOGLE OR FACEBOOK FUELS A PUBLIC CONVERSATION ABOUT THE BORDER BETWEEN CUTTING-EDGE AND CREEPY. PRIVACY IS ALMOST UNIVERSALLY VALUED BY HUMANITY, BUT TECHNOLOGY IS ADVANCING SO QUICKLY THAT PEOPLE HAVEN'T EVEN HAD TIME TO SETTLE ON A USEFUL DEFINITION FOR THE WORD, LET ALONE A SOLUTION THAT EVERYONE CAN LIVE WITH.

COLIN WOOD / STAFF WRITER

he state of free speech in America at any point in modern history can be fairly accurately sampled by looking at what live performance artists, particularly stand-up comedians, are allowed to do and say. From 1961 until his death in 1966, Lenny Bruce was repeatedly arrested for the obscenities he used on stage, including one arrest directly following his use of the Yiddish word "schmuck." The Lenny Bruce era demonstrated a nation's lofty but fading sense of propriety, yet it also demonstrated the relatively high level of privacy Americans enjoyed. Pretty much the only way to have one's privacy invaded in those days was to get arrested for something, a truth made evident when you consider that the president was rumored to have had a secret affair with the nation's most iconic sexpot. Today, the president can't even sneak a Marlboro without making the front page.

From 1966 until 2005, which is, incidentally, the same period that spanned Richard Pryor's legendary career, America experienced a golden age of privacy. The puritanical and somewhat naïve outlook of the 1950s was quickly fading in the late 1960s, and consequently, people no longer cared as much about what others did or said. And even better for privacy, today's digital technologies hadn't yet arrived en masse. It wasn't until sometime after the

year 2000 that everyone began carrying their own personal "gotcha" devices.

And people did start getting got. In 2006, cellphone video captured actor Michael Richards, of *Seinfeld* fame, in a racist, profanity-laced outburst aimed at a black audience member

during a set in West Hollywood, Calif. Video of the incident posted to YouTube turned what would have been a single bizarre occurrence into an ongoing national discussion as the scene was viewed over and over again. Had that same incident happened 10 or even five years earlier, before most people had smartphones, it probably would have become urban legend or perhaps even gone completely ignored

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66 [Privacy] can mean everything and it can mean nothing. That can have some dangerous consequences.



by the public. The Richards incident was the start of a new phenomenon in the comedy world and the world in general.

Suddenly what was once considered a quasi-private setting was compromised by the power and omnipresence of the smartphone. But it's not just celebrities

> who get busted now, and it's not just comedy clubs where the busting happens — it can happen to anyone, anywhere.

he concept of privacy simply covers a lot of territory, and that's part of the problem, said Paul

Schwartz, professor and co-director at the Berkeley Center for Law and Technology. "It can mean everything and it can mean nothing," he explained. "That can have some dangerous consequences."

For instance, privacy can involve the right to make intimate decisions, or maintaining control of sensitive information, or deciding when and how to share data. What's more, the environment is getting more complex. As digital sensors and cameras become cheaper, an emerging Internet of Things is transforming an issue that continues to derive context from a bygone era.

The tools for controlling privacy in years past were eyes, ears and lips, but the dynamic has since changed radically. "We lived in neighborhoods and you knew certain things about people in your neighborhood, and it was a relatively static world in that regard," Schwartz said. "Your parents would tell you to draw the blinds, or you would gossip about people and share information about neighbors."

Now Internet-enabled smartphones are to the privacy discussion what shoulder-fired rocket launchers are to the Second Amendment debate. But when it comes to privacy, public mindset and government policy haven't caught up to reality.

One reason policymakers are struggling so much with emerging privacy issues is that the issues themselves are simply unprecedented. "It's a huge challenge, because it becomes what lawyers call 'a normative issue," Schwartz said. Researchers can poll people about



new technologies or devices, or developers can make guesses about how people will react to the introduction of new products, but there's no way to establish a reliable plan for technologies that have never been used before.

"A term that you frequently hear is that people feel something is 'creepy," he added. "People in industry will talk about avoiding 'creeping out' your customers or you get the privacy backlash." Even the most competent technology companies don't know where to draw the line sometimes, because they're doing something new. Now that everyone has spying tools, everyone is trying to figure out, together, how they should be used.

For practical purposes, Schwartz said, it is not wise to act as though privacy is dead, because the stakes are high. Vigilance is needed, he said, because the victim of ineffective privacy legislation is the public.

The National Do Not Call Registry is an example of privacy legislation done right, Schwartz said. "That is one of the most successful privacy laws of the last 15 years," he said. "It's viewed as a privacy issue, but what you can really view it as is a 'don't bug me when I'm eating dinner' law. You don't care that you're known as a person who might contribute to a certain charity. What you really don't want is to be interrupted. It's kind of a tax on your time. So privacy, we find out, is sometimes just having control of your time or limiting access to yourself in certain contexts."

But other times legislation doesn't work as intended or becomes out of date. The Song-Beverly Credit Card Act of 1971 protects people's privacy by limiting the amount of data that can be collected about them when they buy something. Essentially, the act prohibits the collection and storage of a customer's personally identifiable information as a condition of sale.

In 2011, the California Supreme Court ruled that the act prohibited merchants from collecting customers' ZIP codes at checkout. The problem, Schwartz said, is that the ruling closed the door on the security benefits of asking for a ZIP code in certain settings where it makes sense to do that, like at a gas station or online. The law was eventually adjusted because those instances were determined to be exceptions outside the spirit of the act, but "there was an amazing amount of litigation," Schwartz said, "to figure out all the various

instances in which additional information should or should not be permitted."

For the most part, policymakers don't understand modern technology very well, Schwartz contends, and they're not anticipating technological disruptions in society. There should be groups dedicated to imagining all the various scenarios that could arrive, he said, as is done in the intelligence community, because there will be disruptions and privacy is worth safeguarding.

Fred Cate, professor at the Maurer School of Law at Indiana University, isn't surprised that legislators and other policymakers don't have a good grasp on the tech industry's latest and greatest. "I mean, who really does have a grip on emerging technologies and the issues they present?" he said.

And he agreed that the lack of a good single definition for privacy is holding back progress. "[Legislators] say, 'Privacy is a very personal concept, and it's really up to how the individual sees it," said Cate, who researches privacy, cybersecurity and health information. "You can't regulate anything if you say the thing that we're regulating is up to how the individual sees it."

The lack of clear objectives on privacy leads to ineffective policy, Cates said. He points to examples like the Children's Online Privacy Protection Act, which requires websites with adult content to make users enter birthdates before proceeding. Rather than protecting children online, the law does little more than punt privacy responsibility to the consumer — a common theme of tech-driven privacy legislation.

"Another good example is security breach notification laws," Cate said. "We don't have any idea what to do in response to breached information. So

REDEFINING NORMAL

California Lt. Gov. Gavin Newsom is of the mind that yes, privacy as we've known it is dead in today's more transparent world. "We're going to have to reconcile that the two things need to go together: privacy and transparency," he

told *Government Technology* late last year.

Mindlessly downloading an app onto a smartphone, like so many of us do, is a de facto forfeit of vast amounts of personal information. Newsom blames

a lack of transparency about what we're giving away for the phenomenon.

"We have to have more hypertransparency in a world where privacy is being challenged by these tools of technology," he said. He went on to predict that expectations of privacy will continue to evolve, and things that might have previously been perceived as shocking will soon be accepted as normal. what do we do? We say, 'Let's just tell everybody about it. They're not going to know what to do either, but we'll all be worried and ignorant together."

One of the worst punts, Cate said, are terms of service agreements. "Every time you update your iPhone there are 65 screens of policy to read," he said. "But the average consumer isn't a privacy expert, nor does he have the legal background to soundly evaluate if the agreement is fair."

If privacy means controlling data, then privacy is indeed dead, Cate said. But it should be possible to protect citizens from the harmful misuse of their data. He argues that companies need to make

most of the so-called privacy legislation we've seen in recent years I think shows a lack of ambition."

on't tell Rebecca Jeschke that privacy is dead. Jeschke is a digital rights analyst for the Electronic Frontier Foundation, a civil rights nonprofit focusing on the digital world. That's a cop-out, she said.

"There are studies about how kids, who supposedly don't care about privacy, code their Facebook messages to make sure no one they don't want to see what they're doing sees what they're doing,"



service agreements clear to consumers, and those companies should be held accountable when harmful misuse of data occurs.

Another problem is that data-oriented wrongdoing doesn't have its own definition of harm — it just piggybacks on existing laws, Cate said. Someone who stalks another person using their data is subject to prosecution under stalking laws. Someone who defrauds another person using their data is subject to punishment under fraud laws. Data privacy law itself doesn't really exist in any comprehensive sense.

"I don't think our aspirations have caught up to where our technologies are now," he said. "To be honest, Jeschke said. "Privacy is really important and it's deeply contextual, and I think anyone who says that privacy is dead has an agenda, and it's only dead if we say it is."

She said the current environment often forces consumers to give up personal data to get something they want. "I don't enjoy Facebook, and yet I can't really not be on it, or I'm not going to see pictures of my nieces and nephews," she said. "Do I really want this app or not? I really don't want to read this 25-page terms of service, but I want that functionality."

Similarly, when Jeschke scans her transit card to board various forms of public transit in the San Francisco Bay Area, she's giving up a little privacy because she's trackable, and in exchange she gets the conveniences and discounts the technology brings. "One of the things that infuriates me is that I have to make that choice between convenience and privacy, when you could use encryption on that card and give me both," she said.

Rarely do consumers understand the ramifications of the privacy trade-offs they're making, Jeschke added. "Transparency is only one level of it. Then you need to make sure people know what that means."

As consumers become more sensitive to privacy threats, she said there's a great opportunity in the market for technology companies that consider privacy from the beginning. "We're trying to encourage developers to think about what they would want as a customer instead of what makes it easier for them as a software creator."

Peter Swire was President Clinton's chief counselor on privacy, he's worked under President Obama on privacy issues, and when the NSA domestic surveillance scandal hit, he was one of five privacy experts who wrote *The NSA Report: Liberty and Security in a Changing World.* He said policymakers can't throw in the towel on privacy.

"In every decade, people have written that privacy is dying," Swire said. "In most ways, though, privacy is a bigger issue today than it's ever been."

Swire pointed out that the number of privacy and security rules has skyrocketed in recent years to keep up with the explosion of data generation and collection. In May 2013, IBM reported that 90 percent of all data in existence had been generated in the previous two years, and the marketplace reflects that.

There's still data that needs sound national standards of control, just as the Health Insurance Portability and Accountability Act created national standards for medical data, he said.

"The people who think privacy is dead tend to think that privacy is a lost cause," Swire said. "My response is that we still need to govern the data carefully or else identity fraud will flourish." (a)

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QUARTERLY REPORT / DIGITAL COMMUNITIES

BY TOD NEWCOMBE SENIOR EDITOR

SMART TECHNOLOGY BRINGS BENEFITS, BUT CAN GOVERNING BE REDUCED TO AN ALGORITHM?

Rio de Janeiro, Brazil's second largest city, is about to be flooded. Not by storms, which have proved devastating in the past, but by tens of thousands of soccer fans coming to watch World Cup matches in the city and at other venues around South America's largest country. And it's just a prelude for what will happen in 2016 when Rio hosts the Olympics and millions of visitors will swarm the city to attend hundreds of sporting events.

The logistics of moving so many people around in a few short weeks, while still running the daily operations of a city of such size, would be daunting for any government. But public officials in Rio have a secret weapon. Located in a building that looks like a glass cube, the Centro de Operacoes is a high-tech control room for the entire city, packed with computers, giant screens and hundreds of workers who can monitor everything from water levels in streets after a rainstorm to developing traffic jams. Centro is much more than a large-scale monitoring system. In some ways, it's a vision of the city of the future that captures data streams from thousands of sensors, as well as other sources, then aggregates and analyzes the constant flow of information.

The goal is to make decisions in real time as events or emergencies occur, mitigating their impact on the daily lives of Rio's residents while making sure the city's budget is used as effectively and efficiently as possible. Rio's *Centro de Operacoes* represents

one way that cities can break down silos and use data intelligently so that government operates as a true enterprise, rather than as a series of loosely linked departments and agencies.

Other cities around the globe have different approaches, but with the same goal in mind: link networks of miniaturized electronic sensors with big data analytics and algorithms so that cities are better connected, integrated and able to analyze information more cohesively in order to enhance their efficiency. A smart city is a dynamic city that makes living in a dense urban environment more civil and more rewarding. A smart city is not only attractive to people who want to live there, but also to companies that want to do business there.

So far, a cluster of cities around the world have become leaders in sensor technology and are beginning to show promising results. Besides Rio, there's Santander, Spain; Singapore; London; Seoul; Montreal; and Chicago. Dozens of smaller cities have launched more limited solutions, hoping to capture direct and indirect benefits from the technology.

Some have called the smart city trend the most transformative thing to happen to cities since the urban renewal movement of the 1960s. But others have cautioned that the technology has yet to prove it can fully deliver on its potential. "What you are seeing are demonstrations of the

ABOUT THIS REPORT

The Digital Communities Special Report, which appears quarterly in Government Technology magazine, offers indepth coverage for local government leaders and technology professionals. It is part of the Digital Communities program, a network of publicand private-sector IT professionals working to improve local governments' delivery of public service through the use of digital technology. The program — a partnership between Government Technology and e.Republic's Center for Digital Government - consists of task forces that meet online and in person to exchange information on important issues facing local government leaders and technologists.

Look for *Digital*Communities quarterly reports in Government
Technology magazine in March, June, September and December.



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possible," said Jennifer Belissent, a principal analyst with Forrester Research. "But other than pilot projects at this stage, not much is happening."

Belissent and others have questioned the business model behind many sensor-based solutions that have been rolled out in recent years. Some critics have raised broader concerns about the resiliency of the software that controls hundreds or thousands of sensors and the dependency on algorithmic tools to decide how city services should operate, ultimately impacting critical fiscal decisions. The risk is that cities are rushing to

deploy new technologies without much risk assessment, according to Anthony Townsend, a senior research scientist at New York University

and author of Smart
Cities: Big Data, Civic
Hackers and the Quest
for a New Utopia. He
worries that governments aren't prepared
to deal with situations
should technology fail.
"We have become so
dependent on GPS,
for example. Yet only
a handful of countries have studied the
impact of that reliance

on their economy,"

he said. "Governments tend not to take these risk factors into account. Certainly not cities."

/ SMART • QUESTIONS:

How resilient and secure is smart city software?

How will sensors affect privacy?

What's the business case for sensor-based solutions?

Should sensors and analytical software replace human decision-making?

THE WORLD'S CITIES GROW

For America's cities, it's the best of times and the worst of times, to paraphrase Charles Dickens. In 2012, new census estimates showed the population increasing in large cities faster than the nation as a whole,

and the growth is accelerating. From New York City and Washington, D.C., in the east to San Antonio and Houston in the southwest, urban population growth has accelerated.

Cities also have gained a cachet among millennials, young families and empty-nest baby boomers as a fun place to live and work. For anybody who remembers just how gritty and risky city life was back in the 1970s and '80s, today's urban experience is far more positive. At the same time, economic activity in urban metro areas has grown in importance. The 388 metro areas in the United States make up 84 percent of the nation's population and 91 percent of gross domestic product (GDP); the 100 biggest metro areas generate 75 percent of the GDP, according to the Brookings Institution.

The upswing in urban population growth is playing out globally. In 2010, just more than half of all people in the world lived in an urban area. By 2030, six out of every 10 people will live in a city; by 2050 the proportion will rise to seven out of 10, according to the World Health Organization. Likewise, global cities control a greater share of the world's economic power. An estimated 40 urban metro areas produce two-thirds of the world's economic output and are highly innovative, according to the New America Foundation, a Washington, D.C.-based think tank.

But the growth and buzz has occurred while fiscal problems from the Great Recession continue to roil city budgets, forcing cutbacks in hiring and pay for city workers, according to the National League of Cities. Since 2009, cities have cut more than a half million jobs from their payrolls. At the same time, however, the cost of doing government business keeps growing, putting pressure on budgets that have seen declines in revenue for

every year between 2006 and 2012. City finance officers cited rising costs for infrastructure and public safety, as well as health-care benefits and pensions, while federal and state aid to cities continues to decline, according to the National League of Cities.

With population growth and economic power rising in so many urban areas at the same time that city governments have their hands tied by weak revenue and tight budgets, the situation has created fertile ground for innovative uses of technology. The idea of installing thousands of sensors within a city's infrastructure and linking them to computers that could intelligently process and analyze the information gained broad attention several years ago from two start-fromscratch smart cities: Masdar in Abu Dhabi and Songdo in South Korea.

Using sensor-based technology so pervasively in these cities has been called visionary, but both have run into problems, partly driven by the economy, but also by a lack of people and businesses. As a result, attention has shifted to other examples of sensor-based smart cities, where the approach is different, but the goals are similar: better services, more efficiencies and greater overall sustainability for infrastructure as well as the environment.

"Sensor technology has the power to provide data about what's going on in a number of unprecedented ways," said Steven Koonin, director of New York University's Center for Urban Science and Progress. "It changes the way we can understand, manage and study cities. Citizens can be better engaged by having more city data available."

The idea of having sensors on every utility pole, water line, bus, train and traffic light has been revised to a more pragmatic expectation on how the technology should be deployed and

SENSORS AND CITIES

SMARTER OPERATIONS:

Sensors can measure, track and locate a wide variety of factors in the urban environment. Data from sensors can be analyzed and used to run systems more efficiently and effectively, improving services for citizens while reducing the cost of government operations.

BIG BUSINESS:

By 2020, cities are expected to spend \$20 billion on sensor technology.

SENSOR-BASED APPLICATIONS INCLUDE:

traffic congestion transit parking environmental monitoring waste collection water systems crime and public safety

CITIES WITH SENSOR-BASED SOLUTIONS:

Chicago

Montreal Rio de Janeiro, Brazil Santander, Spain Singapore

ECONOMIC POWER:

The 100 biggest metro areas in the U.S. produce 75% of the nation's GDP.

POPULATION CENTERS:

By 2030, six out of 10 people in the world will live in cities; the number will reach seven out of 10 by 2050.



SHRINKING WORKFORCE:

U.S. cities have cut more than 500,000 jobs from their payrolls. City revenue declined every year between 2006 and 2012.



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used. "Many big cities are already sitting on a lot of data," said Katharine Frase, chief technology officer of IBM Public Sector. By working with what a city already knows and doing a better job of interpreting the existing data, cities can then deploy fewer sensors and get better results, she said.

Frase cites the example of leaky water systems. "Cities spend a lot of money to obtain the water, purify it and put it into circulation," she said. "When they lose that water through leaks, they can't generate revenue off of it. Adding sensors sounds like a great solution, but where do you know to put the sensors?"

The answer is by pulling data from existing infrastructure, such as pressure meters and other non-smart sources and then analyzing where the changes in pressure are occurring and when. "Using those existing tools, you can most likely figure out where the leak is, and now you are in a better position to deploy sensors," Frase said.

Another opportunity has sprung up as cities retrofit old-fashioned mercury vapor streetlights with more energyefficient LED lights. It turns out that the housing for LED lights is a perfect place to pack a lot of sensors - and even cameras. Link intelligent street lights in a downtown district into a network and you have the makings of a smart city. "We're marrying the Internet with advanced Web services and low-cost miniature electronics. and delivering it as a new service to cities," said Hugh Martin, CEO of Sensity System, a company that designs and produces intelligent street light networks. The technology has been deployed at Newark, N.J.'s Liberty International Airport to monitor baggage and foot traffic in one of the terminals. Downtown Las Vegas has also installed intelligent street lights

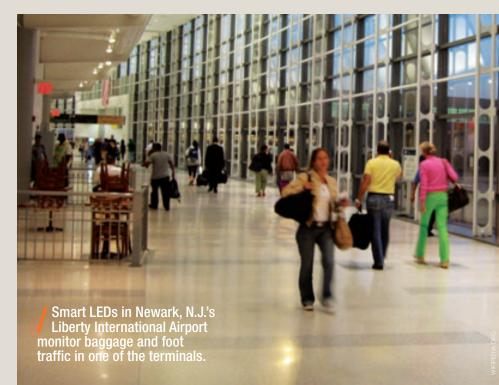
to monitor air pollution levels, foot traffic and for surveillance purposes.

Still, when it comes to fully understanding the capabilities of sensorbased smart cities, it's hard to ignore the showcase projects because they put so many of the capabilities at play in one location, impacting citizens, services and government at once. Rio de Janeiro partnered with IBM to create an environment that could stream data from traffic and public transport, municipal and utility services, emergency services, weather feeds and information sent in by employees via phone, the Internet and radio into a single analysis center. Data is aggregated over time to investigate aspects of city life and government operations. Predictive modeling software lets officials operate and manage the city as events unfold, from unexpected traffic jams and sudden rainstorms, all in real time. The aim of the network according to Mayor Eduardo Paes, is to eliminate the silos between departments, combine data and help the city operate efficiently at the enterprise level.

Santander, Spain, has taken a less centralized approach to using sensors. That's partly because the city is a test-bed site, financed by an \$11.1 million grant from the European Union. Santander is located on Spain's northern coast and has a population of 180,000. Over a four-year period, the city, the University of Cantabria and several private-sector partners have installed more than 20,000 fixed and mobile sensors throughout Santander that cover several initiatives aimed at improving parking and traffic; effectively managing energy in schools, buildings and street lights; increasing the efficiency of waste collection and water management; as well as improving citizen services, such as information about public transit and shopping.

The impact of the sensor projects on the city varies, according to Mayor Inigo de la Serna, but some have shown promising results.

"While we need a bigger timeframe for assessing the savings we are achieving, in the case of street lighting,



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we can easily achieve a cost savings between 30 and 40 percent," he said.

MAKING SENSE

As Santander, Rio and other cities have demonstrated, sensor-based solutions have the potential to impact a broad range of urban issues, from traffic and transportation to energy, public safety and the environment. Less understood is the value of some of the other projects that have been rolled out around the world. For example, one of Santander's test-bed projects involves sensors embedded in the city's gardens to detect soil humidity and enable more efficient watering of the grass, flowers and plants.

But as Forrester's Belissent pointed out, unemployment in Spain is more than 25 percent and for the country's young adults, the rate exceeds 50 percent. "Do we really need water sensors in the city park when it may be more cost efficient and socially more important to give the person a job to do the same work?" she asked.

Finding a working business model to justify a sensor-based project has proven elusive, according to Belissent. Technology can be a very cool thing, and there are some exciting examples involving sensor-based technologies. But showing they can cut costs and impact a city's budget can be difficult. "The question is whether it is more cost effective to install sensors in both the short and long term, or are there alternatives," she said.

Similar misgivings about the cost benefits of sensor-based solutions have been raised by others who study the technology. The actual cost of a sensor can be quite low, depending on its features and capabilities, but the full cost of an entire sensor-based solution can be very high for cities. "I've seen lots of simple solutions out

/ HOW TO START A SENSOR-BASED PROJECT

1 / START WITH YOUR PAIN POINTS.

Identify some of the major impediments to your city's growth and sustainability. The list could be broad, but usually includes: traffic congestion; lack of parking; aging water infrastructure and lost revenue from water leaks; transit ridership; and public safety.

2 / BUILD THE BUSINESS CASE. Perhaps the hardest part, cities need to quantify the problem that needs fixing or quantify the value that the sensor project will bring. Don't be afraid to consider partnerships that could offer new sources of revenue.

3 / DO THE BORING STUFF. Update your governance models, set up shared services across departments, integrate data and redesign workflow. Like all technology projects, sensor-based solutions won't deliver their full value until the organizational issues are fixed first.

4 / USE LEADERSHIP TO GET PROJECTS OFF THE GROUND.

Sensor-based projects involve doing something new and often very different. That kind of change can be difficult to accept. Get leadership to push the project out the gate. Once the first sensor project is under way, the rest won't be so hard to launch.

5 / LOOK FOR LESS EXPENSIVE OPTIONS.

Can't afford to install a network of sensors? Consider putting sensors with GPS trackers on city-owned vehicles, turning them into mobile sensing devices for traffic and environmental monitoring, to name just a couple of possibilities. Scour through existing data to identify potential hot spots for where to selectively place sensors, reducing the number of devices needed to monitor traffic, transit or water lines, for example.



6 / DON'T OVERLOOK PRIVACY CONCERNS. Get ahead of the game as far as privacy issues are concerned. Be transparent about how data will be collected and used, as well as how long the information will be stored. The public wants to be safe, but residents also want to be aware of how it's being done.

there that cost a lot of money," said Charlie Catlett, director of the Urban Center for Computation and Data, a joint initiative of the University of Chicago and Argonne National Laboratory. He pointed out how the city of Chicago kept some of the costs down by putting a GPS sensor on every city-owned vehicle and then using the stream of data to give residents and commuters real-time information

about traffic congestion. Catlett thinks cities could be savvier about creating home-grown solutions, like Chicago's, when it comes to using sensors.

With city budgets so tight, trying to explain the expected value of a sensor-based project can be a struggle, according to IBM's Frase. City leaders must be able to either quantify the problem they are solving or quantify the benefit. "There's always going



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to be a pain point anytime you do something new," she said. "Sometimes it calls for leadership at the top to step in and make it happen."

Cities also have to do what Belissent calls the "boring stuff" of updating their governance models, incorporating shared services across departments and integrating data, all before the sensors get attached to poles or buried under streets. "These are the things that have to be done before doing those more forward-looking sensor projects," Frase said.

LOOKING AHEAD

Despite fiscal problems, the future for smart technologies looks bright. By 2020, cities around the world are expected to spend \$20 billion just on sensor technology, according to Navigant Consulting, a Chicago-based firm. When you include the entire infrastructure of networks, databases, IT consulting and services, the figure is far higher. IDC Government Insights, an IT research firm, predicts that smart city spending will total \$265 billion worldwide in 2014.

But as more urban communities begin to assemble and deploy sensor-driven applications, critics are already questioning whether cities may end up too reliant on sensors and smart networks that drive not just services but also decision-making. Increasing our dependence on software to run services and operate infrastructure increases the risk that something could go wrong, argues NYU's Townsend. Writing software code is still an art, based on assumptions that can create havoc. Assumptions were built into

/ THE BOOM IN URBAN DATA LABS

Hudson Yards is one of the hottest real estate developments in New York City right now. Located on the west side of Manhattan, the project, which includes office towers, apartments, shops and luxury hotels, is about to add its newest tenant: an urban lab that will be run by New York University's Center for Urban Science and Progress (CUSP). The lab will blend science with technology — including sensors — to collect data from the Yards site to measure traffic and pedestrian flow, energy use and environmental conditions.

The project is part of the emerging field of urban informatics. "It is the field fueled by the advance of digital technologies — sensors, wireless communication, storage and clever software — that makes it possible to see and measure activities in an urban environment as never before," reported *The New York Times*.



CUSP is one of several research organizations that have emerged in recent years to tackle the problems of urban living that new digital technologies can impact and hopefully improve. Up the road in Cambridge, Mass., MIT has its SENSEable City Lab, which studies the changes that are occurring thanks to sensors and handheld

electronics. The focus is on how data collected by sensors and used by citizens in an open environment can help researchers understand and address urban issues, said Carlo Ratti, the lab's director. "Sensors allow us to better understand reality, catching the pulse of the city," he said. The MIT lab has conducted research in Seattle, Copenhagen and, most recently, in Singapore.

In Chicago, the Urban Center for Computation and Data, a joint initiative of the University of Chicago and Argonne National Laboratory, is pursuing interdisciplinary research into the science of cities, trying to anticipate the effects of rapid urbanization on the climate and the people who are living in cities in ever greater numbers. Like CUSP, the center focuses much of its work on its host city. Chicago has a similar massive development project under way, called Chicago Lakeside Development, a 600-acre site that will eventually house more than 600 buildings. The center is working with the city and developers to better understand how changes in the project's design will impact the environment and energy use. Much of the data collection will come from sensors, according to Director Charlie Catlett.

But these research organizations and the urban labs they run could be more than just platforms for studying urban informatics, according to CUSP Director Steven Koonin. He thinks they could serve as an alternative way for cities to develop sensor-based applications without going through a costly project with a technology firm. "City agencies that don't have the resources to do analysis on their own, could align themselves with an academic and research organization for help," he said.

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HealthCare.gov that led the system to crash when too many people logged on to use it. Townsend cites Y2K as an example of a software bug that was buried deep in just about every mainframe computer in the world. That one flaw cost companies and governments more than \$300 billion to fix.

Sensor technology relies on the Internet, which has become increasingly vulnerable to hackers. Israel's water, electricity and banking systems have been the target of numerous hacking attacks. In 2012, the traffic management system for a major artery in the port city of Haifa was hacked, causing traffic problems that lasted for hours.

Another concern is the use of sensors to maximize the efficiency of existing infrastructure: roads, rails, water systems and electrical grids. Trying to squeeze excess capacity out of old systems could cause problems down the road, especially if the software isn't stable, robust and secure. And if a problem occurs, can a sensor-based water system shut down properly or does it fail catastrophically? Is there a digital backup in case of failure? Recent events are not reassuring. When hurricanes Katrina and Sandy struck, the cellular phone networks overloaded and crashed. Boston's wireless phone system also shut down from overuse immediately following the Marathon bombing in 2013.

Sensors that can listen, watch and identify by reading vehicle license plates and smartphone GPS coordinates also raise privacy issues. In Europe, strict laws require providers to receive permission from users before they can use personal data, such as location, addresses and the like. Santander Mayor de la Serna said residents have not reacted negatively to the sensors in his city that collect information, which is actually aggregated and kept



Seoul, South Korea, spent millions of dollars embedding sensors in its main arteries in an attempt to capture real-time traffic data. It didn't work. The information was never accurate. But in 2012, the city installed a wireless payment system that uses GPS technology in 25,000 taxicabs. The information from the GPS sensors gave the city the real-time traffic information it always wanted, but at a fraction of the cost of embedding sensors in the road.

Installed sensors have been around for a while, but now cities are turning to mobile sensors to help capture valuable data to monitor traffic and the environment. For example, Chicago put GPS devices on every city-owned vehicle, turning them into instant traffic monitoring stations.

But what about turning citizens into sensors? In Santander, Spain, anyone can download a city-built app to their smartphone and use it to find out what's happening at venues they happen to be passing by. But the app also lets citizens upload information of their own, geocode it and send it to the city, so that others can share the information. The idea is to allow citizens to send as well as receive information that can become part of the overall data set. "It's kind of like a tech version of community watch," said Katharine Frase, chief technology officer of IBM Public Sector.

The more that people are involved with sensor-based projects, the better a city can understand the reality of what's going on, in terms of what people really want rather than what city government thinks its citizens want. "It's a way to capture the pulse of the city," said Carlo Ratti, director of MIT's SENSEable City Lab.

One recent project under way in Copenhagen involves turning bicycles into sensors. "We are turning them into mobile sensing units," Ratti said. "It allows you to collect data about your cycling activity and about your surroundings, creating a big pool of data that everyone can share from."

Some have cautioned against expecting too much from citizen-based sensor projects. But Ratti is confident that they will play an important role in the future of cities. "I believe that people will be the key actors in sensing, five to 10 years from now," he said. "The next stage will be based on bottoms-up sharing of data instead of top-down sensing as it's now done in many cities."

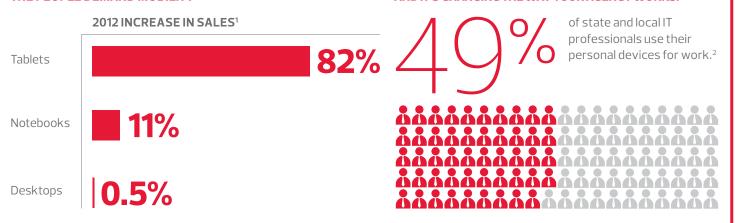


An ever–increasing amount of your staff is using mobile devices for work. But without a complete mobile solution in place, your infrastructure can be overtaxed and sensitive data may be at risk.

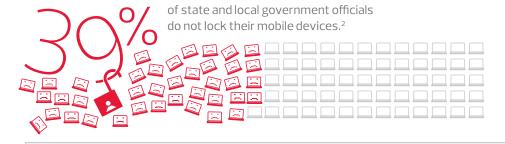
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anonymous anyway. But others aren't so sure. Fred Cate, director of the Center for Applied Cybersecurity Research at Indiana University, told *The New York Times* that the potential for misuse of sensors that can capture nearby conversations, read license plates and record video of people is high.

Rob Kitchin, director of the National Institute of Regional and Spatial Analysis at the National University of Ireland, Maynooth, said interconnected networks of sensors also raise concerns about how cities are governed. In an article published in GeoJournal, Kitchin explained that as cities increasingly rely on data streams from sensors and analytical software to interpret what the data means, there's a presumption that "all aspects of city life can be measured and monitored and treated as technical problems, which can be addressed through technical solutions."

An algorithmic approach to city governance seemly ensures rational, logical and impartial decisions. "Moreover," he added, "it provides city managers with a defense against decisions that raise ethical and accountability concerns by enabling them to say, 'It's not me, it's the data!"

The worst fear is that a sensorbased smart city could be turned against citizens should the politics shift from a benign democratic form of government to one that's autocratic. For a more repressive regime, turning public safety and traffic monitoring sensors into surveillance tools might prove hard to resist.

SMARTER TRANSIT

In Montreal, bus and subway riders who use the transit system's OPUS smart fare card and have a smartphone, can receive personalized coupons from stores and entertainment venues that are located along the route of their ride. The information arrives in

real time, so riders can just hop off the bus and walk into a nearby store or restaurant for discounted coffee, baguette or a meal.

It's the kind of smart city project that would make any public official happy. Sensors in the fare card system tell the database which customers are riding on the bus and which route they are on. The information feeds into the app, which immediately transmits the discount coupons from participating stores to the customer's smartphone.

Rather, it's finding the political will to move to the starting point, assessing needs and making sure the right management systems are in place. "You start by evaluating your pain points, whether it's parking, congestion, crime or, in the case of Montreal, a need to sustain stronger ridership in the city's transit system," said Belissent. City officials need to engage the business community and the citizens to figure out what they want and where to invest, she added.

"I STRONGLY BELIEVE THAT CITIES OF THE FUTURE WILL RELY ON THIS KIND OF TECHNOLOGY IF OUR AIM IS TO BUILD SMART, SUSTAINABLE AND EFFICIENT CITIES.

The program, which merges the latest in smart technology with precision marketing, is designed to encourage loyalty among the public transit system's 2.5 million riders who have an OPUS card. And it works. Ridership has increased 15 percent in the last three years. More riders means more revenue for Montreal's transit system. The city also gets nonfare revenue from the business and retail partners who are paying to be part of the app program. Transit riders who were once just passengers, are now customers with an incentive to stay with public transit. And it's an example of sensor-based technology that has a business plan that can quantify the value and return on investment for city officials.

So how do cities reach this point? Like so many innovative trends, the technology is not really the problem. Cities also need to think about how they want to use the data captured by the sensors and they need to decide which data should be in the open and public, and which is not, according to Frase. "Lots of cities have added the role of chief data officer as a way to think through thoughtfully the policy that drives the sensor-based projects they want to deploy."

And even though most experts agree that sensor-based applications are still a work in progress, especially in terms of the business case to justify the investment, it's not too early to start thinking about the future.

"We've been doing this for four years now and we're still learning," said Santander Mayor de la Serna.
"But I strongly believe that cities of the future will rely on this kind of technology if our aim is to build smart, sustainable and efficient cities."



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Juggling a few passwords is a minor annoyance that many employees take in stride. But when the job requires access to a multitude of applications — all with unique sign-ons and URLs — remembering that information can be a part-time job in itself, and a potential security risk.

The Hawaii Department of Education (HiDOE) found that very scenario playing out among its own ranks. With upwards of 25,000 employees often tasked with accessing 10 or more major applications daily to do their jobs, the department's customer service desk suffered a continual barrage of requests to reset passwords. The situation sparked frustration among teachers and administrators who sometimes lacked access for extended periods. It also redirected the IT staff's focus to lower-level tasks, many of which could be automated with well-chosen technology.

HiDOE found itself in need of an identity and access management solution featuring single sign-on (SSO) to boost worker productivity and IT security.

TACKLING THE CHALLENGE

With an SSO solution, employees would only have to memorize one password to effortlessly access their key applications, including the department's learning management system (LMS), time and attendance system, and other applications from a single sign-in screen. The technology would lower support costs and improve employee

efficiency by reducing the time squandered retrieving and resetting sign-ins, and maintain data security and privacy standards. But implementing SSO also presented numerous challenges.

"We had over 16 distinct systems with varying authentication models and password standards," says David Wu, HiDOE's assistant superintendent and CIO. "While we did have a basic identity management capability through our HR and email system, it was not universal, and we needed to move to a more robust, scalable implementation model."

Reducing employee inconvenience and bridging the gap across disparate systems would require a more powerful and scalable solution. HiDOE sought technology that would work with its Lotus Notes environment for email and other tasks, while education officials desired easy access to their other key software using secure identity management and user authentication.

RACING TO THE TOP

Fortunately, HiDOE was among several winners of the federal government's Race to the Top (RTTT) grant program designed to spur innovation and reform in education. With a \$75 million four-year grant received in 2010, HiDOE was able to earmark \$2.1 million to go towards the technology it needed. Because the grant program set tight deadlines for completion of program phases, Hawaii officials

also had to enlist a technology partner that could roll out a dynamic solution quickly. After weighing other options, department leaders chose Dell Software's comprehensive Dell One Identity solutions and SSO capability, which help organizations manage access governance, identity administration, privileged users and user activity monitoring.

"The Dell Software product line provided us an implementation solution that could be completed within the tight timeframes specified in the RTTT grant," says Wu. "By choosing Dell Software's technology, we were also able to include systems in the scope that would have been difficult, if not impossible, to implement in SSO."

In addition, the Dell Software team offered extensive expertise and resources to ensure a successful project.

ENHANCING PRODUCTIVITY AND SECURITY

With grant funding in hand, the department started the project's first phase in June 2012. Department managers, staff and vendors worked closely for a little more than four months. In November 2012, the Dell Software solution went live to provide teachers, administrators and others SSO access to five of the department's crucial applications, including its LMS, HR system, and time and attendance system. Officials also gained SSO access to the data warehouse and statewide student enrollment application.

"The introduction of SSO represents a milestone in the way HiDOE utilizes its resources," says Wu, noting that users now access most applications by only signing in once each work day.

In addition, Dell One Identity solutions add true identity management with an advanced gatekeeper called a proxy service to tightly control user access. It instantly checks all access "requests" when employees click on a particular icon. The technology allows seamless access to the application or content when, and only when, it detects a valid session identifier and an authorized, authenticated user. Hawaii officials also liked the solution's ability to:

- Remove vulnerability of systems, data and applications
- Support a wide range of authentication methods and security systems
- Enable SSO across multiple web servers
- Provide access and control by a user's role
- Add compliance with audit, access control and separation of duties features In short, rolling out Dell One Identity solutions and the SSO component helped HiDOE rein in increasing IT sprawl and provide all employee groups with easy access to resources they need, without adding infrastructure or complexity.

REVELING IN THE RESULTS

So far, the results have been a hit with educators, administrators and other department employees, who cheered the initial rollout of SSO. They've expressed enthusiasm about extending that ease of use to additional applications, Wu says.

"By April 2013, we had increased the number of systems using SSO to 12, and

today users can access 14 applications — nearly all of our major systems using single sign-on," notes Wu.

Other stakeholders have benefited as well. For instance, application owners have found that easier, less problematic sign-in

users access those resources securely from any device or location. By late 2015, IT staff should be able to use SSO to order new accounts, services and hardware easily and effortlessly through an Amazon.com-like shopping cart. They'll also gain granular

"The introduction of SSO represents a milestone in the way HiDOE utilizes its resources."

David Wu, Assistant Superintendent and CIO, Hawaii Department of Education

is driving greater user adoption of applications, while customer service desk workers are pleased to shift their attention from re-setting passwords to handling other pressing duties.

These SSO benefits and efficiencies led HiDOE to be one of the winners in the 2013 State of Hawaii Excellence in Technology Awards, and to become a finalist for the National Association of State Chief Information Officer's (NASCIO) 2013 State IT Recognition Award.

BUILDING ON A SOLID FOUNDATION

Education officials plan to roll out additional project phases in the near future. For example, SSO capabilities will link with the department's planned implementation of Microsoft Active Directory to enforce security policies across its Windows environment, and to converge its IT infrastructure. That tie-in will eventually allow employee SSO access to web applications, the network itself and other resources. And mobility functions will let

auditing capabilities, with reports that show who requested or approved a service, and related usage details, for improved management and compliance.

"Without a solid identity management foundation, none of these projects would have been feasible," says Wu. Dell One Identity solutions have "provided us with the foundation we needed to take HiDOE to the next level from an information systems perspective."

Today, HiDOE is still deciding which additional components of Dell Software's technology to phase in. One of the plans is to let users access a newly designed internal employee web portal and the network using SSO. It is looking to add two-factor authentication to enhance security when users access systems from outside the network as well.

For now, though, teachers, administrators and customer service desk representatives are handling job tasks more efficiently, helping Hawaii schools continue their race to the top.

Dell Software helps customers unlock greater potential through the power of technology—delivering scalable, affordable and simple-to-use solutions that simplify IT and mitigate risk. The Dell Software portfolio addresses five key areas of customer needs: data center and cloud management, information management, mobile workforce management, security and data protection. This software, when combined with Dell hardware and services, drives unmatched efficiency and productivity to accelerate business results.





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The Nod gesture control ring lets users manage various devices with hand movements. Gadgets include phones, tablets, Google Glass, watches, home appliances, TVs, computers and more. Users can swipe through PowerPoint slides, operate GoPro cameras and adjust Belkin light switches and Nest thermostats. Nod is designed to be worn on the index finger and contains two CPUS, motion sensors and a Bluetooth antenna with a 30-foot range. The ring is available in more than 12 sizes, and each size ships with three interchangeable inserts that work for righties and lefties for a good fit. Nod's battery life is currently one day of active use, and it is waterproof to 5 atmospheres or about 169 feet. www.hellonod.com



Meet Up 🔺

Panasonic announced the KX-UTG200B and KX-UTG300B (session initiated protocol) SIP phones, designed to enhance communications and lower operating expenses. The phones offer plug-and-play simplicity and flexible configuration options, with features such as call forwarding, intercom, voicemail to email, fax to email, dial by name directory, multiple extensions, one-touch conferencing and more unified communications tools. The SIP phones have either 5-inch WVGA or 3.5-inch QVGA color graphical TFT LCD display screens with capacitive touch, as well as built-in Bluetooth headset support. The devices can store 1,000 phone book entries, and 300 placed call, received call and missed call log entries. www.panasonic.com

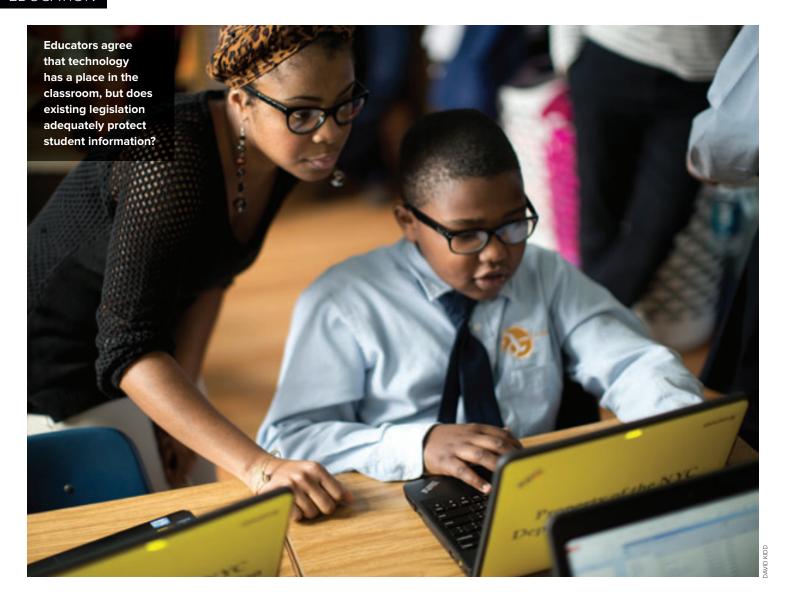
Cord Control

Its design based on a child's toy snake, the Snakable USB cable for Apple or Android devices protects the connectors from breaking using reinforced, jointed connectors that bend easily. The heavy-duty cable has a coating that keeps the Snakable from knotting and tangling. Lightning Snakables will be Apple-certified under the Made for iPhone program, meaning no "This cable may not work ..." error messages on a user's iPhone or iPad. The cable will measure four feet and will be available in red, white, black, green and orange. As of press time, the designer had

reached his pledge goal in a Kickstarter campaign. www.snakable.com







The Data Dilemma

Can student data improve learning without compromising privacy?

By Tanya Roscorla / Staff Writer

nstead of locking student data in the principal's office, more school districts are moving it to cloud providers.

By sharing data with private companies, schools can improve student learning using data analysis tools. But on the flip side, privacy advocates worry that student data is not safe in the hands of schools or the third parties they contract with.

"Across the board, students unfortunately don't have the level of protection

they need," said Khaliah Barnes, director of the Electronic Privacy Information Center's Student Privacy Project.

Voices of concern seem to be getting louder. A lawsuit filed in California accused Google of violating anti-wire-tapping laws by scanning student email, a practice the company has since abandoned. At least 32 states have taken up student data privacy legislation this session. And policymakers throughout

the nation gathered in Washington, D.C., for a School Privacy Summit earlier this year that addressed this matter. The issue of student data privacy has indeed sparked a national conversation.

Growing Pains

In the last 20 years, student data has moved from paper to digital, and now to the cloud. And its quick adoption in school

districts has left the law in the dust, said Sonja Trainor, director of the Council of School Attorneys at the National School Boards Association (NSBA).

"There's been so much movement and innovation in using data, and it's happened so quickly, that I think many **32**

The number of states with student privacy bills under consideration

schools are right now just taking a moment to look at it comprehensively," she said.

Part of that evaluation process involves looking at existing contracts with third-party vendors, taking ownership of student data decisions and reviewing guidelines that a number of organizations have created. The U.S. Education Department, Consortium of School Networking, NSBA, Common Sense Media and Electronic Privacy Information Center, to name a few, have all released guidance on how to safeguard student information.

in its guidance this year started with the words "it depends." That demonstrates how complex FERPA really is and how much more work there is to be done, Lupovitz said.

"FERPA's very complicated — there are all kinds of exceptions and requirements — and it really requires schools to have bulletproof contracts with their vendors," she said. "What we've seen so far is in practice, that's not always the case."

Keith Bockwoldt has been reviewing his school district's contracts with

66 The idea is to make sure that the technology, the information and [student] data is used appropriately to improve learning, without having to worry that it's not secure or safe or that all kinds of third parties are looking at it.

Common Sense Media recommends three overarching principles for schools and policymakers to consider:

- Students' personal information should be used only for educational purposes.
- Students' personal information and online activity should not be used to target advertising to students or families.
- Education technology providers in schools should have appropriate data security policies in place.

"The idea is to make sure that the technology, the information and their data is used appropriately to improve learning, without having to worry that it's not secure or safe or that all kinds of third parties are looking at it," said Joni Lupovitz, vice president of policy for Common Sense Media.

One of the questions around student data privacy is whether existing legislation — including the Family Educational Rights and Privacy Act (FERPA) and the Children's Online Privacy Protection Act — adequately protects student data. Trainor and Lupovitz agree that both pieces of legislation have gaps and don't cover all the issues that technology raises.

But more legislation isn't necessarily the answer. Instead, joint guidance from the U.S. Department of Education and the FCC might help provide clearer direction, Trainor said. Many of the questions that the Education Department tried to address companies including Google. He's also looked at guidance from several organizations to make sure he's doing everything he can to protect students' data.

As the director of technology services at Township High School District 214 in Arlington Heights, Ill., Bockwoldt is comfortable with his current Google contract and doesn't have a problem with anything the company is doing.

"I look at Google as a company that is helping education, but I think people are at the micro level really digging into any little thing that Google may be doing to misperceive it as bad or collecting student information, and I don't believe that's the case at all," said Bockwoldt, who was an NSBA 20 to Watch honoree in 2013.

Google's competition begs to differ. Microsoft has been rather outspoken about the importance of ensuring that companies are not using student data for anything other than educational purposes. And the company has called out Google and Apple in particular for their data practices.

"Our view is simple: Kids are not products," said Cameron Evans, chief technology officer of U.S. Education for Microsoft. "They're there to be educated, and they shouldn't have to compromise in order to get great education and great technologies at the same time."

He said schools can have technology and privacy without compromising. In

fact, more third parties will be collecting student data because schools can use it to inform instruction and give students more ownership of their learning.

Achieving Balance

When it comes to technology, school district leaders shouldn't throw out tools and applications because of privacy considerations, but they should be willing to talk openly about the issues, according to Pete Just, CTO at the Metropolitan School District of Wayne Township in Indianapolis.

"I'm glad to see greater awareness of this, but I sure hope we don't torpedo the good ship of education because of some alarmist viewpoints as opposed to a balanced point of view," said Just, who also serves on the Consortium of School Networking's Board of Directors.

For Just, striking that balance means creating an environment where technology and privacy work in tandem to maximize student learning.

As for third-party applications, many people just click "OK" without actually reading the terms of service that spell out what the company can do with their data. And that can be dangerous, Just said. Schools should understand what they're agreeing to before making a decision.

They also must take more responsibility for setting the conditions of contracts with third parties. "We need





to have, as districts, a little more stake in the game with these providers, creating data standards agreements that we have with providers, and basically demanding on our terms what they can and cannot do with the data," Bockwoldt said.

Some of the questions districts need to address include: How long do you store data? What's the protocol when a breach occurs? What security procedures are in place?

Schools should be especially wary of free or "freemium" services, whose value often comes at the expense of student privacy. The bottom line for Barnes is that if districts don't think the data will be secure in a third party's hands, they shouldn't entrust it to them.

Barnes also recommends that schools be transparent about which third parties have access to student data and what they are doing with it. Publishing this information on the district's website gives parents and students a clear understanding of what's happening with their data.

Consortium of School Networking for its education technology leadership.

Along with sharing data with vendors, Kent School District also works out how to share data with its counterparts in King County. Seven districts including Kent won a 2012 Race to the Top grant to raise student achievement together. When a student moves between school districts, they must be able to share information

66 Across the board, students unfortunately don't have the level of protection they need.

At Kent School District in Washington state, technology staff members have their work cut out as they make agreements with third-party providers. The district has data standards that are required to be in each agreement, and the IT staff members teach the companies they talk with how to incorporate privacy into their practices.

"I'm appalled at the way some will say, 'Just send us an Excel file with your kids' information as an email attachment.' We have actually done a lot of education of our vendors," said Greg Whiteman, director of technology integration for Kent School District, which won the 2014 Team Award from the about the services they provided to help the student succeed and any special needs that should be addressed immediately.

"Everyone's not out to make a dime off this data. We do need it to move between districts and third parties," said Stosh Morency, executive director of IT at Kent School District.

"What we all want is a safe place where our kids go to school," Lupovitz said. "They can use technology to really learn and thrive, it can be very engaging, and they don't have to worry about who's watching them, but kids can just be kids, and learn and explore."

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Ahead of its Time?

Controversy around student data mining has reached a fever pitch, which is evidenced by punishing headlines exposing the practices of schools and education tech companies that gather information about students and put it to use.

The nonprofit inBloom, bolstered by substantial contributions from the Bill and Melinda Gates Foundation as well as the Carnegie Corp. of New York, was working with districts in nine states to warehouse student data online in order to help better personalize the learning process.

Parents cried foul when they realized the amount of data the company had access to on their children — more than 400 data fields were available for schools to fill in, some of which were highly personal, including Social Security numbers, details on family dynamics and specific student learning challenges.

In the end, the company closed its doors, citing "mischaracterizations" and a lack of understanding on the part of the public at large about the benefits of technology in education.

Some have speculated that another company will likely sprout up in its place, but clearly some gaps in understanding and legislation need to be filled in first.

"How do we ensure that the right data is collected, that there is governance to collect and share, protect and access this information?" asked Paige Kowalski, director of state policy and advocacy for the Data Quality Campaign, in a recent interview with *Education Week*. "It's that governance piece that is so crucial."

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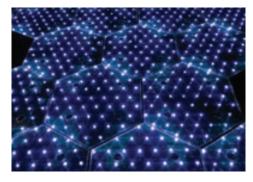
YOU CANGET THERE FROM HERE

Don't be the pedestrian that gets hit by a bus while checking directions on a smart-phone. India-based Lechal (which means "take me there" in Hindi), is making a shoe with insoles that connect with smartphones via Bluetooth, using vibrations to guide users to their destination. Originally designed to improve mobility for the visually impaired, the shoes can also help track fitness goals by measuring steps taken and calories burned. SOURCE: SPRINGWISE; IMAGE: LECHALCOM



A LOOK INSIDE

Forget the gym selfie, car selfie and duck face selfie — a more medically useful opportunity for self-photography is now available. A tiny camera from Georgia Tech mechanical engineering Professor F. Levent Degertekin offers high-resolution, 3-D pictures of internal organs. Resembling a mini cymbal, the apparatus features a circular silicon chip embedded with 100 sound wave-capturing sensors, shedding light on obstructions in blood vessels without increasing blood temperature. SOURCE: WIRED



Sustainable Streets

What if the 4 million miles of highway in the U.S. could harness the power of the sun they sit under all day, and add that energy back into the power supply? Scott and Julie Brusaw of Idaho-based Solar Roadways are poised to find out. Their Federal Highway Administration-funded prototype has taken shape in the form of a 12-foot-by-36-foot parking lot, and the pair has since taken to Indiegogo to help bring the product to market. The durable hexagonal panels are heated to ease snow and ice removal, and feature LEDs that can display road markings.

SOURCE: GIZMAG; IMAGE: SOLARROADWAYS.COM

READY FOR ROLL-UP?

Researchers at the University of Surrey in the UK, working with scientists from Philips, are getting closer to bringing "roll-up" technology to life. New breakthroughs in flexible electronics have come from working with a simple-circuit component that can be used in analog electronic designs, including display screens. The component, called a Source-Gated-Transistor, could potentially be built into additional items made of flexible plastics or textiles. SOURCE: SCIENCE DAILY, IMAGE: SHUTTERSTOCK.COM







Two Solitudes

Big data raises questions about privacy, innovation and choice.

t is time to bring some analog thinking to today's most interesting and important digital challenge — the intersection of innovation and privacy around big data. Digital is binary — on/off, yes/no. Analog is variable, it attenuates with the distance between things and it allows a little noise in the signal without causing failure.

Too often, the discussion of privacy and big data is binary. One is good. The other, bad. That is the starting point for most public interest groups that point to misuse of big data at the cost of privacy by government (massive NSA surveillance) and industry (federal regulators have settled privacy complaints against Google, Facebook and some 30 other companies). At the moment, these well organized and often well funded groups seem to have the momentum and mindshare on their side in the public debate over big data.

But the debate cannot end there. Big data, itself with powerful friends and considerable financial backing, has just begun to show us the potential for solving intractable problems and powering innovation and economic growth. Last month, even as Congress considered a bill to restrict NSA data surveillance, the White House released a pair of companion reports — one policy, the other technical — in an attempt to strike a balance between seizing the opportuni-

Paul Taylor is the chief content officer of e.Republic, Government Technology's parent company. ties of big data and preserving values, including privacy and civil rights.

The policy report spotlights where big data is making a difference — from education and medical research to public safety and the digital economy, stating, "Unprecedented computational power and sophistication make possible unexpected discoveries, innovations and advancements in our quality of life." Out of the blocks, the report affirms that "properly implemented, big data will become [a] historic driver of progress" while later recognizing that analytics have the potential for misuse of personally identifiable information in ways that could undermine "longstanding civil rights protections."

66 Good policy protects privacy while opening data to appropriate and innovative use.

The reports take aim at the holy grail of the privacy community: notice and consent, which are at the heart of the Fair Information Practice Principles. The policy report suggests they have become obsolete in a big data world and may retard innovation. The technical report goes further, writing that the current privacy policy framework does not and cannot scale. It recommends a policy shift from regulating collection to focusing on use, reuse and the prevention of abuse.

Rob Atkinson, president of the nonpartisan Information Technology and Innovation Foundation, thinks about these issues in an analog way, with the inherent tradeoffs in mind. "There is this fragile ecosystem where you have this resource called data and you can figure out really cool ways to add value to our society," said Atkinson.

He argues that good policy protects privacy while opening data to appropriate and innovative use. "Privacy people don't see it that way. They choose privacy first, last and always," Atkinson said. "In making that choice, they are choosing less money, less innovation, less health, less safety. ... If we go down that path, we have to make it clear that those are what our choices are and that

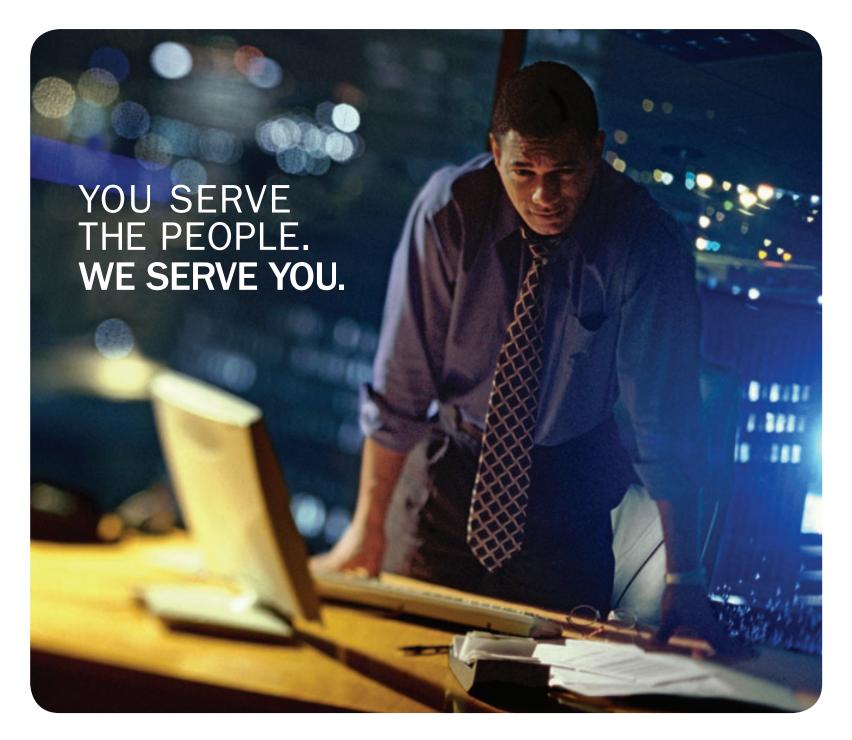
is what our choices mean."

In some work I did for Intuit, the maker of TurboTax and other software, I met Laura Fennell, the company's general counsel. She has been thinking in an analog way about this for some time too, so much so that she worries that

the bright lights of big data may sometimes blind us to who actually owns the information and whose interests its use should serve.

"Companies should be obligated to think about data as their customers' data," said Fennell, and companies' stewardship responsibility is to use that data to "gain insights into their behavior that can help them change their lives. If they do a good job at that, revenue will come. If they do a bad job at that, it won't."

The test in government is somewhat different, but the same caution applies to its relationship with citizens. And there is no binary solution in finding a workable balance, only analog. (a)



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