

GCN

TECHNOLOGY, TOOLS AND TACTICS FOR PUBLIC SECTOR IT
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**THE REAL
KILLER APP:**

CITIZEN

SERVICE

**HOW TO TAKE THE
GUESSWORK OUT OF
DEVELOPING USER-
CENTRIC MOBILE APPS**

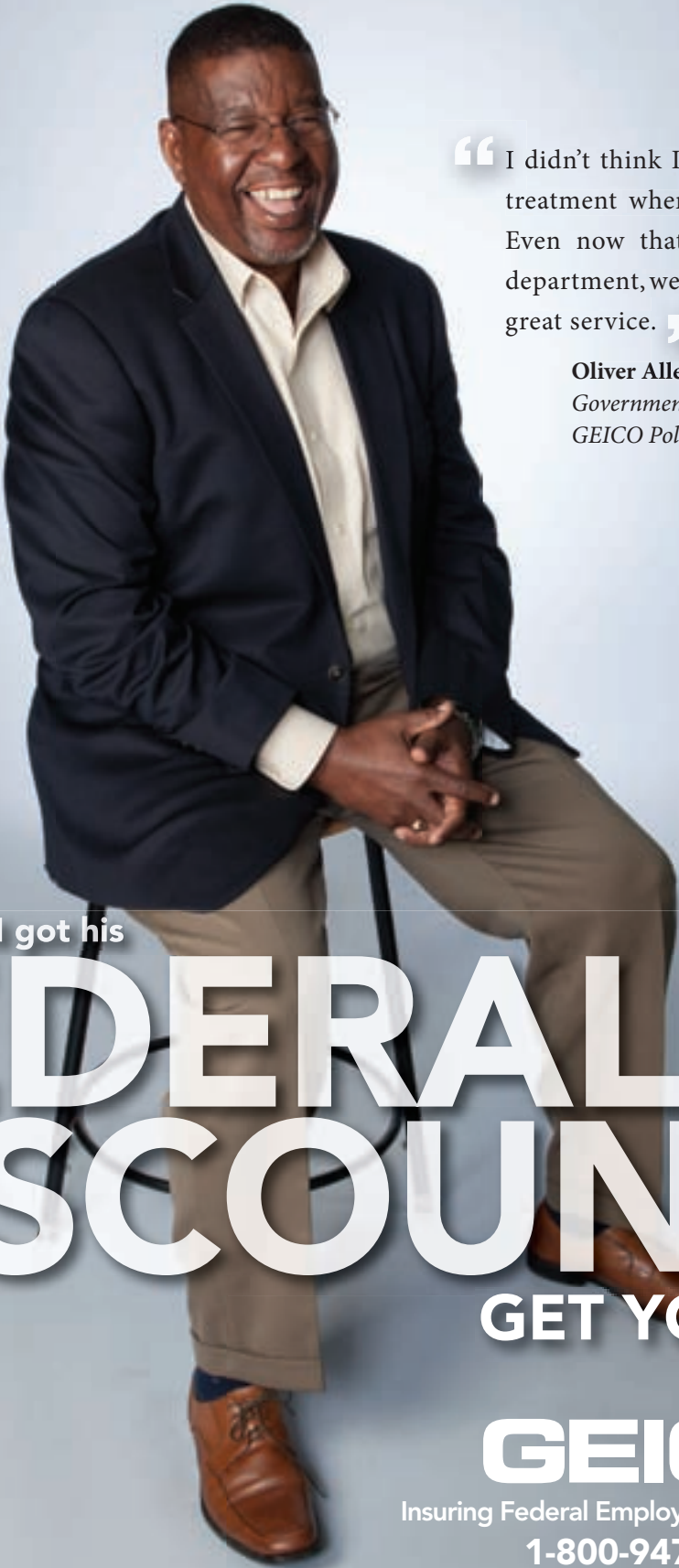
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“ I didn't think I would get the same treatment when I left the Military. Even now that I am in a federal department, we have continued to get great service. ”

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States turn to tech for tracking marijuana

BY SUZETTE LOHMEYER

States with legal marijuana industries need technology to track plants from seed to sale and from doctors to patients. Tech companies are answering the call in creative ways. Here are some examples.

MAINE AND HAWAII: FROM HUNTING PERMITS TO MARIJUANA

In partnership with the Maine Department of Health and Human Services, e-government services provider NIC developed an online service that allows doctors to issue patients a marijuana certification that is watermarked for authenticity. Patients then take the certification to a distributor.

Some information is collected in the process, including the physician's name and ZIP code, and whether the patient is over the age of 18. The state uses that information to determine where distribution centers should be located.

Dan Andrews, the Maine portal's general manager, said the service also protects against fraud. The previous system "was basically just a Word document that providers would fill out and give to the patient. There was a lot of confusion. With the online service, it gets printed on official paper that gets watermarked."

NIC, which developed a similar system for Hawaii, launched in 1992 with a focus on streamlining government licensing and registration processes — from big-game-hunting permits to mo-



Colorado uses Franwell's Metrc system to track marijuana plants.

tor vehicle services and now marijuana regulation.

WASHINGTON AND NEW MEXICO: A SYSTEM BASED ON PHARMACEUTICAL DISTRIBUTION

Washington state uses BioTrackTHC's marijuana traceability software, which is based on parent company Bio-Tech Medical Software's products for tracking pharmaceuticals and preventing abuses such as patients going to multiple doctors to receive prescriptions for the same medication.

The system uses bar codes to enable traceability with a quick scan. "If [a plant] was found on the street, a law enforcement officer could scan it and find out instantly where it came from, where it's going and whose it is," BioTrackTHC CEO Steven Siegel said.

Brian Smith, communications director at the Washington State Liquor

Control Board, explained the steps a dispensary must go through to legally sell a plant. "I'm growing it," he said. "I'm plugging it into the system. I'm coming up to a harvest date. I'm sending a lot sample to the lab and putting it in a travel manifesto to where the marijuana is going."

Then the marijuana travels from a processor to a retailer, where taxes are assessed and paid.

"We could trace where a product needed to be recalled all the way back to that particular lot that it came from," Smith added.

New Mexico has also signed a contract to implement the BioTrackTHC system for monitoring its medical marijuana.

COLORADO: RFID MOVES FROM CUCUMBERS TO KUSH

When Colorado issued a request for proposals for a system to regulate

marijuana plants, it cited radio frequency identification as the preferred technology. Getting to a functional system took a while — a 2011 contract was shelved because of budget shortfalls, and state officials and growers were still scrambling as legalization took effect on Jan. 1, 2014 — but Colorado's Marijuana Inventory Tracking Solution now requires every plant and every bag to be tagged for RFID.

Growers are responsible for tagging their inventory and logging the data into the state's online system.

Franwell, a firm that specializes in

RFID, used technology the company had developed for air cargo and fresh food tracking to create a system for tracing Colorado's marijuana plants.

Franwell CEO Jeff Wells said tracking marijuana is different from other products because it requires such a high level of regulation.

"In all of our experience, and we've been working in supply chains for a few decades, I don't know another system that exists where a regulatory body is assigning a serial number for each and every box of cucumbers, for example," he said. "But, then again, it's not dangerous enough.... It's not

federally illegal [to grow and ship] cucumbers."

Growers in Colorado have complained about the cost of the tags and the hassles of logging their inventory data with the state, but Wells said RFID speeds up the inspection process and provides security because the tags are difficult to counterfeit.

"Someone can take a handheld [device] to a facility and do a spot check a lot easier than with a bar code," he said. "They can read many, many plants in seconds and quickly verify against what they have reported in the system." •

Nanosatellite can act as 'cell phone tower in space'

BY MARK POMERLEAU

In an effort to bolster communications capabilities, the Army will deploy nanosatellites to get around problems associated with "over the hill" visibility in remote areas.

The first nanosatellite developed by the Army's Space and Missile Defense Command — the SMDC-Orbital Nanosatellite Effect — is already in orbit.

"It's basically a cellphone tower in space, except it's not for cell phones, it's for Army radios," said Travis Taylor, senior scientist at SMDC's Space Division.

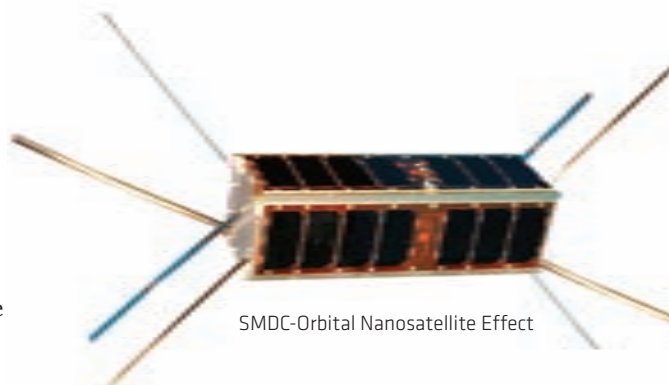
Larger imaging satellites, which would still fall into the "nano" category, could join the SMDC-ONE. They are capable of identifying a tank or a truck on Earth from orbit.

Military officials hope to deploy an entire constellation of nanosatel-

lites. "If we put five to 12 of these small satellites in orbit, it will cover most areas soldiers are operating, providing them real-time, all-the-time communications," Taylor told the Army News Service.

Nanosatellites in low-Earth orbit — approximately 1,200 miles above Earth's surface on the high end — would provide soldiers in remote locations with radio access. Low-Earth orbit brings the nanosatellites approximately 60 times closer to the Earth than geosynchronous communication satellites, so they can relay weak signals from handheld radios, according to a briefing given by Taylor in 2013.

And nanosatellites are not just for communications. They can be used to track environmental conditions, illegal logging or a change in the course of



a river, and in space, they can detect solar and cosmic radiation or interactions between magnetic fields, according to the Economist.

In addition, the satellites also provide greater accuracy in space weather reporting, which can protect more expensive satellites and prevent astronauts from being exposed to high radiation doses.

And they enable real-time tracking for ships, which broadcast identification signals that can be picked up by nanosatellites flying in low-Earth orbit. •

The limits of machine translation

BY KATHLEEN HICKEY

Although consumer programs like Skype Translator are making it easier for people to communicate when they speak different languages, governments are struggling to make information available to non-English speakers.

In a presentation last year, officials at the U.S. Labor Department stressed that anti-discrimination laws require agencies to provide information in other languages.

Furthermore, “it is seldom, if ever, sufficient to use machine translation without having a human who is trained in translation available to re-

view and correct the translation to ensure that it is conveying the intended message,” the presenters wrote.

But an increasing number of resource-strapped agencies at all levels are relying on machine translation.

New Hampshire’s Department of Revenue Administration and Virginia’s Department for the Blind and Vision Impaired are using machine-translation technology and including links to Google Translate to help users navigate their websites.

The Army, however, faced a situation in which machine translation was not enough. When the military started training doctors in Afghanistan, there

were few medical manuals available in the local language, Dari, and few speakers of both English and Dari who knew medical terminology.

Using a combination of computer translation, computer scientists and Afghan doctors, the Army collected 6,000 medical phrases in Dari and compiled them into reference manuals.

“Computers could never replace the human translator, but we look for ways to relieve some of the burden, especially in less commonly used languages, like Dari, Pashto and Serbian,” said Melissa Holland, chief of the U.S. Army Research Laboratory’s Multilingual Computing Branch. •



EDITOR'S NOTE

IT for all levels of government

Does technology translate?

I’m not talking about literal language translation, although we do touch on that, too (see story above). Rather, I mean the technology itself: Are the same hardware, software and as-a-service solutions relevant at different levels of government? Or are city, county, state and federal IT systems different species entirely?

The answer, of course, is “it depends.” Not many cities run weather satellites and need the geospatial infrastructure that the National Oceanic and Atmospheric Administration demands, for example. And few feds spend their workdays worrying about which system can best track pothole-repair requests.

The overlaps, however, far outnumber the outliers. Different levels of government might wrestle

with different budgets, procurement processes and political pressures, but everyone has data to store, mobile workers and citizens to support and cybersecurity risks to manage. And whether it’s the CIO at NASA or the IT team in Nevada County, Calif., there are legacy systems to manage and questions about what should move to the cloud.

GCN’s coverage reflects those overlaps. In this issue, for example, our feature on citizen-centric mobile app development shares lessons learned through efforts at the U.S. departments of Education and Energy, Colorado’s Department of Health Care Policy and Financing, the City of Riverside, Calif., and the University of Texas.

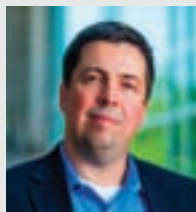
A look at storage solutions finds that Austin, Texas; Northumberland County, Pa.; Morgan County, Tenn.; and the Federal Communications

Commission are all asking the same questions. And even where we cover systems that are specific to a single level of government – New Hampshire’s new IT system for its Division of Motor Vehicles, for example – the fundamental challenges and the building blocks used to address them have much broader applicability.

In other words, the GCN team believes there’s much to be learned by looking beyond one’s immediate neighbors – and we’re always on the lookout for great IT stories at any level of government. If you have one to share, please let us know!

And if you have a different view on tech’s “translatability,” well, that’s one of the 10 questions in our reader survey. Please go to http://is.gd/GCN_survey, and tell us what you want most from GCN.

– Troy K. Schneider
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New York to retain state workers' email

BY DEREK MAJOR

A dustup over email retention led New York Governor Andrew Cuomo to eliminate the policy of auto-deleting state workers' email messages after 90 days. Now any email purges will be done manually.

The move came in response to calls for greater transparency, especially in light of the attention thrown on the issue by former Secretary of State Hillary Clinton's use of a private email account for official State Department correspondence.

However, Bill Mulrow, Cuomo's top aide, put a different spin on the issue. The Wall Street Journal quoted him as saying, "I came from the private sector before I joined the administration, and as we know, this is really not about retention. Everybody knows that emails last forever. It's really more about records management and how

we find a uniform policy and how we find transparency."

The policy change means that more communications will be retained and accessible for public records requests or investigations of wrongdoing, ProPublica reported.

The previous auto-delete policy was in effect for about two years, so it's probable that some public records have been lost. "The purged emails are not coming back," wrote John Kaehny, executive director of the pro-transparency group Reinvent Albany, in an email message to ProPublica. "There [is] no Freedom of Information Law or archive 'police' to ensure that email records are actually being saved."

In addition to the policy change, Cuomo's administration announced it will introduce a bill that would bring the state legislature in line with the state's Freedom of Information Law practices. •



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What: "Local Government Energy/Environment Technology Priorities for 2015," a survey by the Public Technology Institute.

Why: The researchers concluded that the top priorities for local officials involved in energy, environment, sustainability and technology are the same as those of government IT managers: funding, aging infrastructure, and disaster mitigation and preparedness.

Respondents also cited the failure of information and data sharing between utilities and municipalities, environmental management systems, keeping up with technology updates and statewide consistency in renewable energy standards as top concerns.

Because local governments are first responders, they appreciate the "interdependencies between energy systems and communications, transportation, emergency management and other infrastructure systems that are critical at the local level of government," the report states.

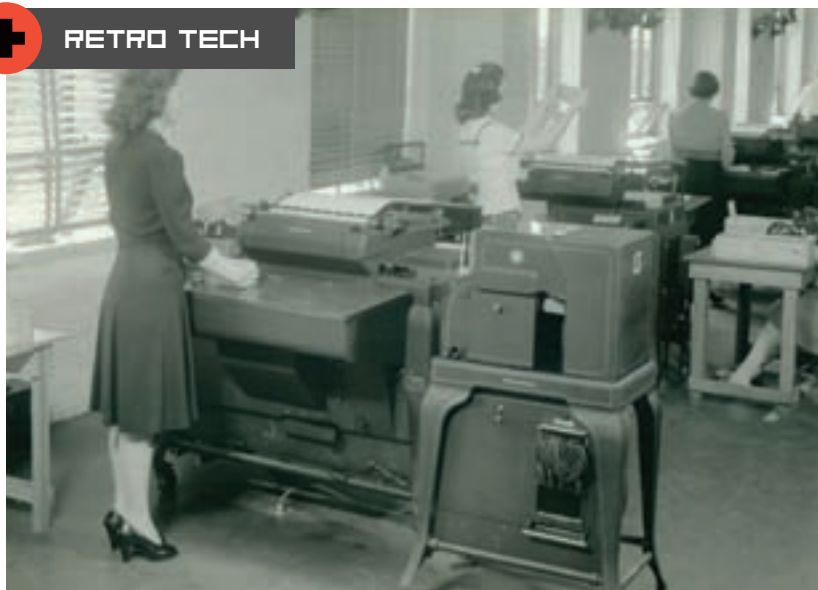
After Hurricane Sandy, local government officials pushed disaster mitigation and preparedness to the top of their priority lists.

Energy assurance planning is more expensive if local governments have to develop plans in the wake of a disaster. By contrast, preparedness contributes to energy efficiency and sustainability because it supports the finance, communication, health and transportation systems that stabilize and protect the public in times of crisis.

Full report: is.gd/PTI_energy



RETRO TECH



GCN has covered government IT since 1982, and the technology started earlier still. The Census Bureau, for example, relied on a dozen of these IBM Alphabetic Accounting Machines for the 1940 census. (Commerce Department photo)



Working Smarter with Automation

Faster, better, cheaper.

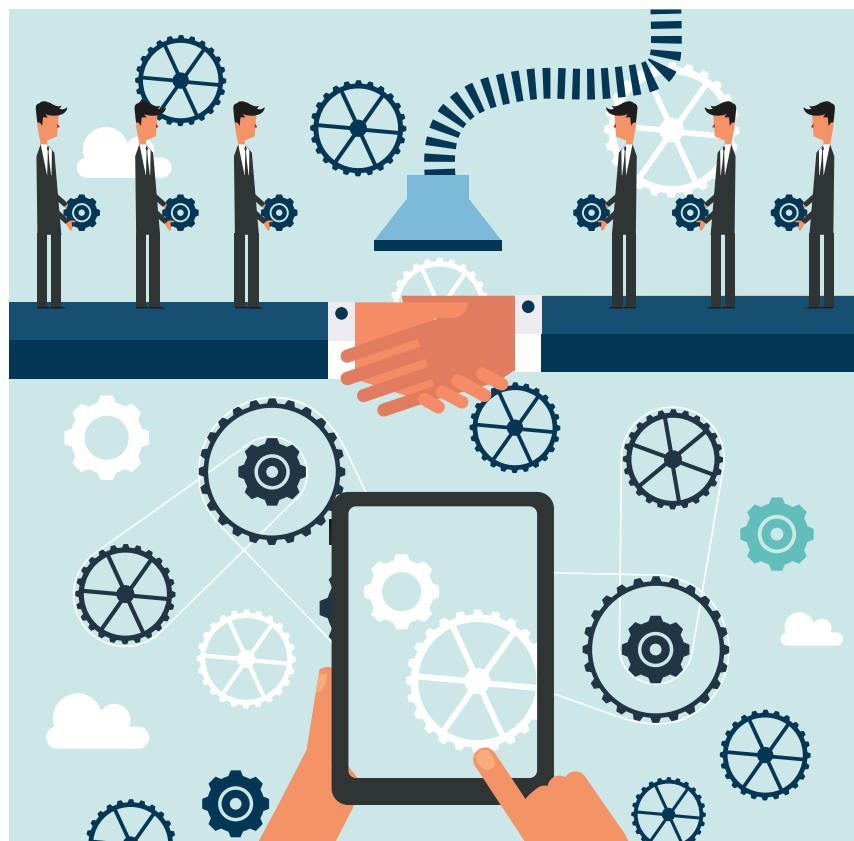
When it comes to how government users want to access IT resources, it's practically a mantra. Add to that mandates such as Cloud First, the Digital Government Strategy and the Federal Information Technology Acquisition Reform Act, and it soon becomes clear why automation is so critical to agencies today.

Manual processes no longer have a place in any agency's IT portfolio. They are expensive, labor-intensive, and susceptible to human error. The only way to meet user demands for speed and flexibility, along with government's requirements for cost-cutting, innovation and customer self-service, is through automation.

Automation creates consistent, repeatable processes and configurations, which in turn reduces the potential for human error and speeds up deployment and provisioning. Automation also enforces consistency of IT policies and compliance mandates, including security. Finally, automation allows agencies to take a giant step forward in making IT services more customer-focused.

Automating Infrastructure Delivery and Lifecycle Management

Automating infrastructure delivery and lifecycle management makes a lot of sense for agencies today. In addition to improving efficiency and saving money, automating infrastructure delivery allows departments within agencies to access the infrastructure they need, when they need it, without worrying about maintaining hardware and networking equipment. If there is a spike



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in requirements due to an internal deadline or citizen-facing service, the infrastructure is always available.

Automating lifecycle management has its own benefits; it can help ensure that resources are used to their fullest at all times—no forgotten idle workloads, no oversized workloads, etc. Don't be afraid to use lifecycle management features, from automatic discovery of hardware and software assets to software distribution and provisioning—to your advantage.

While automation clearly comes with plenty of benefits, there are ways to improve the ROI and benefits the agency gets from automated infrastructure delivery and lifecycle management. The first step, says Jon

Schulman, a Senior Systems Engineer for VMware's public sector Solutions, Engineering and Technology team, is to make sure you understand the organization's processes and how automation can fit into them. "It's very important not to fall into the trap of automating bad processes," he says. "It's easy to do, but it can really impede the benefits the agency will get."

Take the time to fine-tune your automated offerings before offering them to users. Schulman recommends viewing your internal IT department as "Customer Zero" for the automation journey first. That approach will give IT managers the chance to understand and refine the processes and technical imple-



mentation required before enabling self-service.

Application services

Applications are key to the way agencies run critical processes. By automating the process of provisioning applications, users can be sure that they are always accessing the newest version of the application, and they can access those applications immediately, from wherever they happen to be, on whatever device they happen to be using. Automated application provisioning also ensures users only can access the applications based on their approved profiles.

Most importantly, the traditional application development process immediately becomes much more agile, productive and efficient by eliminating the manual process of provisioning each development and test instance. Instead, application developers can use repeatable, preconfigured, secure code blocks to drastically reduce development time. Automated application provisioning also makes troubleshooting, documentation, upgrades and decommission much easier.

To get the most out of automating application provisioning, make sure the IT team understands the factors leading to full automation. That includes:

- **Integration:** Leverage your investment in existing infrastructure tools.
- **Automation:** Conduct that integration through native integration or open protocols.
- **Augmentation:** Consider modernizing the data center and reducing long-term CapEx and OpEx through a more software-defined approach, such as the Software-Defined Data Center.

Beyond SaaS

While concepts like SaaS, IaaS and PaaS are frequently discussed, there are many other services that don't fall into these categories, but are

excellent choices for delivery as a service. Examples include file sharing as a service, analytics as a service, or storage as a service. There are also many agency-specific processes that could benefit from this approach—processes like onboarding a new employee, which can include everything from human resources processes to equipment provisioning and payroll. Or it could be a complicated verification process for security clearance.

Automating these often complex processes provides similar benefits to other types of automation—it simplifies and speeds up every part of the process while reducing human error and saving money. It does this by integrating all parts of the process and combining it with automated abilities to request, approve, provision, operate and decommission whatever is required by the service.

While the benefits of implementing anything-as-a-service (also commonly referred to as XaaS) are vast, they can easily be overshadowed by poor planning. The simplest and first step is to catalog the services already employed by each department in the organization and look for common overlaps, such as storage new employee onboarding. In tandem, ask department heads and users what services they use the most often, and which services would be most useful to them. That information is crucial to determining which services make sense to offer as services. Next, examine how existing systems interact with each other, and how that interaction would change. Finally, analyze what it would take technologically for each user group to access the service under consideration. Only then is it time to consider the technology and application development part of the undertaking.

Agencies also can use automation to improve the performance and manageability of the enterprise by automating management workflows. Done right, automating

management workflows can reduce managers' interaction with day-to-day processes while simultaneously improving the responses of those processes. Using a policy-based governance model will allow managers to keep tabs on these processes without needlessly being a pinch point in the workflow, Schulman says.

Work smart

It all boils down to working smarter, not harder. Automation itself is a "work smart" philosophy, but it requires the right mindset and upfront planning, training and tools. Mindset is critical; without making that shift to the customer-centric, service-oriented mindset, it's almost impossible to make the necessary people and process changes necessary to get the most out of automation. It's also important to stress these changes toward collaboration, communication and service throughout the organization.

Upfront planning is also important. Before attempting any change to the environment, it is crucial to know what customers want, what they currently have, and how systems are currently integrated. Without that knowledge, it's easy to make mistakes. Once you know what you have and what you need, the next step is reorienting the data center to facilitate the automation. That requires a commitment to cloud technology, along with capabilities like self-service portals that allow users to directly provision new services, management, analytics and orchestration tools.

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The new perimeter and the rise of IDaaS

IDENTITY MANAGEMENT has been a major focus in security for a long time. In the federal government, that focus stretches at least as far back as the implementation of Homeland Security Presidential Directive 12 in 2005.

The Obama administration ratcheted the effort higher in 2012 when it released the National Strategy for Trusted Identities in Cyberspace.

Strong identity solutions have become even more vital after a rash of high-profile breaches of both public- and private-sector sites last year.

An executive order from President Barack Obama, released late last year, requires agencies to cut down on identity-related crimes by issuing credentials with stronger security.

Identity management will increase in importance when agencies finally start moving more of their IT activities to the cloud. Critical data will stay behind agency firewalls in private clouds, but other services and applications will migrate to public clouds.

"Extending an organization's identity services into the cloud is a necessary prerequisite for strategic use of on-demand computing resources," according to the Cloud Security Alliance.

However, agencies are tightly wedded to their onsite identity and access management (IAM) systems, which generally use Active Directory and Lightweight Directory Access Protocol and over time have become shaped by agencies' individual policies and specific needs. What's needed is federated identity management for hybrid

market in 2015, versus just 4 percent in 2011.

That change is driving development of new, cloud-based identity solutions. Centrify, for example, already has a fair number of government agencies as customers for its cloud-savvy identity management product, but it recently launched its Centrify Privilege Service, which officials

are easing and budget pressures make the cloud an increasingly attractive solution, agencies are still hesitant to give up key assets to the cloud.

Centrify's chief marketing officer, Mark Weiner, said that so far, several agencies have begun playing with CPS to see what it might do for them.

Parallel to the growing

Identity management will increase in importance when agencies finally start moving more of their IT activities to the cloud.

clouds, which would allow agencies to extend those AD/LDAP systems into the cloud.

Cue the rise of identity as a service (IDaaS). The term covers a number of services needed for an identity ecosystem, such as policy enforcement points, policy decision points, policy access points and related services.

Cloud providers such as Microsoft and Amazon already offer cloud-based directories that sync with on-premise systems. Given that cloud computing is projected to become the bulk of IT investments by 2016, Gartner expects full-blown IDaaS to make up a quarter of the total IAM

claim is the first purely cloud-based, privileged identity management solution.

Privileged accounts in particular have become a favorite target of cyberattacks because they allow bad guys almost unlimited freedom to roam across an organization's systems and steal data or disrupt operations.

Centrify said its new service offers a way to manage and secure privileged accounts that legacy IAM cannot do in hybrid IT environments.

However, the company does not expect it to be an easy sell in government. Although fears about the security of cloud solutions

demand for IDaaS is the use of the phrase "identity is the new perimeter" to describe the brave new world of IT.

Again, the phrase has been in circulation for years, but as mobile devices proliferate and the cloud becomes the primary way of delivering apps and services, the former hard edge of the network is becoming much fuzzier.

Single logons that grant users access across soft-edged enterprises will become ubiquitous as agencies work toward business efficiency. Making sure the identities used for that access stay secure will be the key. •

Can brain scans spot insider threats?

IN THE 1980s, when I was up for a job at the San Jose Mercury News, I was asked to take a personality test. Several of the questions had been taped over, but I could still read what was underneath. One of them was “Does the sight of dirty, ragged fingernails repulse you?”

I wondered who had come up with the questions and what they were supposed to reveal about me. And, of course, I imagined what impact my answers would have on my job prospects.

Today, researchers at Iowa State University are taking personality screening to a new level, and they have found that they can identify people who are likely to be cybersecurity risks by reading their neural activity.

The study, directed by Professor Qing Hu, measured the brain activity and response times of subjects presented with a series of security scenarios. Hu’s team found that people with higher self-control posed less security risk than people with lower self-control.

The researchers screened 350 students using questionnaires developed by criminologists more than 20 years ago to measure individuals’ levels of self-control. Then they selected the 20 students at each end

of the spectrum and tested their neural responses to security scenarios.

Researchers found two effects in the electroencephalograms (EEGs), said Robert West, a psychology professor who worked on the study. “One of them is that individuals with high self-control will have more

their primitive reflexive evolutionary capability to make decisions.” Those in the latter group tend to be greater security risks, he added.

“We’re not saying that people with low self-control are bad people,” Hu was quick to add. “People with low self-control simply may not be good candidates

self-control. People like Snowden will defeat the system that we are talking about.”

But Hu said he believes that Snowden is an exception. There are plenty of people who have compromised security because of one small external incentive or stimulus, he said. “They don’t think about whether they might be caught [or] go to jail.”

Hu and West acknowledge that more work is required before the screening is ready for real-world use. For one thing, it’s impractical for employers to hook up applicants to EEGs.

“Once we establish the standard values using the sophisticated equipment, then a company can screen as part of your job interview using 20 or 30 questions,” Hu said. “That’s all we need.”

As interesting as the research is, what companies might do with it is creepy. By some estimates, as many as a third of companies already use personality tests as a factor in making hiring decisions. If the new screenings are considered more accurate, it’s likely that more companies and, potentially, government agencies might adopt them. That prospect will understandably upset privacy advocates and job applicants alike. •



Iowa State University researchers measured brain activity to assess who was more likely to violate cybersecurity policies.

neural activity when they are considering major violations. That is attenuated in those with low self-control.”

According to Hu, individuals who display greater activity in the prefrontal cortex when faced with a security scenario demonstrate higher levels of self-control and are less likely to present a threat. “Some people have developed an ability to use more executive control,” Hu said. “Others rely more on

for a job that has access to sensitive, confidential data because they are easily induced or enticed by external factors.”

At the same time, he acknowledged that individuals with high self-control can also be security risks. Hu said Edward Snowden, the National Security Agency analyst who released huge amounts of classified data, “appears by all indications to have very active high

Intelligence at the edge: 4 tips to begin exploring IoT

THE INTERNET OF THINGS

is a relatively new term in government, though the concept has been around for decades.

Data can be collected through edge devices, such as sensors, wearable technology or mobile phones. IoT makes those devices smarter because data is computed in real time where it's first collected and then transferred to a user's device or a server for additional processing. For devices that don't have the ability to translate data into information, IoT gateways can be added.

IoT can give government managers actionable information more quickly, which allows them to do their jobs more efficiently and effectively. Other benefits include reduced infrastructure investments, increased quality and security of information, and new approaches to data transmission with limited network bandwidth.

Agency IT and operations managers are adopting IoT thoughtfully in a crawl-walk-run evolution. Most are not ripping out whole systems; rather, they are testing bits and pieces of IoT by adding sensors or gateways to their existing solutions.

If you're thinking about trying IoT technologies,

make sure you:

1. Ask yourself what problems you're trying to solve. For example, if you have sensors that send a signal every five seconds indicating that a room's temperature has not changed, you're wasting money. Instead, insert a gateway appliance that would make the current sensors send a signal only if a change in

is conducting tests on soil moisture levels, a gateway in the ground could send an alert when the soil is too dry. That, in turn, could generate a command to turn on sprinklers or even notify a command center that there is a potential increase in fire hazards.

3. Consider where the users are. Just as you want to translate only the data

questions:

- Is the security model robust and adaptable to support myriad use cases and models across different infrastructures?
- What's the policy on shared data?
- How manageable are the edge endpoints?
- Does data move seamlessly and securely through the systems?

The Internet of Things holds great potential not only for cost savings and productivity, but also future innovation.

the environment crosses a specific threshold of concern. Or install a smart sensor that would do that automatically. That instantly reduces the amount of data going through the communications system — and it cuts costs.

2. Work with a solutions architect who's familiar with IoT. Agencies need someone who can suggest the right elements of IoT so that you only transfer the data you need. A solutions architect can help an agency determine where data should be collected and computed.

Note that some IoT communications are two-way. For example, if someone at the U.S. Forest Service

you need, you want to send the data only where you need it to go. In the Forest Service example, you might want information to go to rangers' mobile phones so they know the sprinklers are about to turn on. First responders, on the other hand, might want the information sent to local gateways for two-way processing in their vehicles and to a local or national command center.

4. Understand the four principles of IoT. Underlying the entire IoT system architecture are connectivity, manageability, security and interoperability of systems and data. To understand those elements, ask yourself the following

- Does data exchange or fusion happen across domains rather than under specific standards within one domain?
- Can users view and interact with the data on many platforms, including smartphones, gateways, tablets, dashboards and control centers?
- How will the system integrate with the agency's new and existing technology?

IoT holds great potential not only for cost savings and productivity, but also future innovation. Those are advantages agencies cannot afford to ignore. • — *Tiffany Sargent is IoT senior solutions architect and principal engineer at Intel Federal.*

5 steps to building a microservices foundation

MICROSERVICES — small pieces of software that do one thing and do it well — are a hot topic in the context of software delivery and development, especially among government IT professionals.

That's because microservices can be a godsend for agencies seeking greater agility and accelerated service delivery.

Microservice architecture describes “a particular way of designing software applications as suites of independently deployable services,” according to Martin Fowler, who has written a thorough introduction on the subject.

Microservices are typically organized around “business capability, automated deployment, intelligence in the endpoints and decentralized control of languages and data.”

Consider, for example, a government website that has different sections fed by separate application programming interfaces. Each API can be managed through a microservice, which can make it much easier to control content and security for that site.

Getting there, however, requires government IT administrators to re-examine their traditional enterprise architectures. Existing platforms are gen-

erally built on traditional IT approaches that emphasize scalability, efficiency, safety and accuracy. Those traditional platforms are important because they run day-to-day operations and provide IT services across an agency. However, they can be saddled with technical debt.

Standardizing on ecosystems and platforms

mented with ideas from agile methodologies — such as test-driven development, which requires that test cases for the eventually delivered functionality be created before any application code is written. That approach allows agencies to build automation that can run all test cases against code commits or updates, which empowers develop-

ment, while monitoring tools give IT managers global insight into their operational environments and let them identify trends or issues before they result in outages.

5. Introduce some chaos into the environment. System failures are bad, but they can help organizations become more resilient. Therefore, IT professionals

Microservices can be a godsend for agencies seeking greater agility and accelerated service delivery.

that free up resources and correct failed workloads can serve as the foundation for microservices. Here are a few ways government IT administrators can build that foundation:

1. Set up and empower small, agile groups. Then encourage the groups to experiment; they should fail fast so they can succeed sooner. Quick failures result in better understanding and problem solving, which can lead to great things. Teams should be encouraged to try things, see how they work and then pivot as required with the newfound knowledge.

2. Think about continuous integration. It is partly derived from and imple-

ers to experiment.

3. Then try continuous deployment. Once the codebase's health has been determined, agency IT professionals can start thinking about continuous deployment, which also eliminates the cost of change because code delivery is automated. Even just one code push a day can drastically increase agility.

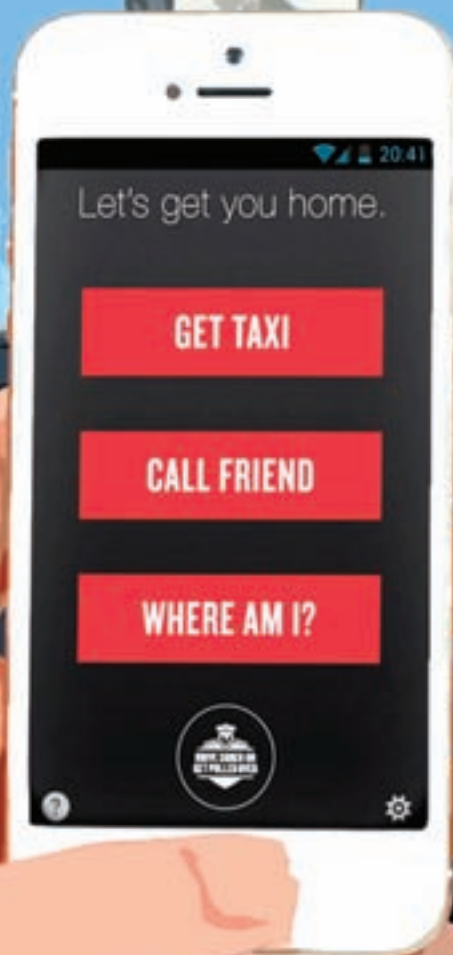
4. Consider platform as a service. PaaS provides consistent runtimes and developer self-service for quickly provisioning instances for use. With PaaS, developer environments no longer require a month-long fulfillment. Tools such as Jenkins provide for automation, continuous integration and

might want to introduce some chaos into their environments via tools such as Netflix's Chaos Monkey and its derivative projects. Those tools help detect and rectify potential failures and can greatly increase system reliability.

The foundation for microservices is built on going small and agile and supporting that effort with technologies that allow organizations to react quickly and roll out new services continually.

It's the perfect environment for today's government agencies. •
— Jim Tyrrell is a principal JBoss solutions architect in Red Hat's Public Sector practice.

THE *REAL* KILLER APP:



SaferRide, Transportation Department

CITIZEN SERVICE

HERE ARE SOME WAYS TO TAKE THE GUESSWORK OUT OF DEVELOPING USER-CENTRIC MOBILE APPS

BY PAUL McCLOSKEY

For all the disruption that the launch of HealthCare.gov caused, it had a number of healthy side effects, including a commitment to improving digital services at all levels of government, especially applications designed for mobile users.

Since then, the Obama administration set up the U.S. Digital Service to help federal agencies transition to digital systems, established the 18F tech incubator at the General Services Administration and requested \$100 million in funding to back the efforts.

“Digital service is getting serious in part because of some high-profile services that didn’t work so well when we first rolled them out,” said Mike Kruger, director of the Commerce Department’s Office of Digital Engagement. “And that digital service has to be good. It’s no longer acceptable to be clunky and hard.”

Those requirements are increasingly being applied to citizen-facing mobile apps, which are rapidly becoming the

tool of choice for accessing government data. Last year, research and analytics firm comScore estimated that a majority — 53 percent — of all digital media time is now spent on mobile apps.

“People want Google ease and Amazon personalization,” Kruger said. “If you work in the public or private sector, you have to deliver that kind of digital service. It’s got to be that simple.”

To perform at that level, government and industry executives say mobile apps need a thorough tune-up, from the user interface to the back end.

‘BECOME YOUR USER’

The first principle of building a government mobile app that meets industry standards is personalization, which involves the ability to zero in exhaustively on end-user preferences.

“You want to know what your users would do — how they use mobile, are they comfortable using native apps, does the native app bring them a specific functionality that actually helps?” said Jacob

MOBILE

Parcell, manager of mobile programs at GSA's Office of Citizen Services and Innovative Technologies.

"There are a lot of federal applications that start out thinking what the agency would like," he added. "But it's not what the agency would like — it's what the user would like. You want to become your user and think like they do."

Parcell, who also manages the federal government's Mobile Gov Community of Practice, offered examples of apps he believes strike the right balance of

design, function and personalization. They include the Transportation Department's SaferRide, which helps people find a ride home when they've had too much to drink.

The app's format is reduced to three buttons labeled "get taxi," "call friend" and "where am I?" At the same time, its functionality has been enhanced with the addition of Yelp's application programming interface, which points users to the nearest available taxicabs.

The Energy Department's Lantern Live app, which helps people find gas

stations during power outages, also weaves together form and function well, Parcell said.

In particular, the app has a crowd-sourcing feature that allows people to report which gas stations still have fuel available during an emergency.

Parcell also cited the IRS' IRS2Go app, which lets users check on the status of their tax refunds. And the agency continues to update the app — for example, by making a number of changes for the current tax cycle and simplifying screens after users reported that "they

CAN WATSON MAKE GOVERNMENT APPS SMARTER?

Government mobile apps are undergoing a gradual transformation from being used mainly to deliver answers for frequently asked questions to becoming dynamic customer service power tools. Now they might also be on the verge of getting much, much smarter.

Recently, a team of students at the University of Texas at Austin won \$100,000 in startup funds for their work on a mobile app that helps users access Medicaid and other public services.

The team took first place in the Watson University Competition, whose goal is to fund apps that use Watson's natural language-oriented question-and-answer technology to improve the ability of people to find information about local health and human services.

IBM gave students access to a Watson developer shell and training on how to work with the cognitive system.

"You don't program Watson, you teach it," said Lauri Saft, director of the IBM Watson Ecosystem. "We gave them the empty shell of Watson and said, 'Go and come up with ideas you feel would be valuable.'"

The winning students injected publicly available information into Watson, including advice on finding social services in Texas, the location of food pantries and the availability of temporary housing. The result is an app named CallScout.

"We spent a lot of time figuring out

what the call center actually wanted, what features they thought they needed and designing it in a way that would be easier for their users," said Bri Connelly, leader of the winning team and now part of a commercial venture seeking to launch the app under the name Cerebri. "We tried to be really intuitive because a lot of these people are not engineers like us."

The CallScout application stood out for the judging team because "it was a novel application for social services," Saft said. "Even though we had hundreds of applications from different kinds of industries, we had never seen anything quite like this."

The team got high marks for the

app's "ease of use and how simple and consumable it is," Saft said. "There was such power in that. Technologists sometimes over-engineer these things, but they had kept it so clean and so simple with the end-user client or citizen in mind. It came together really nicely."

Connelly said Cerebri will launch in July in the central Texas region, where the team hopes to generate interest from 211 call centers.

The developers also plan to expand into other areas and are building prototype applications for assistance with health care, Medicaid and Medicare, and tax issues "to see where our best fit is," she said.

— Paul McCloskey



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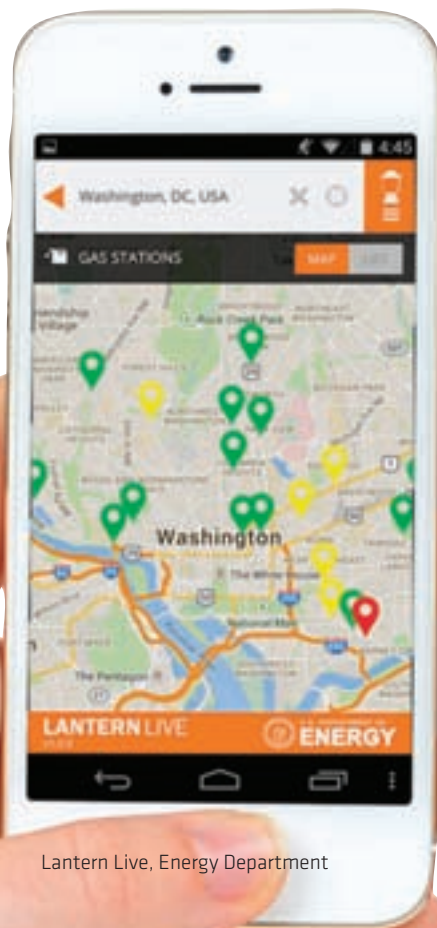
MOBILE

were having to do too much,” he said.

In addition, agencies should make sure they’ve incorporated approaches already used elsewhere to design similar tools.

“Whatever field you’re developing your app for, you need to understand the science and research of that field and make sure you’re building on top of that foundation of understanding that’s been accumulated over time,” said Joseph South, deputy director of the Education Department’s Office of Educational Technology.

He added that it’s often a good idea to create what is called a minimum viable product — “a small product that minimally meets the requirements — and then get it in the hands of users so they can give you feedback that helps you iterate your design in ways that will be most useful to them.”



Lantern Live, Energy Department

APPS IN THE ENTERPRISE

Developing a responsive app doesn’t stop with design. It also means paying attention to how people interact with an agency’s full-service infrastructure over time.

“There’s a lot of focus going on about ‘Is this app easy to use?’ ‘Are people happy with the way it works?’” said Mark Headd, technical evangelist at Accela, a firm that helps developers create civic apps. “That’s important, but as governments start to use more of these apps, we need to understand how it affects a customer service agent in a department having to answer a caller’s question. That’s a harder problem to solve.”

He said the solution involves making sure highly skilled employees are available to help the people who really need it. “If I’m a government administrator, I’d much rather have my high-value resource deal with a call from a person who’s just lost their food benefits than have them deal with a call about trash pickup Wednesday or Thursday,” he said.

By addressing basic requests or questions, mobile apps can help agencies make the best use of costlier staff resources, he said.

Those decisions also depend on maintaining an ongoing analysis of traffic coming into the agency’s call center. “What I think governments are not doing enough of is looking across the enterprise and asking, ‘Are we pushing these things to the top because we know people are calling and we want to allow

them to self-serve more efficiently?’” Headd said.

BACK-END CRM

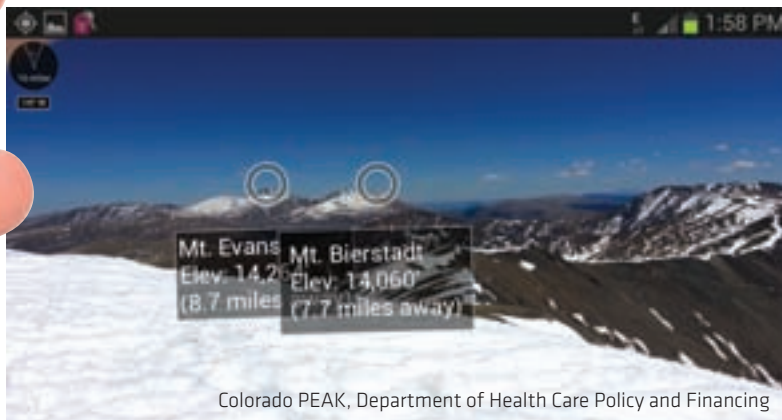
However, analytics about the performance of government apps and call centers often require a level of back-end systems integration that not all agencies possess, analysts say.

“Government has put some good apps out there,” said Alan Webber, a research director at IDC Government Insights. “The problem is that there is seldom a back-end system to support the applications. What’s missing are the customer relationship management-type systems that will allow them to actually manage the application.”

The lack of CRM stands in the way of offering apps with more transactional features, such as those that enable people to schedule a picnic area at a local park or check a person’s name and address against a tax database, he said.

Some governments are bridging the gap, however. Riverside, Calif., for example, operates a set of back-end systems using Oracle’s Siebel CRM tool, the company’s SPL customer-care software and permitting system Permits Plus. Together they “eliminate a lot of paperwork and save a lot of time,” Riverside’s Chief Innovation Officer Lea Deesing said.

Even so, the city wants to streamline its app offerings even further. Riverside currently has seven public-facing 311 apps and is considering consolidating them to better manage 311 traffic and stay on top of the inevitable codebase updates.



Colorado PEAK, Department of Health Care Policy and Financing

The city's app suite includes a 311 mobile app through which people submit 600 service requests monthly; an e-services app that residents use to send requests via the city's website; and internal apps, including a graffiti abatement tracker used by the city's maintenance crew.

"Our next step is to take an inventory of all of our apps and determine if citizens would be better suited with one app that does it all rather than having all these individual downloads that they have to do for each piece of functionality they want," Deesing said.

COLORADO'S PEAK

Colorado has been building its back end by setting up a CRM platform for the Department of Health Care Policy and Financing's Program Eligibility and Application Kit.

PEAK enables state residents to check their eligibility for Medicaid and other health services via a mobile app. It has helped automate a process that used to take 45 days, said Antoinette Taranto, the department's chief client officer.

Before it launched the website and app, the department had been fielding about 5,000 calls a day. "We went from a heavy paper process to all of a sudden having 60 percent online," Taranto said. About a third of the online users were accessing the website via a mobile device, she added.

In developing the app, the department looked at statistics for its call center to determine the top reasons people were contacting it, she said. Callers were mostly pursuing five questions that were conducive to self-service, including asking for a medical card or updating their eligibility information and status.

"We took those five things and put them in the mobile app," Taranto said.

Today, Medicaid clients in Colorado can update current income or job changes. If they qualify for programs that require paying a fee, they can use their mobile device's camera to take a photo of a check or credit card and upload the necessary payment information.

"It's really given consumers a lot of

TRAINING-FREE APP DESIGN

Developing a new app for your agency? Make sure potential users don't need to invest much time figuring out how to use it, app designers say. If training is required, your audience might already be lost.

"For mobile apps and even desktop apps, if it requires training then you... did not do a quality or complete job of user-experience design," said Tim Young, a principal at Deloitte Digital, which helps government agencies design apps.

To avoid confusion, the design must account for the user experience well enough to anticipate any navigation hurdles. To do that, Deloitte's app design process builds toward a highly refined profile of the end user, which starts with identifying the appropriate platform, whether it's iOS, Android, Windows or multiple platforms.

The firm's user-experience designers

conduct ethnographic research, focus groups and stakeholder interviews and dive deep into the user preferences they uncover. People in a rural area might have spotty Internet access, for instance, so an app designed for them might incorporate an auto-save function.

Young said aligning an app's requirements and the target user group's characteristics requires discipline. "It's not, 'Here are some requirements I came up with because I'm a coder and I'm good,'" he said. "That's not how this works. That's not how you get high technology adoption rates with very low training costs."

"The bottom line is user-centricity, making every decision on design based on what the users want and need versus what the client or the developer wants," Young added.

— Paul McCloskey

flexibility and control, and it streamlines the administrative side," Taranto said.

'THE LONG TAIL': APP MAINTENANCE

Although government agencies are making progress on building more mature mobile apps, few are tackling what some say is a potentially costlier problem: maintaining all those apps.

"What's happened is that agencies and commercial entities now have dozens of apps," said Brian Paget, technical director for content and analytics at Adobe. "They're realizing [that] while it's relatively inexpensive to build an app once, it's much more expensive to maintain that app over the long run. That's where the long tail is."

The task of maintaining mobile apps mirrors a challenge that surfaced about a decade ago during the evolution of Web content management tools, Paget said.

"If you look back at how we used to maintain websites, you would write

HTML code," he said. "Then if you wanted to publish your story on the website, you'd call the developer to put it on the site."

The same problem exists today in the app content arena. "When agencies get to the maintenance cycle, they still need a developer to maintain the content," Paget said. "The job of mobile administrators is how to centralize the management of app content and figure [out] how to get internal business users to do that. That's a sea change."

And making that change requires an ongoing evolution. "The next level of maturity is to make the maintenance on those applications a lot more efficient and make sure we embed analytics into these apps, so that we understand patterns of utilization that we need to improve on," he said.

"Mobile applications can be a legacy system, too, if we don't have an easy way to continue to maintain [them]," he added. "You don't want to build the next generation of legacy applications that happen to be mobile friendly." •

Storage at (smaller) government scale



BY WILL KELLY

To solve the ongoing storage challenge, smaller agencies often need look no further than the cloud

Data storage requirements are exploding at every level of government, but not all agency budgets are created equal. Smaller federal agencies and state and local governments have the challenge of crafting secure, scalable and accessible storage solutions at an affordable price.

Here's how some of them are tackling that challenge.

Small storage, small agency

"In this day and age, for anyone, especially small or medium, to build any kind of storage solution is really bizarre," said Tony Summerlin, senior strategic adviser to CIO David Bray at the Federal Communications Commission. "It really should just be a decision as to which cloud provider they're going to use for storage. I mean, it doesn't make any sense to own anything."

In fact, Summerlin recommended that smaller agencies consider using the storage that comes with their software-as-a-service or platform-as-a-service solution.

"What people are trying to do is separate the app from the storage, and it's not that easy," he added.

Christian Heiter, chief technology officer at Hitachi Data Systems Federal, sees cloud-based storage as a great option for smaller agencies. "I think people are still trying to learn about it," he said. "It's still a new area. Some people would still like to keep it private because they understand that implementation, but the cloud provides a nice capability in the future."

He added that "if there's a good cloud implementation, they can start working with their infrastructure in the cloud or their application in the cloud or the software that

they need and move into a private implementation later if they find their needs change."

Rob Stein, vice president of NetApp's U.S. Public Sector, offered a variation on the usual on-premise, virtualization and hybrid cloud decisions that dominate discussions about keeping storage on budget. NetApp espouses a multitenant storage solution for smaller federal agencies and state and local government agencies.

In that model, departments become tenants in a governmentwide or hybrid cloud storage solution instead of buying their own.

Small storage, small budget

"The budget challenge is usually on the capital expenditure," Summerlin said. "If you can somehow roll it into an [operations and maintenance] situation rather than doing [it as a capital expenditure], then you're always in better shape in government."

And when asking for money to expand agency storage, Summerlin advised emphasizing transparency and the need to better serve the public. Although storage isn't sexy, he added, it's vital to most agencies' missions.

Small storage, big planning

Whatever your approach to storage, you can expect to need a lot of it, Summerlin said.

"You better plan for the fact that everybody's kept everything forever, in one way or another," he added. "Planning for storage is something you better do and try to get as much of it either off-line or near off-line as possible."

And make sure you budget for it, too. "It does cost money," Summerlin said. "They say that storage is practically free, but 'practi-

STORAGE

cally' is a very broad spectrum. I would say it's one of the key issues. You better spec out what you actually have in storage. It usually surprises people how much they actually have."

He said agencies must have a strong

records management policy in place, and he added that the unadulterated growth in Microsoft Outlook .pst files and other individualized storage mechanisms must stop.

"I think the discipline around what

you are or are not going to keep should be pretty tight," Summerlin said. "Each time that you go to a new data store, you have the opportunity to clean the data and do a lot better job on tagging and metadata." •

Local government storage solutions

A closer look at how three jurisdictions are handling their storage needs.

Northumberland County, Pa.

Northumberland County's legacy IT infrastructure put limitations on workforce productivity, which adversely affected county services and made it difficult to comply with data-retention policies.

Improving county services and data protection without increasing the IT budget was a challenge driven by Stephen Bridy, a new county commissioner with a long career as a financial adviser in the private sector.

The county selected a hybrid cloud solution, NetApp Private Storage for Amazon Web Services, to manage the county's data efficiently and support future IT initiatives.

"Northumberland County will easily save over \$1.1 million in hardware and facility costs over the next 10 years by moving to the cloud — and even more by not having to hire extra headcount to manage a growing data center," Bridy said.

The new system also strengthens data security and disaster recovery while meeting data compliance and sovereignty requirements.

Austin's Public Safety Department

The Public Safety Department in Austin, Texas, archives the in-car videos from the department's 650 police vehicles at the end of each shift. That collection was growing at a rate of 2 terabytes to 4 terabytes per day.

The city needed an economical storage

system, but it was also facing challenges related to the scalability of its network-attached storage, whose requirements exceeded 1.5 petabytes.

City officials evaluated public, hybrid and local on-premise private clouds as potential solutions. They chose Caringo Swarm, a storage software solution, because they wanted something that would function as an operating expense rather than a capital expenditure, and public cloud providers couldn't meet compliance requirements.

Caringo Swarm decouples data from hardware, enabling the city to buy storage capacity and then deploy it on the cheapest, most efficient hardware available at the time.

The approach saves the city at least

to improve the infrastructure's scalability and disaster recovery capabilities while reducing IT operating costs.



Therefore, the IT staff looked for a solution that could reduce the amount of time spent managing infrastructure by simplifying virtualization and improving the availability of critical workloads.

The school district chose the Scale Computing HC3 virtualization platform to replace aging hardware, refresh the infrastructure and support higher uptime service-level agreements for critical workloads.

With the HC3 solution, the school district has virtualized 75 percent of its computing environment. The IT staff runs as many as 24 virtual machines on HC3 and was able to reduce the time spent managing infrastructure by as much as 24 percent.

The IT staff also reduced the time needed to recover from critical workload-supporting hardware failures from as much as 8 hours to less than 10 minutes with the high availability built into the HC3 platform.

— Will Kelly



half the cost of one refresh cycle. And although the city pays maintenance costs, it doesn't have to rebuy hardware and software every five years.

Morgan County, Tenn., School District

The Morgan County School District faced operational challenges related to storage management, and officials also wanted

NH preps agile, off-the-shelf solution for DMV

New Hampshire's DMV is speeding development of a new driver's license system by adopting a commercial solution

BY STEPHANIE KANOWITZ

Descriptions of the Division of Motor Vehicles don't usually include words such as "speed" and "efficient technology." But an IT upgrade for the driver's license program at New Hampshire's DMV could change that thinking and serve as a model for other agencies nationwide.

At least in part, that's because the state opted to go with a commercial solution rather than build a custom-made replacement for its aging system. The New Hampshire DMV and systems integrator Tech Mahindra are using agile development techniques to build the new Motor Vehicle Enterprise System (MOVES) in 22 months.

MOVES is built on top of Microsoft's Dynamics CRM, or customer relationship management, platform, which the agency has been using since 2011. The new system will digitally manage information on driver's licenses, financials, hearings, inventory, dealers and inspection stations. MOVES also integrates with federal and state justice systems and the state's financial system, and it automates many processes for the first time.

"The entire country is watching New Hampshire right now to see how our progress is going [on] our modernization effort," said Jeff Oberdank, supervisor of driver licensing at New Hampshire's DMV. "There isn't a lot of custom coding [or] a lot of custom building that has to be done," and no

new equipment is needed, he added.

"We have one of those [legacy] systems that we don't have anybody left to work on, so what we really wanted to do was go with something that is upgradeable," he said.

Oberdank was referring to an IBM mainframe that was installed in 1983

"We sat with our mainframe programmers, and it took us from conception to rollout and testing about six months for this end of production," Oberdank said.

Then the new team had a turn. "It took Tech Mahindra about two weeks to build it," he said.

"The entire country is watching New Hampshire right now to see how our progress is going [on] our modernization effort."

- JEFF OBERDANK, NEW HAMPSHIRE DMV

and that the DMV is still using while MOVES is being developed.

He said MOVES already offered a glimpse of its effectiveness when Oberdank's team was implementing a program mandated by the Federal Motor Carrier Safety Administration under which commercially licensed drivers must submit medical certificates to prove they are fit to drive commercial vehicles.

Using the mainframe system, the DMV's frontline staff would have to manually enter the certificate information so that it could be directed to a federal system that makes the data available to police.

MOVES captured the details of the medical certificate information and made it valid for 24 months. When a driver applies for or renews a commercial driver's license, the DMV can refer to MOVES to check the validity of the certificate before issuing a license.

Eventually, the DMV will be able to receive the certificates electronically from medical providers.

Tech Mahindra worked closely with Microsoft in developing MOVES. The highly configurable system, specially designed for motor vehicle departments, also supports customer service, compliance checks, performance measures and fraud prevention. •

Graphics acceleration takes VDI to new level

Adding dedicated GPUs to a Texas town's virtual desktop system has improved the user experience

BY HEATH DOUGLAS

The city of Round Rock, Texas, employs 850 people to serve a population of 100,000. Our city covers a wide area just outside Austin that, while beautiful, often impairs employee productivity. For example, repairing a computer on the far side of town requires someone from the IT team to drive to that location, retrieve the workstation, and return to the office for diagnosis and repair before making a second trip to return the computer to its user.

That model, plus the inherent risks involved in storing data on local computers with inconsistent backups, poses significant costs and risks to the city government.

Training is another issue. The Round Rock Fire Department uses videos because the nature of its employees' shifts makes it difficult to assemble everyone for live training sessions. Yet until recently, the firefighters at each station had to share two or three desktop computers, which made it difficult for them to view the videos.

Our IT department realized that those challenges lent themselves to a virtual desktop infrastructure (VDI). Now we have centralized servers that host and run applications, render graphics and send the resulting data to users at remote locations.

Employees can access the servers from any desktop, laptop or mobile device that has the appropriate portal



client installed on it, and they can do that via just about any local or cellular network. They also receive full Windows desktops that act as terminals. As a result, the end users' experience is largely identical no matter what device they are using to access the servers.

Applications — from general office tools to streaming video and high-end 2D and 3D graphics and modeling tools — benefit from graphics acceleration via a dedicated graphics processing unit (GPU), which frees the CPU to run the applications. However, legacy remote-access protocols do not include GPU support and therefore pass the graphics tasks to the

CPU. That approach consumes excessive CPU cycles, which degrades the speed and quality of graphics-oriented applications.

We implemented VDI without GPU support and immediately started hearing complaints about jerky video playback, poor quality and intermittent audio. We eked out marginal performance improvements by disabling all desktop interface enhancements, but that delivered an antiquated user experience. VDI gave us remote access, bring-your-own-device readiness, ease of management, standardized application/desktop images and data security. But the video playback and interface problems spurred us to explore ways

to optimize the graphics.

Adding graphics acceleration immediately improved performance across the board. Users reported virtual desktop performance equal to or better than their existing computers. Our new VDI consists of five servers running a total of 300 virtual machines with one NVIDIA GRID K1 card per server. Each graphics card uses NVIDIA GRID vGPU technology to share each physical GPU among multiple virtual desktops, and each card supports as many as 30 concurrent and 60 total users. Employees receive Windows 7 desktops, and we are in the process of upgrading to Windows 8.1.

Migrating from PCs to VDI with graphics acceleration can give local governments several long-term advantages. First, VDI requires less IT overhead. At Round Rock, one person man-

ages the entire VDI. We use three more people to manage the remaining workstations at various locations in the city.

Second, VDI lets us store data in the data center, where we can secure it and protect it against disasters. Storing data on local drives risks losing the data itself, the investment in obtaining that data and the historical value of retaining that data for ongoing use.

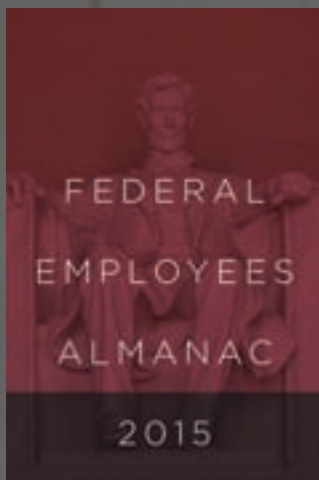
Third, most city employees now use low-cost thin clients to access the VDI. The police and parks departments use tablets to access virtual desktops so they can file forms and reports from the field without having to return to the office to use a computer. Users love the improved performance and not having to commute back and forth to do their work, especially in the evenings and on weekends. That high level of mobility also allows employees

to use their own devices to access the network, which makes them more productive while saving the city money.

The initial cost of deploying VDI in Round Rock was a wash compared to desktop PCs, but we expect to see significant long-term savings, along with happier and more productive city employees. Today, approximately 80 percent of the virtual desktops in Round Rock include graphics acceleration, and that percentage will grow over time.

In addition, our VDI deployment is ready to support more remote and telecommuting employees. Meanwhile, our IT department is continuing to find new ways to use accelerated virtual desktops to increase the value of our investment even further. •

— Heath Douglas is the IT director for the city of Round Rock, Texas.



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Palm Springs police break free of paperwork

SceneDoc's mobile documentation platform lets police securely collect text, photos, video and audio in near-real time

BY STEPHANIE KANOWITZ

Police officers in idyllic Palm Springs, Calif., keep a box of 56 forms in their vehicles that they pull out when they respond to an incident. After they fill in the paperwork by hand, they take it to the station, digitize the information, upload it, create a folder and move it to a secure location, where the evidence team grabs it and moves it again.

"There's a lot of inefficiency and man-hours wasted," Palm Springs Police Department Sgt. William Hutchinson said. "Not only do we want to go paperless, but how can we keep the officers in the field longer without having to come to the station? We wanted a platform that could do a lot more than just forms.... We also wanted [officers] to be able to take pictures and do audio or video — anything digital."

A few months ago, Hutchinson turned to SceneDoc for help. The company specializes in policing as a platform, and its software platform enables public safety officials to securely collect information using mobile devices. In addition to digitizing all those forms, the latest version of SceneDoc lets users take photographs and record audio and video from their mobile devices.

What's more, it lets officers in the field communicate in near-real time with supervisors back at headquarters. SceneDoc's system automatically



syncs with the cloud so that supervisors can get case updates as they happen.

Hutchinson said that feature has been a huge boon because there have already been situations in which a detective has been able to tell an officer on the scene to ask someone additional questions. In the past, detectives would review files only after officers had manually submitted them, and then detectives would have to hunt down the missing information themselves.

Although it is still in the testing phase in Palm Springs, SceneDoc has already cut in half the amount of time

officers spend on paperwork, Hutchinson said.

Using iPad Air 2 tablets, officers can log in, choose the type of form they need and then populate it by keying in information or selecting from dropdown menus. With a hit of the "save" button, all the information goes directly to the police department's server, and officers can stay on their beats.

"I suspect that with a little more learning and as the officers get to use this, that 50 percent [time savings] will be more like 60 to 75 percent as they start getting better at this, which I think is going to drastically improve our response times and the officers'

time on call,” Hutchinson said.

The platform, which works on Android and iOS devices, is not Web-based so officers can use it even when they don’t have Internet connections. Additionally, the data they collect remains encrypted and containerized on the device whether it’s connected to the Internet or not. Once a user gives the OK to submit the information, it goes to a specified server.

Given the nature of the information, security is a top priority. To that end, the product complies with the FBI’s Criminal Justice Information Services requirements and uses 256-bit encryption and multifactor authentication.

“Whether that data is on the smart device or moving to the server or on the server, all of that data is fully encrypted throughout that entire process,” SceneDoc CEO Alex Kottoor said.

Additionally, photos taken via SceneDoc don’t comingle with other photos taken by a mobile device. “We don’t want the gory homicide picture showing up in the same roll as your kids’ fishing trip last weekend,” Kottoor said.

In its latest iteration, SceneDoc can now manage team-based investigations. “Because the software has the intelligence to know who is in the agency’s structure on the platform, a case leader can arrive at the scene, or be back at the office for that matter, and assign a case to these 33 agents or these 33 officers,” Kottoor said. “At that point, every bit of data collection happening through SceneDoc seamlessly gets managed through a single case or occurrence number, and then from a reporting perspective, the software would have the intelligence to bring that all together.”

Additionally, the platform accommodates shared devices because it isolates user accounts so that when one person logs in, he or she can’t access what the previous user collected.



“We wanted a platform that could do a lot more than just forms.... We also wanted [officers] to be able to take pictures and do audio or video – anything digital.”

– SGT. WILLIAM HUTCHINSON, PALM SPRINGS POLICE

Pricing for SceneDoc is structured around volume-based subscriptions. The costs include licenses, support, storage and automatic updates when the company releases new versions, which happens about twice a year.

Hutchinson said all the officers in his department will have access to SceneDoc in July. He also plans to

take advantage of the platform’s ability to integrate with the department’s computer-aided dispatch system, and he said he looks forward to upcoming SceneDoc capabilities, such as the ability for police officers to scan driver’s licenses.

“I wish we would have had something like this years ago,” he said. •

'Black clouds' block all but authorized devices

A new tool rejects the open communications of the Internet in favor of a default closed approach to traffic

BY BRIAN ROBINSON

The Internet has a fundamental problem with security that's part of its very DNA. And if things stay as they are, that problem — and Internet security — can only get worse.

The Cloud Security Alliance (CSA) and its industry partners intend to change that.

If things go as planned, within two years the partners will produce the first "black cloud" — an open-source, software-defined perimeter (SDP) that will stop distributed denial-of-service attacks and enable highly secure cloud-based applications.

"We think this is a pretty big idea," said Jim Reavis, CSA's co-founder and CEO. "We've already defined a very specific framework for how you could implement this so that organizations can build the software themselves. And several government agencies are now doing that."

The current project, which CSA is developing with digital risk management company Waverley Labs, will develop open-source code for one specific use case. Reavis said the goal is to create standards and start seeding the market with open-source software that information security and network providers would then embed in their solutions.

"We've been working for a while with the [CSA] SDP Working Group and have already had several proprietary versions that have gone into different

security control layers," said Juanita Koilpillai, CEO of Waverley Labs. "So we thought why not make this an open-source project, which we'll develop versions for multiple layers over time, the first being single packet authentication that will allow [network] devices to deny all connections from anything other than the application they want to talk to."

ELIMINATING THE NEED FOR HYBRID CLOUDS

Beyond applications, the goal is to only allow connections to devices that have been authorized to talk with the networks, which provides the ability to hide the organization's resources from all eyes except those that have a specific right to see them.

It essentially turns the concept of the Internet as an open communications medium on its head. The fabric of the Internet is now like Swiss cheese, with so many holes that it's all but impossible to completely defend against modern threats such as man-in-the-middle or SQL injection attacks. If you use the Internet, you are vulnerable.

By contrast, CSA's SDP approach makes total security the starting point and allows only those connections it can authenticate. That approach cannot be instituted for the whole of the Internet all at once, but with the Internet of Things looming, when millions of embedded computers and sensors will be

connected via the Internet, "fundamentally, we are now at the point where we are going to have to shift from this default open approach to layer on default [closure] to darken parts of the Internet," Reavis said.

One area in which this could be immediately useful is in spurring agencies' move to the cloud. Despite various mandates and directives, it has been a slow process for government because of security concerns. Those concerns have prompted the rise of hybrid clouds in which some applications and services reside in a public cloud while more sensitive information stays behind agency firewalls in private clouds.

That solution can be expensive for agencies, however, because the cost savings associated with the public cloud are blunted by having to maintain an on-premise infrastructure.

In CSA's model, everything could be moved to a public cloud because SDP allows the creation of dark clouds inside the public cloud infrastructure. Those dark clouds would be owned by the agency and would be invisible to everyone except for designated and authenticated users.

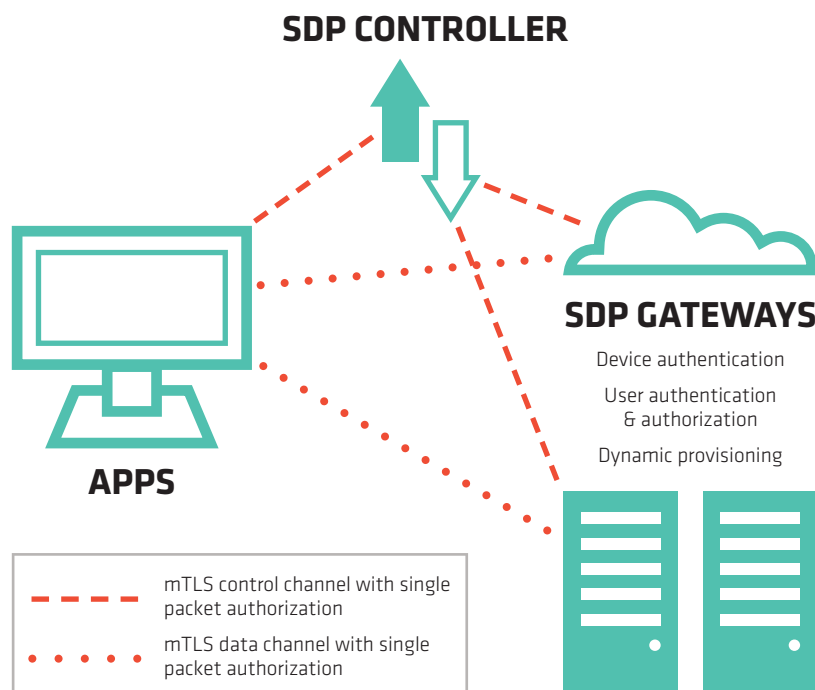
There would be no possibility for anyone else in the public cloud to see or share the organization's data, the main fear agencies have about moving sensitive applications and data to the public cloud.

"'Virtual private cloud' is going to be

Multilayered security

The Cloud Security Alliance's software-defined perimeter has five layers of security controls that together make it difficult for attackers to gain access. Those layers are:

- **Single packet authorization**, which rejects all traffic from unauthorized devices.
- **Mutual Transport Layer Security**, which provides two-way cryptographic authentications.
- **Device validation**, which proves that the private key is held by the proper device and that the device is running trusted software and being used by the appropriate user.
- **Dynamic firewalls**, which individually enable communication with each device.
- **Application binding**, which only allows authorized applications to communicate via encrypted TLS tunnels and blocks all other applications from using those tunnels.



Source: Cloud Security Alliance's "SDP Hackathon Whitepaper," April 2014

such a commonplace term once this gets implemented, and that's going to be the default way that people operate," Reavis said. "It's going to be a big shift for IT and will deliver big cost savings to agencies over time."

CREATING COMMUNITIES

The technology CSA and its partners are using is not new. It's based on protocols developed by the Defense Department and the National Security Agency, and it uses standard security tools such as public-key infrastructure, layered security, IPsec and Security Assertion Markup Language, along with well-understood concepts such as

geolocation and federation to enable connections.

Until now, however, most SDP implementations have been highly customized solutions, available only to the organizations (such as Coca-Cola) that developed them. The goal of CSA's project is to move the SDP model to a more general audience. Accordingly, the open-source version being developed by Waverley Labs seeks to bring people together to talk about how to implement SDP, what standard protocols could be used, what sequence of events should be followed, how to write JSON files to allow interaction with applications and so on.

"Our goal is to create a community that is really struggling to protect their applications and help them either hide them or move them to the cloud," Koilpillai said. "None of the problems we are trying to tackle with this are simple; otherwise, they would have been solved by now."

Waverley Labs will do a phased release of the SDP for different security layers over the next 18 to 24 months. The project will help agencies see how an actual implementation works, she said, which is vital for this kind of thing because "you actually have to take that and prove it; otherwise, people won't believe you." •



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Tech we hope to see in the public sector



Peruse

As more and more data moves to the cloud, a familiar problem emerges: how to sift through it all.

Peruse is a startup that promises to bring true natural-language search to virtually any file type that's been stashed in the cloud. No more sorting by last-modified date or struggling to recall file names; just ask for "all KPI reports sent by Susan last month." More important, deep insights can be drawn from the data inside those documents – think Wolfram Alpha-style queries of your organization's private data store.

The service is still a work in progress, but it already supports Box and Dropbox repositories, and Peruse promises other cloud services will follow soon.



Spinel

The Naval Research Laboratory is developing a ceramic material to produce armor-strength windows and aircraft canopies. But spinel – a transparent magnesium aluminate that can be pressed, polished or ground into shapes – could produce ultra-rugged lenses, mobile device screens and more. And it's far better than glass at letting infrared light pass through, which opens up all sorts of sensor and imaging system possibilities.



Project Vault

Powerful encryption, secure mobile storage and two-factor authentication – all in a microSD card? That's the vision of Google's Project Vault, unveiled at the company's I/O developer conference in May.

Project Vault is essentially a secure computing environment that squeezes into a microSD slot. It includes a secure operating system, various cryptographic services, an ARM processor, NFC chip and 4G of storage. Data can be secured locally, and communications between two Project Vault-enabled devices are encrypted end-to-end.

Many agencies are hoping derived credentials can make mobile technology more secure without sacrificing usability. This little device could take that one step further.



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