GCN

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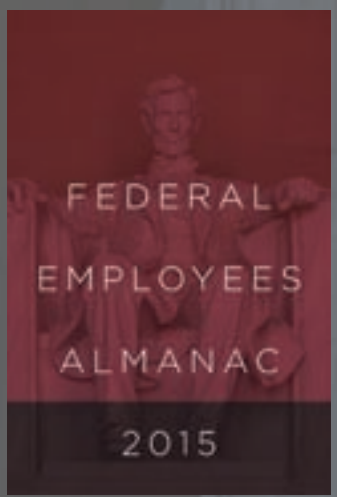

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GCN (ISSN 0738-4300) is published 11 times a year, monthly except Dec by 1105 Media, Inc., 9201 Oakdale Avenue, Ste. 101, Chatsworth, CA 91311. Periodicals postage paid at Chatsworth, CA 91311-9998, and at additional mailing offices. Complimentary subscriptions are sent to qualifying subscribers. Annual subscription rates payable in U.S. funds for non-qualified subscribers are: U.S. $125.00, International $165.00. **Subscription inquiries, back issue requests, and address changes:** Mail to: *GCN*, P.O. Box 2166, Skokie, IL 60076-7866, call (866) 293-3194, outside U.S. (847) 763-9560; fax (847) 763-9564 or email GCNmag@1105service.com. **POSTMASTER:** Send address changes to *GCN*, P.O. Box 2166, Skokie, IL 60076-7866. Canada Publications Mail Agreement No: 40612608. Return Undeliverable Canadian Addresses to Circulation Dept. or XPO Returns: P.O. Box 201, Richmond Hill, ON L4B 4R5, Canada.

BRIEFING

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for Public Sector IT

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Serious games scoring big in government

BY STEPHANIE KANOWITZ

A few years ago, New York City officials turned the challenge of managing handicap accessibility into a game, giving points to people who submitted photographs of, for example, curbs that were too high for people in wheelchairs to navigate.

"What they started to notice was that people were doing a much better job in seeking these [situations] out when they started to play with it," said Lindsay Grace, a communication professor at American University.

That was despite the fact that the reward – more 'points' – didn't have any monetary value. The pay-off came from people's desire to win and test limits.

"We could give them some [form of] direct transfer and say, 'Congratulations. You earned 100 points, here's a $10 gift card,'" said Grace, who co-presented a session on government gaming March 15 at the South by Southwest conference.

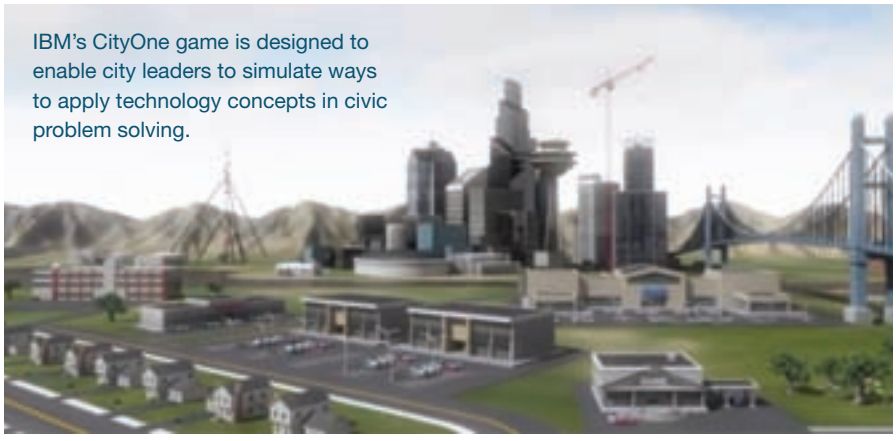
"The problem with that is it's a form of work. It's a form of labor. But if the experience itself is extraordinarily satisfying, then it pays for itself," he said. "That's why people do the work of a marathon or a fun run. They aren't necessarily saying, 'OK, what's my payout?' The experience itself is quite enjoyable."

Government's use of games is nothing new, but technological changes have, well, changed the game.

Today's growth spurt in big data and analytics, combined with the challenge of getting the producers and consumers of data to engage directly with new tools, is driving the proliferation of large-scale games such as the one New York played.

In government, games and gaming methods have been gaining steam for training, change management and employee culture improvement as well as externally to boost citizen engagement.

"You're creating an entrée for people that is quite attractive," Grace said. "So it's not, 'Hey, we just wrote some really good policy and all you have to do is read these 630 pages.' It's 'Well, we have a game that's going to get you pretty far in understanding. Why don't you try this first?'"



IBM's CityOne game is designed to enable city leaders to simulate ways to apply technology concepts in civic problem solving.

"Games have been used for eons," added Tony Demarinis, director of gaming at Deloitte Consulting, who cited lacrosse's roots as a battle-training tactic. "There are intangible attributes that require people to put disparate pieces of data together in a unique and creative manner to solve problems that you cannot get in any other form or fashion but in activities that look like games."

Human computation games hold the most promise for government, he said, adding that three years ago there were 16 examples of these worldwide, and now more than 80 exist.

They use true game mechanics the way puzzles do, but the work players do is called an isomorph, a translation of a real-world problem. "Players are playing a game to solve a problem, but you don't really care what the problem is. You're just playing the game," Grace said.

For instance, a space invader game in which players have to figure out what doesn't look right is a great way to train information technology workers on network intrusion detection.

"If I told you this is work or I told you this is a game, you change the way you frame the problem psychologically," Grace said. "You're more driven to experiment, you're more driven to get the optimum solution."

IBM is a company that sees the value of game formats for government applications and challenges. The firm's Smartplay program helps to integrate

real processes and data into problem-solving games for the military and other government agencies. Using its cloud infrastructure and applications to incorporate adaptive analytics, business process management, learning management systems and social business applications, IBM is developing a number of serious games, designed to solve business puzzles.

It has two main games: CityOne has been compared to the popular SimCity game, where players develop a city, while Innov8 lets players practice running a business.

IBM is also acting as a "second use marketplace where game developers can repurpose what was initially created for entertainment and resell it as practical solutions to complicated problems informed by real-world data," according to a Motherboard article.

That's what happened to Achron, a real-time strategy game that was not a success with the public but was picked up by the Pentagon for use in logistics training.

"The premise here is that we know you've worked hard to create intellectual property," said Phaedra Boinodiris, Serious Games program manager at IBM, during a game developers conference earlier this month.

"Whether it's a game, an analytics engine, a gaming engine, whatever this intellectual property is that you might have, we see an opportunity to leverage this as part of a broader ecosystem to make games as a service happen for some of this clientele."

Another company, BreakAway Games, created Code Yellow, a game that lets hospitals enter their own data to simulate, test and improve their readiness for disaster response.

Overall, games are overcoming their stigma as amusement for the couch potato to gain wider audiences, acceptance and uses, Grace said.

"If you look at the history of Angry Birds – a very popular casual game – it basically calculates to 380 years of computation," he said. "The amount of time that people are solving problems on Angry Birds is a tremendous amount of cognitive labor. So the idea is why don't we convert that? If we can get even a couple of those hours for people to solve other problems, imagine the kinds of problems we can solve." •

Who's online now? 18F builds Web analytics dashboard

Marking its one-year anniversary, 18F unveiled analytics.usa.gov, a public digital analytics dashboard for almost 300 executive branch government domains, including every Cabinet department.

Like metrics from Google Analytics, the site shows which government pages are most popular and which devices, browsers and operating systems people are using.

The White House said it plans to use the insights gleaned from the dashboard "to focus our digital service teams on the services that matter most to the American people and analyze how much progress we are making."

Among the initial insights are that 33 percent of all traffic to the government websites that were tracked came from mobile devices, up from 24 percent last year. Seasonal services or unexpected events drive people to government sites for information, which explains why the IRS has the most visited site.

Developed by 18F, the digital services delivery team housed at the General Services Administration, analytics.usa.gov was built in two to three weeks, the team said on its blog. But the group expects to make improvements so that the tool can handle dynamic queries and be easily shared with other agencies.

The analytics.usa.gov dashboard is a static website, 18F said, that is stored in Amazon S3 and served via Amazon CloudFront. Real-time data is downloaded from the Google Analytics Real Time Reporting API. According to the team, "The dashboard loads empty, uses JavaScript to download JSON data and renders it client-side into tables and charts." The group took this approach, it said, because it can "handle potentially heavy traffic to live data without having to scale a dynamic application server."

In the spirit of openness, all the data used in the dashboard can be downloaded from a menu below the dashboard; code for the dashboard and the data reporting system is available on GitHub.

In the year since its creation, 18F has developed a number of tools including Discovery, the OASIS market research tool; FBOpen, a set of open-source tools to help small businesses search for opportunities to work with the U.S. government; api.data.gov, a hosted, shared service that provides an API key, analytics and proxy solution for government Web services; and Midas, a platform that facilitates collaboration. •

How to keep legacy systems from becoming liabilities

BY KATHLEEN HICKEY

While plenty of public-sector IT systems are moving to the cloud, legacy systems are still the workhorses of many agency IT operations. But greater computing demand from transparency and mobile or big data programs coupled with frequent technology advances can quickly turn a legacy system into a liability.

A recent report from Washington state calls for creating an enterprise-level modernization roadmap to systematically tackle the problem of updating legacy IT systems.

The report by the Office of the Chief Information Officer (OCIO) examined 45 executive branch agencies. Of the 1,983 IT systems in use, 31 percent were legacy systems, with 55 percent of the legacy systems identified as mission critical. Most of the legacy systems (84 percent) were developed and hosted in-house. Almost half of the legacy systems fell into one of three business areas: financial management, agency specific and licensing/permitting.

The roadmap would be used by the state to mitigate current risks from legacy systems. In order to accomplish that, the state advises that agencies stay current on software versions and be able to identify, categorize and analyze their application portfolio as well as determine when to modernize or replace systems.

Determining what was a legacy system went beyond age and programming language. "Categorizing a system as 'legacy' was not simply a matter of age or programming language, but rather a combination of views into whether that system could be easily updated, resourced/staffed, posed security risk or other agency-specific determinations such as whether it aligned to a desired enterprise technical architecture or introduced unnecessary complexity to overall business processes," said the report.

Legacy systems pose a Catch-22 for agencies. They remain in use, the report said, because of the costs associated with migrating the systems to a modern platform. But these systems are also expensive to run, they burden the state's IT infrastructure, and they carry increased risks for data breaches, theft or service disruption.

This is especially true for citizen-facing systems, the report noted, because many of those applications were designed for use only in a secure internal network and not over the Internet.

And while back-office systems, such as core financials, are critically important to the state's day-to-day operations, their visibility is much lower, making upgrades a "hard sell," the report said. As a result, replacement or upgrade of legacy IT systems often comes only when enhancements are made for new business capabilities or when IT staff has time to make improvements.

The OCIO also asked agencies what criteria they used to fund modernization projects, resulting in a consolidated list of criteria used by participating agencies. The data included mission alignment, public visibility, risk, alignment to enterprise architecture (such as reducing number of platforms or improving data integration), improving efficiencies and cost savings.

Further, the report noted that modernizing or replacing IT systems is "a moving target. A system that may not be considered legacy this year might become legacy next year due to the pace of technological change, shifting skill set availability and cost, and changing business needs."

The challenge of maintaining legacy systems is being felt across the public sector. Last year the Texas Department of Information Resources issued its own report and assessment of its legacy systems.

The authors made six recommendations on how to tackle the problem: identify and prioritize security risks; develop a legacy modernization roadmap; establish statewide standards for application development; use commercial off-the-shelf solutions, particularly cloud-based services; consolidate reporting and analytics into consolidated business intelligence services; and implement application portfolio management practices. •

How to reduce risk of maintaining legacy systems

Until agencies can phase out their legacy systems, the report recommended steps IT managers can take to reduce risk:

- Improve documentation, capture system information and rewrite system code when possible.
- Provide code developers with training to identify high-risk systems and revise or develop new, secure code.
- Stay up-to-date on software versions.
- Use pace-layering to identify different systems and modernization strategies.
- Consider migrating to software-as-a-service or commercial off-the-shelf deployment models.
- Migrate from legacy systems to shared or enterprise services.
- Increase standardization.

NASA tests smart glasses for astronauts

BY MARK POMERLEAU

NASA is continuing to build upon its plans to harness virtual and augmented reality for space exploration. The space agency and Osterhout Design Group announced they are exploring the use of ODG's Smart Glasses for terrestrial and space-based activities.

ODG's Glasses allow users to do everything they would also do with a tablet, the company said. They could let astronauts remotely access documents and/or charts, decreasing the weight of materials they carry into space and allowing hands-free work. As a NASA spokesperson told Computerworld, commercial airline pilots carry around 15 pounds in manuals, but in space exploration, every pound saved counts.

With the augmented glasses, astronauts could conduct line-of-sight checks with digital markers overlaid on machinery, keeping the user's eyes focused on the task, according to a release by Osterhout Design Group.

"As electronic directions and instructions replace paper checklists and longer duration missions are considered, there is a need for tools that can meet evolving demands," said Lauri Hansen, engineering director at NASA Johnson Space Center.

"ODG's technology provides an opportunity to increase space mission efficiencies, and we are pleased to explore its potential in human spaceflight while also advancing its use here on earth."

NASA previously partnered with Microsoft to simulate scientists working together in real time on Mars' surface. The HoloLens project uses NASA virtual reality software called Onsight to take images from the Curiosity rover and project them as three dimensional holograms, allowing scientists to simulate walking on the red planet's surface. •

Augmented glasses from Osterhout Design Group focus on government and Mil-spec standrds.

OSTERHOUTGROUP.COM

NIST funds center to model disaster recovery strategies

BY MARK POMERLEAU

After a large storm system rips through a community, a quick response time is essential for saving lives and rebuilding so communities can get back to business. To help communities improve disaster response and remediation, the National Institute of Standards and Technology awarded a $20 million contract to Colorado State University to create the Community Resilience Center of Excellence.

The center will develop computer tools and virtual models to help local governments decide how best to invest in resources to mitigate the impact of extreme weather on communities and speed recovery.

NIST-CORE, or Community Resilience Modeling Environment, will be a pivotal piece of the center's capabilities for meeting stated goals. Using an open-source platform, NIST-CORE will incorporate risk-based decision-making and enable quantitative comparisons of different resilience strategies, NIST said.

The system will provide scientific metrics and decision tools that communities will use to evaluate the resilience of a built environment and its interconnected infrastructure. The models will also integrate social systems that are essential to recovering communities in various sectors, such as health care delivery, education, social services and financial institutions.

"The tools developed by the center will help to further advance the important goal of disaster resilience from ambitious concepts to cost-effective solutions that communities can implement over time," said Acting Under Secretary of Commerce for Standards and Technology and Acting NIST Director Willie May.

NIST-CORE will eventually be capable of performing analysis unlike any other disaster-resilience model in the world – learning from one analysis to the next. As it continues to be applied, NIST-CORE's performance will be tested alongside data from previous disasters. •

Cities tap Yelp to improve health inspection process

BY KATHLEEN HICKEY

Not only is Yelp helping people find great restaurants, it's also helping health inspectors target offenders and pushing restaurants to clean up their act.

Today, cities such as Los Angeles, San Francisco, Evanston, Ill., and Raleigh, N.C., have health sanitation scores posted on Yelp.

One of the first initiatives began in 2012, with Yelp partnering with San Francisco and New York City to develop the Local Inspector Value-Entry Specification, an open data standard developed by Code for America that allows municipalities to publish restaurant inspection information to Yelp. The partnership was announced in January 2013 by San Francisco Mayor Ed Lee.

Yet, due to technology issues, not every city has been able to post scores. In fact, based on research from cloud solutions provider Socrata, a majority of U.S. cities do not yet publish restaurant inspections, nor do they collect it in a digital-friendly format, Government Technology magazine reported.

Most of the information is also locked up in PDFs or Excel documents, said Ian Kalin, Socrata's director of open data.

To address the issue, Socrata recently announced a partnership with Yelp to use Socrata's Open Data Portal for governments to connect restaurant inspection data to Yelp. As part of the deal, Yelp will become a member of Socrata's Open Data Network, enabling Socrata government customers to link data in Socrata's Open Data Network to Yelp's LIVE open data format.

In addition, Socrata will be offering free tech support to help its government clients transition its data to a friendlier, more accessible format via open data portals and application programming interfaces. San Francisco, a Socrata customer, is already using Socrata technology to post reviews on Yelp.

Yelp is not only on the receiving end of health data. Yelp, along with other review sites, could be used to help health departments better use their resources by narrowing the search for violators. Yelp averaged 139 million unique visitors in the third quarter of 2014, demonstrating that the site is a goldmine of information for those seeking restaurant reviews.

Today inspections are random, "which means time is often wasted on spot checks at clean, rule-abiding restaurants," said authors Michael Luca, an assistant professor at Harvard Business School, and Luther Lowe, director of public policy at Yelp, in a Harvard Business Review article.

Researchers developed an algorithm that analyzed merged Yelp review and ratings data (looking for words such as "dirty" and "made me sick," for example) with hygiene violation data. The HBS study found that the model could correctly classify more than 80 percent of restaurants into either the top half or bottom half of hygiene scores using only Yelp text and ratings.

Yelp data "can predict the likelihood of finding problems at reviewed restaurants. Thus inspectors can be allocated more efficiently," concluded Luca and Lowe.

In addition to improving public health via awareness and improved inspection efforts, there is yet a third way the data can be used – by the restaurants themselves.

Lowe suggested in a February blog that the project could help end food poisoning by embarrassing restaurants into improving their sanitary conditions. Results from a 2013 survey found that restaurants informed that their score was posted on Yelp tended to clean up their act and have higher scores in their next inspections, he said. •

Chicago hopes to replicate public health analytics

One city – Chicago – is already using predictive analytics to determine which restaurants are most prone to health violations and which to focus inspections on based on potential violators rather than random checks.

Map of Chicago food inspections charts public health compliance, business awareness.

Chicago CIO Brenna Berman and Chief Data Officer Tom Schenk completed a pilot program in February to analyze more than 15,000 restaurants in Chicago and its surrounding neighborhoods for potential violations, according to Government Technology.

The team used data from Chicago's WindyGrid data repository with help from data scientists from AllState Insurance and combined it with data sets from the city's SmartData analytics platform.

The city analyzed information such as the age of the restaurant, previous inspection scores, data from sanitation complaints and the occurrence of property-based crimes.

Its ultimate goal is to replicate the process in other municipalities. Chicago's Department of Innovation and Technology, led by Berman, is developing WindyGrid as a free, downloadable open-source platform, reported Government Technology.

The estimated total cost of the project is $3 million, $1 million of which comes from a grant from Bloomberg Philanthropies Mayor's Challenge and other funding generated by the city. Chicago would like to release WindyGrid's code via GitHub and other outlets in the fall so it can be used by other government agencies.

DATA.CITYOFCHICAGO.ORG

DOI, USDA open-source recreational data

BY MARK POMERLEAU

In a joint effort to publicize recreational environmental data for public use, the Department of the Interior and the Department of Agriculture will be hosting the myAmerica Developer Summit to expand the best ways to make this information available to the public.

The April 11- 12 summit will augment both agencies' projects and goals by bringing experts in technology and outdoor recreation together to collaborate on solutions for using data to promote and protect public lands.

Summit participants will "develop trip-planning tools, enhance current online resources and cultivate methods for sharing data more easily – all in the name of improving access to America's federal lands," the Interior Department said in its announcement.

In 2013, more than 400 million recreation visits were paid to the national parks, wildlife refuges, monuments and other public lands Interior manages. These visits alone contributed $41 billion to the U.S. economy, supporting approximately 355,000 jobs nationwide, the agency said.

"Engaging entrepreneurs and enthusiasts to help transform disparate sources of information on public lands into useful, user-friendly formats will inspire visitors to explore our public lands and resources, while boosting tourism, outdoor recreation, jobs and economic activity in local communities," said Interior Secretary Sally Jewell.

Both DOI and USDA have laid the groundwork for easier access to recreational data with the creation of the Recreation Information Database (RIDB) application programming interface, which provides all RIDB data in fully machine-readable and filtered data feeds or downloads.

RIDB is part of the Recreation One Stop, a program that aims to provide a single source of information such as recreation areas, facilities, campsites, tours and permit entrances on federal lands, historic sites, museums and other attractions/resources. The USDA will debut the API platform and the information it has collected at the myAmerica Summit.

In addition to resources such as the RIDB, the myAmerica Summit will feature a hackathon to develop additional technological platforms and tools. •

DARPA makes strides in searching the 'deep web'

BY MARK POMERLEAU

The "deep web," a concept more in keeping with fiction than science, gained widespread attention after the FBI shut down the Silk Road, the Internet's premier international one-stop shop for all things contraband.

A so-called "anonymous marketplace," the site ran on Tor, free software that makes it difficult to trace Internet activity by sending traffic through a worldwide volunteer network of thousands of relays.

The deep web traversed by denizens of the Silk Road makes up a majority of the Internet space, according to experts, who assert that the commercial Internet – the .coms, .nets, .govs, .orgs and .mils typically accessed through mainstream search engines – only consists of about 5 percent of Internet traffic, according to a report from CBS News.

The other 95 percent has proven to be a cyber safe haven for all types of illicit activity, from narcotics trade to illegal weapons.

Law enforcement officials have gone to great lengths to prevent such illegal activity, but if they don't know where to look in the deep web, such marketplaces can be next to impossible to find.

Until now, that is. The Defense Advanced Research Projects Agency developed a search engine last year capable of searching the deep web.

DARPA's goal for Memex, as the search engine is called, is to develop the next generation of search technologies and revolutionize the discovery, organization and presentation of search results and along the way, shine a light into the deep web.

"The goal is for users to be able to extend the reach of current search capabilities and quickly and thoroughly organize subsets of information based on individual interests, according to a DARPA report on Memex.

"Memex also aims to produce search results that are more immediately useful to specific domains and tasks and to improve the ability of military, government and commercial enterprises to find and organize mission-critical publically available information on the Internet."

> "Memex helps us build evidence-based prosecutions.... In these complex cases, prosecutors cannot rely on traumatized victims alone to testify. We need evidence to corroborate."
>
> – MANHATTAN DISTRICT ATTORNEY CYRUS VANCE JR.

While DARPA intends for Memex to be used in the public market, initially it will be used by law enforcement to combat human trafficking and other illicit activity by monitoring chat rooms, online forums, advertisements, job postings and hidden services.

One of the complexities of the deep web is that much illicit activity is not available long enough for search engines to "crawl" them.

As part of Memex, DARPA is working with 17 different teams of researchers from industry and universities to develop tools to give government agencies ways to access these dark reaches of the web.

In a recent success story in Scientific American, Memex was used by law enforcement officials to help locate a victim of sex trafficking. The Memex system incorporates eight different open-source and browser-based search and analysis programs to perform data analytics.

DARPA is still holding much of the Memex technology close to its vest, but tidbits of information have trickled out since its inception.

According to the report in Scientific American, DARPA researchers have also made progress in creating tools that help analysts identify relationships among different pieces of forensic data.

The software also helps investigators build data maps showing visualizations of the links in hundreds of these data associations. It can identify relationships between a single piece of data – an email address, for example – and hundreds of websites.

For instance Memex can create heat maps that illustrate where other pieces of forensic data – classified ads, for example – are most heavily concentrated.

The visualizations help highlight associations that might otherwise be overlooked, according to the Scientific American report.

The New York County District Attorney's Office said it now uses Memex in every human trafficking case it is pursuing. "Memex helps us build evidence-based prosecutions," said Manhattan District Attorney Cyrus Vance Jr. "In these complex cases, prosecutors cannot rely on traumatized victims alone to testify. We need evidence to corroborate." •

MANHATTANDA.ORG

Voting technology: Is it secure yet?

BY KATHLEEN HICKEY

With the presidential election coming up in 2016, many constituencies are looking to how they can use technology to streamline the voting process. However, the security of voting systems – both with and without technology – remains a question.

One method gaining support is to secure the voting process by moving to open-source software. The TrustTheVote Project wants open-source technology used from the top down, in voter registration, voter information services, ballot design, the foundations of ballot tabulation, election results reporting and analysis and elements of auditing.

The initiative is the flagship project of the Open Source Election Technology Foundation (OSET), which wants to have a demonstrable impact on the 2016 elections.

"Our nation's elections systems and technology are woefully antiquated. They are officially obsolete," Greg Miller, chair of OSET, told the Huffington Post.

Three companies — Election System and Software (ES&S), Dominion Voting Systems and Hart InterCivic — dominate the voting machine market and have little incentive to update their systems, reported Babe. Further, election data standards are at least a decade old. The result is that election administrators are buying outdated machines.

Moving to an open-source format would encourage tech-savvy groups and individuals to verify the integrity of the voting system, assure accountability and get more voters to the polls. The idea is that the more widely available open software is, the more scrutiny it will receive, the more flaws will be surfaced and the stronger the code will be. "Make that machine a glass box instead of a black box," said Miller.

But open-source code isn't always regularly reviewed nor is its security verified. Such assumptions can lead to vulnerabilities, like the Heartbleed bug.

In lieu of actual voting technology, a popular tool being adopted by jurisdictions around the country is the electronic polling book. E-poll books allow election officials to review and process voter information but not actually record or count votes. Currently 30 jurisdictions use e-poll books, according to the National Conference of State Legislators.

E-poll books come in either laptop or tablet form and go beyond the capabilities of paper poll books, which contain a list of eligible voters in the district or precinct. Some additional functions include the ability to redirect voters to the correct polling location and scan a driver's license to pull up a voter's information.

The technology seems to be gaining momentum as it gets adopted differently across jurisdictions. Recently, Microsoft also announced that Election System and Software chose a Windows tablet (the 10-inch Toshiba Encore 2) for its newest poll books - the ExpressPoll Pollbook Tablet. •

Security expert: Online voting not ready for prime time

While online applications may add conveniences to the voting process, critics aren't convinced that security and privacy risks associated with Internet voting will be resolved anytime soon.

David Jefferson, computer scientist in Lawrence Livermore National Laboratory's Center for Applied Scientific Computing, has studied electronic voting and security for more than 15 years. He believes "security, privacy, reliability, availability and authentication requirements for Internet voting are very different from, and far more demanding than, those required for e-commerce."

In short, voting is more susceptible to attacks, manipulation and vulnerabilities, he said.

Even so, some champions of Internet balloting believe the safeguards that protect online shoppers from hackers can also protect the sensitive information and meet the legal regulations associated with voting online. Advocates also believe that Internet voting will increase turnout, cut costs and improve accuracy.

> "Internet elections are essentially impossible to audit."
>
> – DAVID JEFFERSON

Jefferson refutes these claims by asserting that there currently is no strong authentication or verification solution for online shopping. Also, while proxy shopping is a common occurrence and is not against the law, proxy voting is not allowed.

"Internet elections are essentially impossible to audit, and there's no meaningful way to recount because there are no original indelible records of the voters' intent against which to compare the outcome," Jefferson he said. "The only vote records are on the server, and they are highly processed electronic ballot images that have been operated on by millions of lines of code on the client device, during transit through the Internet and on the server and canvass systems."

– Mark Pomerleau

BY BRIAN ROBINSON

Massive OpenSSL audit hopes to squash Heartbleed-like bugs

OPENSSL IS BACK AGAIN, about a year after it first made a splash with the now infamous Heartbleed bug revelation. This time around, however, it looks like it could be a good thing.

Cryptography Services, a part of the Linux Foundation's Core Infrastructure Initiative (CII), is going to audit OpenSSL security. It's billed as an independent audit, even though the CII has been instrumental over the past year in trying to right the OpenSSL ship by providing some of the money to get the beleaguered open source software full time development help.

CII is a multi-million dollar project housed at the Linux Foundation to fund open source projects for core computing functions. Inspired by the Heartbleed OpenSSL crisis, the Initiative's funds are administered by the Linux Foundation and directed by a steering group of industry backers.

Heartbleed was a major shock to the cybersecurity ecosystem for several reasons: Not only is OpenSSL widely used in both public and private organizations' network and system security, the coding mistake that created it apparently went undetected for several years before it could be patched, and no one could say for certain how many systems had been affected or what data might have been compromised.

The crisis created by that bug fed into a concern about open source software overall, with other threats such as the Shellshock vulnerability in the Linux and Unix operating systems and a possible SQL injection attack on the popular Drupal content management system adding to the worries.

It's not as if any of these major open source resources can easily be replaced. OpenSSL is reckoned to be used on up to two-thirds of existing web servers; Linux and Unix also drives many servers, and Drupal has become a reliable and flexible option for website operations, including those at the White House and other government agencies.

Open source software isn't alone in having security holes, of course, as many users of Microsoft, Apple, Adobe, Java and other proprietary software know. But open source security is seen as suffering from the same resource that's considered its strength, namely an army of volunteer developers. On the one hand that leads to innovation and fast turnaround of new features that users of open source crave but also to more opportunities for tampering and coding mistakes.

According to Gartner, 95 percent of all mainstream IT organizations will leverage some element of open source software – directly or indirectly – within their mission-critical IT systems in 2015. At the scale, introducing vulnerabilities can be expected. In a recent analysis of more than 5,300 applications uploaded to its platform, Veracode, a security firm that runs a cloud-based vulnerability scanning service, found that third-party components introduce an average of 24 known vulnerabilities into each web application.

Open source security is seen as suffering from the same resource that's considered its strength, namely an army of volunteer developers.

Admittedly, others think all those volunteer developers can also be a security strength, since it puts that many more eyeballs into reviewing code. However, the events of 2014 threw enough doubt onto the security of open source software that both industry and government have been moved to do something to improve it, from bills aimed at ensuring the software supply chain to proposals for controls on the use of third-party software components.

At first glance, the Cryptography Services audit looks to be the most comprehensive and important of these efforts. According to the consultants that will be running it, the audit will cover a range of security concerns but will focus primarily on Transport Layer Security stacks and on protocol flow, state transitions and memory management. The audit may be the largest effort to date to review OpenSSL, the group said, and it's "definitely the most public." It will help to spot and fix bugs such as Heartbleed before they become the kind of problem they did last year.

Preliminary results of the audit could be out by the beginning of the summer, Cryptography Services said.

It should be eagerly anticipated, as the revelation of Heartbleed, Shellshock and other bugs hasn't necessarily brought better security. Months after the initial announcement of Heartbleed, around half of the 500,000 servers thought to be vulnerable from the bug had not been fixed. And the vulnerabilities keep on giving, with Cisco just one of the latest to say that its products had been affected. •

AN INTERVIEW WITH

Stuart Fleagle,
Vice President,
Government Solutions,
Carpathia

Alan Boissy,
Product Manager, vCloud
Government Service,
VMware

Cloud Solutions and the One-Size-Fits-All Fallacy

While it may be tempting to make an all-or-nothing decision when it comes to the cloud, it's not that simple. Alan Boissy, VMware's Product Manager of vCloud Government Service, and Stuart Fleagle, Vice President of Carpathia Government Solutions, explain the differences between the different types of cloud and how federal agencies can best determine the right fit for their needs.

Q Are all federal applications and workloads suitable for a public cloud?

A Boissy: It's not that some clouds aren't appropriate. It's more about each workload and its requirements. You can't look at your IT landscape with a monolithic, homogenous approach. Most applications developed in the past several years are web-enabled and modular, so they can take advantage of the elasticity of the cloud, and they are usually the easiest to migrate. However, deciding which applications and workloads make sense for a public cloud requires an understanding of how each application works and what its requirements are. For example, some government systems have been around for decades and aren't designed to scale. That means that it is likely going to be either difficult or cost-prohibitive for them to move to the public cloud. Additionally, some applications may have to stay on premise because of security requirements. Because of the varied requirements, we believe that most government agencies will end up with some sort of hybrid, multi-cloud scenario where some workloads will stay on premise, some will have to be in specialized FedRAMP clouds to satisfy security requirements, and some will be a great fit for the public cloud.

Q How can an agency determine which applications are best-suited to the public cloud versus an on-premise or private cloud?

A Fleagle: It completely depends on the type of application or workload. For government agencies, there will be some data and applications, especially those deemed mission-critical, that will never find their way to a public or community cloud but will remain behind the fence in an on-premise environment. Then there are applications that can be hosted and managed by a secure cloud service provider. And finally, there are workloads that are appropriate for a multi-tenant, community cloud environment. The Department of Defense (DoD) is a good example of how that would work. In its guidance, DoD defined different categories of workloads based on security, impact levels and mission impact, and put those use cases in different categories. That's the upfront work agencies should do to guide them to the right kind of cloud for a particular workload.

Q It seems like many organizations are moving toward an enterprise cloud approach—essentially, a "cloud first" approach that steadily migrates as many data center functions and applications to the cloud as possible. What is the best way to achieve the enterprise cloud?

A Boissy: There isn't a single cloud provider that can check every box for the many different types of applications, workloads and data sets. That's why organizations are choosing a hybrid approach to enterprise cloud. The key is finding a vendor that offers that flexibility, because it allows agencies to slowly wean themselves off of managed hosting and legacy infrastructure when and as it makes sense. The hybrid approach also provides the most flexibility, because it enables agencies to move workloads to the cloud and back again as required.

Q Is it more cost-effective for agencies to take an enterprise approach to cloud?

A Fleagle: It depends. Take the example of an agency that experiences spikes of activity, which could happen during tax season, healthcare enrollment season, or during times of emergency or conflict at the Department of Homeland Security. During steady-state times, that agency might be running in a dedicated cloud environment where they know exactly what they are paying for on a monthly basis. However, when spikes occur, they can be easily switched to a multi-tenant cloud to take advantage of instant scalability and on-demand provisioning of additional resources. It's the concept of owning the base and renting the spike, which can be very cost-effective.

A Boissy: An enterprise approach to cloud also allows agencies to share resources more easily, which can save a lot of money. For example, an agency may have several divisions, each using its own email system, payroll system and SharePoint sites. With an enterprise approach and a shared services strategy, that agency can drive real efficiencies by eliminating duplication. The cloud helps achieve this because it allows all divisions to access resources from a central place. It also frees agencies from geographic constraints.

Q What about the huge investments agencies have made in technology and the skills to implement and manage that technology? As we get deeper into the cloud era, does this mean that all of those investments are now obsolete?

A Fleagle: Most agencies have made a significant investment in virtualization as a way to consolidate and automate data centers, and that is something that definitely isn't lost when moving to the cloud. Take the example of VMware. The vast majority of government has standardized on VMware, so migrating to the cloud using VMware vCloud® Government Service provided by Carpathia™ does a good job of leveraging an agency's existing technology investment. It can knock down cost hurdles and agency staff doesn't have to be retrained or learn new technology.

Q When you have different cloud solutions in different departments, doesn't management become tricky?

A Boissy: Right now, it can be complicated because many solutions have their own monitoring tools and alerting tools, and different user populations use the data differently. Technical users just want to know how much a CPU is spiking or whether the SQL database is down, while the finance people want to see CapEx and OpEx data, and executives want to see all of that information at a higher level. Vendors are starting to work toward the "single pane of glass" approach where everybody will get the data they need from one dashboard, but it's taking some time. Vendors are also getting smarter about offering APIs where they can have their data ported into other programs so it can be presented in a single view.

If you could offer a few pieces of advice to agencies about cloud computing, what would it be?

A Fleagle: Strongly consider a hybrid approach. It's the most flexible model for government. With this model, a cloud service operator can provide different cloud scenarios within the same data center, from private cloud and public cloud to a bare metal virtualized environment. A hybrid model can connect any combination of those over a Layer 2 connection at a nominal fee, with zero latency and maximum flexibility.

A Boissy: There are two reasons why cloud migrations fail. The first reason is if an agency leaves it solely to the IT department to make the decision. Instead, it should be a business decision that includes input from not only IT, but finance, legal, procurement and the executive team. The second reason for failure is not understanding your own environment. By understanding only what you have, you can get to the point where you have a clear agenda of what you are trying to accomplish. If you don't do that before starting on your cloud journey, you're less likely to be successful.

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INDUSTRY INSIGHT

BY DANIEL RASKIN

How the Identity of Things streamlines the citizen experience

IDENTITY IS A CRITICAL component of compliance and federal privacy policy.

Without a sound and comprehensive identity strategy – and the tools to deliver it – agencies have no way to enforce regulatory compliance, secure systems or monitor users' online behavior – whether it is through a laptop, mobile phone, tablet or wearable device.

Yet traditional identity management vendors are still having one-dimensional conversations focused on yesterday's challenge, the internal user. And identity management continues to be based on monolithic platforms that use static rules to make decisions and are not designed to easily integrate with new applications.

However, Identity of Things (IDoT) platforms are now emerging to provide device-agnostic access, handle large-scale populations and make decisions based on context. Large and small government organizations alike are adopting IDoT for its ability to manage the digital identities of employees while keeping citizen users secure.

ACCELERATING ONLINE SERVICES

Today, identity management platforms must cater to the pace of user demands. Unfortunately, government agencies have relied on traditional identity and access management (IAM) systems for years, cobbled together via acquisitions.

This made for unwieldy "product suites" that were overly complex, with redundant and incompatible capabilities. Niche IAM players created streamlined solutions to address specific problems, but without any overarching identity solution, agencies had no way to quickly and easily build and manage persistent user identities across departments.

IDoT requires a unified identity model. Its core tenet is that identity should be exposed in a single, repeatable way that makes it easy to roll out to any connected device or thing. The goal behind this principle is to provide new public services quickly, reducing the delivery time from years to just weeks.

At its core, IDoT uses identity to create a single, consistent panoramic view of a citizen across every agency. It also uses data to build profiles that will help agencies engage with citizens more effectively and efficiently. Understanding who these citizens are helps governments deliver more relevant services and products.

All of this makes for satisfied citizens and opportunities to build out new online government services, while also preventing government data from falling into the wrong hands. Key features of an IDoT platform include:

- Real-time context to help an agency make access and security decisions
- A persistent identity of the user across the organization
- Personalized services based on real buying habits
- A common identity platform for authorizing how data is shared across apps, devices and things
- Modular and flexible architecture, to facilitate repeatable business processes, accommodate millions of concurrent users and devices and reduce typical deployment times.

In addition to making public services more efficient, IDoT will help solve online security issues as part of a robust, multi-layered security model. Real-time contextual clues in addition to credentials help government agencies vet whether to give access and how much. For example, when a system detects a login attempt with correct credentials, but from an unrecognized IP address or at an atypical time of day, the software triggers additional security precautions such as asking security questions or texting verification codes to a user's cell phone.

PRACTICAL APPLICATIONS FOR IDOT

New smart city initiatives are the prototypical example of IDoT in action, using technology and data to implement more cost efficient, sustainable services and information in transport, healthcare and environmental protection.

> The Identity of Things creates a single, persistent, panoramic view of a citizen across every department, reducing time to roll out services from years to weeks.

That's where IDoT platforms can help, allowing citizens to securely access city services quickly and efficiently while also making their lives better.

IDoT can also alleviate security and efficiency woes when it comes to filing taxes, paying parking tickets, managing welfare services and health information, applying for schools and student loans, and conducting a wealth of other routine activities.

When citizens are empowered with quick, easy and secure self-service, they ultimately come away satisfied, the ultimate destination for an IDoT-driven agency. •

— Daniel Raskin is vice president of strategy for ForgeRock.

BY (ISC)2 ADVISORY BOARD EXECUTIVE WRITERS BUREAU, DAN WADDELL

Where to find actionable threat intelligence

IN TODAY'S WORLD of ongoing data breach cycles, federal agencies struggle to keep up with the threats that loom over systems that hold sensitive data – everything from personally identifiable information and protected health information to design plans for the latest stealth aircraft.

The problem is now receiving attention at the highest levels of government. For some time now, the White House has considered the idea of a federal government-led fusion center for coordinating threat intelligence, but it only recently became official when the White House announced the formation of the Cyber Threat Intelligence Integration Center.

So how can organizations provide actionable threat intelligence in an effective and efficient manner?

First, it's important to accurately understanding the term "threat intelligence."

Threat (as defined by NIST) is any circumstance with the potential to adversely affect organizational operations and assets, individuals, other organizations or the nation through an information system via unauthorized access, destruction, disclosure, modification of information and/or denial of service.

Intelligence (as defined by the FBI) is information that has been analyzed and refined so that it is useful to policymakers in making decisions – specifically, decisions about potential threats to national security.

Taking these definitions into account, it's clear that sources of threat information are found in a variety of places both internal and external to an organization – and certainly not limited to technical sources such as network monitoring logs, firewalls, intrusion detection and prevention systems, malware analysis tools, honeypots, phishing traps and so on.

The phrase "any circumstance or event" could also mean heightened activity on a Dark Web forum (the deepest, darkest parts of the Internet where underground cyber criminals discuss and conduct illegal activity), a post on social media or an attack against a government ally in a different part of the world.

Just these few examples show how much work is required to sift through all of these data sources.

So where should agency personnel begin in identifying data sources that will result in actionable threat intelligence? Some potential sources exist in the existing IT environment:

Local data logs: Review system logs, packet captures, malware, incident data, local honeypots, IP addresses that "phone home" to command and control servers operated by the criminals.

Hard drives: Perform forensic analysis on infected machines, looking for attack patterns, targeted files and data.

Logical/physical access system logs: Analyze login attempts, check swipe access logs into the datacenter or server room – wherever the most sensitive data resides. Look for odd or unusual patterns in both.

> The key to identifying threats is to start planning now. Once a system is breached, there's no turning back the clock.

Performing analysis on this magnitude of data is no small task. As a result, IT managers need to develop a solid data analysis strategy that incorporates people, processes and, most definitely, technology. Automation is absolutely paramount when dealing with this volume of data. The following high-level outline provides a simple starting point:

- Conduct a risk assessment based upon the agency mission.
- Identify the threats that pose the most danger to the mission. Who wants the data? Why? Consider both insider and outsider threats.
- After compiling a good list of potential threats, assess their capability and intent. A disgruntled user who was just fired may want to exact revenge but may be limited in capability. A system administrator in the same scenario has both capability and intent.
- Take inventory of the data sources of threat information needed to help identify the biggest threats to the agency.
- Go one step further and determine how many of those data sources can be compiled by individual staff members and which others require additional effort in order to collect data. For example, does the current service-level agreement (SLA) with the agency's cloud service provider allow the IT manager access to logs that may hold data critical to help track down attackers?

Finally, the key to identifying threats is to start planning now. Time is the most valuable asset in the event of an attack. Once a system is breached, there's no turning back the clock. Agencies must rely on thorough preparation and analysis of threats in order to stay one step ahead of the attackers. •

— Dan Waddell is (ISC)2 Director of Government Affairs and EWB member and lead author of this peer-reviewed article.

INDUSTRY INSIGHT

BY NEIL CHAUDHURI

Struggling with Scrum? Try Kanban for IT projects

OVER THE LAST DECADE, many have written about what agile software development offers to government IT. Effective practices for making agile work in the federal government were outlined in report from the Government Accountability Office and in the U.S. Digital Services Playbook.

Yet while government IT has improved, it has a long way to go. We witnessed the spectacular failure of the initial rollout of HealthCare.gov, and many far less visible failures happen all the time. One reason is that not enough government IT projects are agile. Another is that Scrum, the most popular agile framework, is hard.

In fact Scrum is so hard that the primary duty of the ScrumMaster is to serve as its guardian. Although I am certified in Scrum and teach a Scrum course, I am not so dogmatic as to ignore how hard it is to execute effectively. Thankfully, it isn't our only hope. As Yoda once said, "There is another."

Let's examine why Kanban may in many cases be a better choice for government IT projects than Scrum.

Scrum is a process. Kanban is more of a metaprocess, asserting key principles without prescribing how to accomplish them. There is nothing about sprints, Product Owners, formal planning meetings or any of the ceremony associated with Scrum. Based on the lean manufacturing model espoused by the "Toyota Way," Kanban is in a way a superset of Scrum.

Depending on whom you ask, Kanban has five properties or six practices, but I prefer to follow the example of Marcus Hammarberg and Joakim Sunden and focus on three objectives.

VISUALIZE WORK

Analogous to the Sprint Backlog in Scrum, a Kanban board is an information radiator that conveys the workflow in an explicit way. Each item of work is represented by an index card or Post-it color coded to the type of work (e.g. new feature, bug, etc.) with a short description, a deadline, the team member who has pulled the work and other pertinent information.

The work items are arranged in columns indicating where they fall in the workflow. A typical column set from left to right might have these columns: ToDo, Analysis, Development, Testing, Acceptance, Deployment and Production.

A Fast Track column could be added for urgent work items that arise. Another useful tidbit might be criteria for exiting a stage in the workflow. For example, what makes code ready for testing? The Kanban board demonstrates unequivocally where everything is in the workflow and reveals potential bottlenecks. The board can even reveal steps you weren't even aware exist.

LIMIT WORK IN PROCESS

Queuing Theory offers insight into reducing the cycle time for an item in your workflow. In particular, Little's Law states cycle time is the quotient of work in process and throughput. In other words, to speed up the flow, you need to limit work in process and/or increase productivity. The latter will happen with automation, training and familiarity with the work. Meanwhile, you should make sure as few items as possible are in process at the same time. Large chunks simply bog down the whole system.

When you force the team to tackle too many tasks simultaneously, it leads to context switching, mistakes, more work to correct those mistakes and ultimately delays.

MANAGE FLOW

Limiting work in process is a key component to managing flow, but a related element is eliminating waste.

Lean experts Mary and Tom Poppendieck identified seven wastes of software development analogous to wastes in manufacturing. Those familiar with Scrum know source control, testing, continuous integration, cross-functional teams and splitting work into manageable, similarly-sized chunks eliminate waste. The Kanban board helps identify blockers as cards accumulate in various columns.

Also avoid open-ended commitments. Deadlines make you focus. In Scrum, timeboxes are built-in with fixed sprints during which the team delivers the highest-priority features. Kanban has no sprints, but you should impose timeboxes in the form of deadlines and service-level agreements.

Scrum is just as focused on meeting these three objectives, but it takes a formalized, sprint-centric approach to address flow. Scrum also focuses more on team interaction when doing the work than on the work itself.

Perhaps those in government IT intimidated by the rigor of Scrum should focus on optimizing workflow directly and give Kanban a try. • *— Neil A. Chaudhuri is founder and president of Vidya.*

IT managers struggling with the rigor of Scrum should focus on optimizing workflow directly and give Kanban a try.

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Finding the right storage balance

New virtualization techniques and emerging flash technologies are giving data center operators more control over how they manage storage systems, speed backups and reduce costs.

BY CAROLYN DUFFY MARSAN

For agency data center managers looking to improve the economy of their data centers, one of the best options for savings lies in the how storage is managed.

Thanks to new virtualization techniques and emerging flash storage technologies, data center operators now have ways to control how they deploy storage systems to speed backups and reduce costs.

"Data centers [operators] should be introspective and look at how their storage is being accessed and find ways to customize storage solutions for each different workload," said Jason Hick, head of the Storage System Group at the Energy Department's National Energy Research Scientific Computing Center (NERSC).

"There are a variety of emerging storage technologies. Using all of them for what they do best is key," Hick added. "You need to understand flash, disk and tape and come up with the best mix based on your internal operations. It pays huge dividends for us when we balance our workloads well."

GCN talked to operators of several cutting-edge government data centers to find out which new storage technologies they are deploying and what best practices they are using to keep their costs steady and their performance escalating.

Here are their recommendations:

1. CONSIDER FLASH

Flash memory is more expensive than disk drives or tape, but it can be a good choice for performance-intensive applications because of its speed.

The DOE's NERSC in Berkeley, Calif., deployed flash for its file system metadata in August. Hick said flash is working well in this key application, which affects all 6,000 of the center's users for services such as logging in to the supercomputer.

> **"There are certain cases where it makes a lot of sense to substitute flash even at an increased cost because the performance benefits are there."**
>
> – JASON HICK

"Backing up our critical file system was taking 12 hours. Users noticed because the file system became slow and unusable," Hick explained. "After deploying flash, the backups are down to three hours … I'm not sure we have any complaints now. I don't think the users even know we are backing it up."

Hick encourages data center operators to conduct a careful analysis of flash memory and determine the trade-offs for each application.

"There are certain cases where it makes a lot of sense to substitute flash even at an increased cost because the performance benefits are there," Hick said. "If you can get four-times benefit in performance and reduce user complaints down to zero, I would say it's worth it."

NERSC is so happy with how flash is working with its file system metadata that it plans to have a layer of flash technology built inside of its next supercomputer.

"The flash will be on [an] interconnect inside the supercomputer to store data for the duration of a simulation," said Katie Antypas, deputy for data science at NERSC. "This will be another layer of storage that our users will have access to."

Antypas explained the Center's different storage tiers: " Now we have scratch, project and archive," she said. "Scratch data we keep for up to 12 weeks. Project data we keep for a couple years, and our archive goes back 40 years. Flash will store data for hours or days. The trade-off is that it offers really high bandwidth."

John Goodhue, executive director of the Massachusetts Green High Performance Computing Center (MGHPCC), has similar views about the potential for flash.

MGHPCC is a joint venture of five Massachusetts universities working on government-funded research projects such as climate change modeling, genome sequencing and security analysis. The center uses flash for temporary storage when the supercomputer is working on a problem.

"Flash gets you a lower latency. When you're working with a dataset where you need to grab a large number of very small chunks of data out of a very big data set, flash is very good choice," Goodhue said. "As the size of flash drives goes up and the cost goes down, the affordability of flash is improving over time."

Even so, Goodhue said sometimes regular disk drives are better than flash.

"You need to think hard about the cost of flash and where it is really going to benefit you because it is very problem-dependent," Goodhue said. "Flash isn't going to lift all boats, but it is going to lift a lot of them. Make sure that the speed really matters. Often, disk is just as good and is less expensive." •

2. MAKE SURE THE NETWORK IS POWERFUL ENOUGH TO SUPPORT CLOUD STORAGE

The MGHPCC has adopted a cloud-based approach for the many petabytes of scientific data it stores in a two-year-old facility in Holyoke, Mass.

MGHPCC has several tiers of storage. Scratch, for short-term data, provides 10 terabytes of temporary storage for computers that are working on a problem. High-performance parallel file systems store petabytes of data after it has been processed and network-attached storage systems handle the most critical files, including home directories.

"We use a cloud strategy for our storage," Goodhue said. "That's why we place a huge emphasis on high bandwidth and very efficient networking."

"What you're seeing in a facility like ours is a large amount of data stored right next to the compute resources," he said. "Instead of moving the data to the scientist's computer, we're moving the compute to where the large dataset is stored."

Goodhue said network speed is critical given that MGHPCC is located in Western Massachusetts while the researchers it supports are in Boston and other parts of the state. To work these digital distances, MGHPCC has 10G links to its university partners and plans to upgrade to 100G links.

"We pride ourselves on looking like a local resource to our users," Goodhue said. "It's important from a networking and storage management point of view that it is very fast and very easy to move data from a workstation in Harvard out to Holyoke and back."

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Goodhue pointed out that having a high-speed network connection doesn't necessarily mean that data will transfer at a fast rate. He recommends data center operators consider the network protocols that they use, too.

"There are protocols that are good at moving data over high-bandwidth links, and protocols that are not good at that," Goodhue says. "We've had several instances where we had to rethink how we connected to locations to keep data in sync between two storage pools because the protocols that we had been using were either too sensitive to latency or very sensitive to high-bit errors." •

3. DON'T BE AFRAID OF TAPE, ESPECIALLY FOR ARCHIVES.

NERSC has a total of 72 petabytes of data stored on tape systems, some for long-term archival purposes and some to support ongoing projects. Although it is an older technology, tape is cost-effective, Hick said.

"Tape is often reported to be dead or about to die," Hick said. "One of our newest users, the Joint Genome Institute, didn't use tape at all, only disk storage. They were struggling with how to store all of their data, and their budget was out of control. Yet they were very skeptical about why we would use tape. We have a lot of experience with tape, and we taught them about it.

"Tape is not all great," said Hick. "But in the end it solved their data growth and budget problem for storage."

Hick said tape offers significant cost and capacity advantages over disk systems and is a viable solution for government data centers that are not keeping an archive because they think it is too expensive.

"I talk to a lot of government sites that don't have an archive. They are in compliance for email, but beyond that they don't understand the value of retaining data," Hick said.

The Social Security Administration, which has little choice about whether to retain data or not, is looking toward a new approach to storage in the next year. SAA will migrate its mainframe backup and recovery operations from magnetic tape media to disk-based virtual tape. The Electronic Vault system will come online by the end of 2016 to support the agency's new National Support Center.

"Modern virtual tape systems have the performance and capacity to handle our backup requirements, while using significantly less data center floor space compared to magnetic tape media," SSA said in a written response to GCN questions about its storage systems.

SSA's commitment to virtual tape is significant, as it has 27 petabytes of raw deduplicated virtual tape and approximately 50 petabytes of raw Direct Access Storage Devices (DASD) storage in three data centers. When SSA has fully migrated to the new National Support Center, it will have 30 petabytes of raw DASD, the agency said.

SSA is deploying virtual tape systems from Oracle and EMC, which will provide the performance and capacity to handle backup requirements using significantly less data center floor space compared to magnetic tape media.

"Virtual tape provides all of the advantages of modern disk-based storage at a price that is cheaper than magnetic tape media," SSA said. The bottom line? "By the end of 2016, when our Electronic Vault becomes fully operational, SSA will no longer have physical tape," the agency vowed. •

4. BOOST EFFICIENCY WITH STORAGE VIRTUALIZATION.

SSA is embracing virtualization across all of its media – including tape – as it migrates to a new 300,000 square-foot National Support Center in Urbana, Md., which opened last September.

The agency has already virtualized much of its open system data stores, which are attached to HP, Oracle Solaris, VMware and Windows servers using storage-area networks and network-attached storage. Mainframe subsystems from EMC and IBM are virtually provisioned and auto-tiered, too.

SSA says virtualization is improving storage system usage and energy efficiency.

"The virtualization and automated tiering of mainline mainframe and open systems storage subsystems have allowed us to service the increased input/output (I/O) demands of the servers while consolidating data onto higher density media. This reduces both the physical and environmental footprint," SSA said.

At the same time, SSA is deduplicating its data to reduce the amount of storage required for backups. For example, SSA is seeing a deduplication reduction factor of 18:1 for tape backups on its open system platforms and 9:1 for the mainframe virtual tape subsystem.

SSA said deduplication is giving the agency a significant environmental advantage. "Our continued migration from physical to virtual tape is providing improved energy efficiency, reduced footprint and enhanced business resilience," SSA said.

SSA also virtualizes and auto-tiers its mainline DASD subsystems to support its I/O needs and slash its physical and environmental footprint. SSA said heavily accessed data will reside on solid state drive (SSD) media while high capacity data will reside on high-density Serial ATA (SATA) media.

The agency said government data

centers will reap significant rewards by exploiting storage virtualization along with automated tiering and data deduplication. "These technologies are robust and maturing rapidly," SSA noted.

Data centers that are adopting storage virtualization should deploy resource management and performance management tools, SSA recommended.

"These tools are essential to managing a storage infrastructure supporting high-performance, high-availability workloads with a given staff efficiency," SSA said. They become even more critical when virtualizing and tiering storage. •

5. OPTIMIZE THE TRANSFER VERY LARGE DATASETS

Many leading-edge data centers are grappling with how to transfer massive datasets of 10 terabytes or more from one location to another. To handle the massive transfers, they are adopting services such as Globus, developed by DOE's Argonne National Laboratory.

Globus is a cloud-based data transfer service that supports the sharing of large datasets in a way that carefully manages bandwidth and improves reliability.

"We started as a high-performance secure file transfer service," said Vas Vasiliadis, director of products, communications and development for the Computation Institute at the University of Chicago's Argonne National Lab. "If you want to move terabytes or petabytes of data from a national lab back to your campus, we are a service that will act as a third-party mediator or controller to make sure the data transfer completes. We recover errors automatically and notify you when we're done."

The Massachusetts Green High Performance Computing Center is one user of the service. MGHPCC's Goodhue said the software has an interface that's easy for scientists to use without needing IT support. The benefit of Globus is that it optimizes the way a large file is transmitted across the network.

"Globus figures out the speediest way to get the file from here to there," he said. "It has a set of performance monitoring tools to periodically check those paths and make sure nothing is hindering the transfer rate. You can think of it as an overlay on the Internet that is very careful about the paths it chooses and also tests those paths to make sure the transfer rates can be very high."

Goodhue said Globus makes the transfer "simple, fast and transparent for researchers to move big datasets from one place to another."

The Globus service has been available for five years and includes 30 federal laboratories and universities as its customers.

Argonne offers other services that takes advantage of the transfer technology, including a data publication and discovery service that allows researchers to share their data with others through a cloud-based platform.

"We give them the mechanism to describe their data using metadata and to assemble it and spread it across multiple systems for storage," Vasiliadis said. "We give the data a permanent identifier, which allows the researcher or institution to curate it in a way that makes sense for them."

One of the advantages of Globus is that it allows the end user to manage, move and share very large data sets without involving IT department personnel. The model has uses for enterprise data as well as scientific data, Vasiliadis said.

"We're handling the administrative burden and letting our users take advantage of the high-performance storage systems we have in place," Vasiliadis said. "Transferring data is really time consuming and error-prone, and it shouldn't be that way. We give the user a simple browser tool, and they can move terabytes of files and forget about it. They don't have to babysit the transfer." •

6. PROTECT DATA ARCHIVES WHEN THE DATA CENTER IS BEING RENOVATED.

The National Energy Research Scientific Computing Center learned the hard way that data centers need to protect their tape-based archival systems when the building is under construction.

NERSC has 45 petabytes of scientific data stored in its archival tape system, which dates back 40 years. Unfortunately, the archive suffered from what Hick called a "dusty tape problem" due to regular construction at the center.

"We're frequently doing construction to prepare for new techniques of cooling, or removing walls to get a bigger supercomputer system," Hick said. "That activity is not good for storage, in particular the dust involved in construction. I'm talking about particles down to the submicron level," Hick said, adding that his team learned how to protect its tape archival system from dust.

A few years ago, NERSC had to hire an environmental remediation company to migrate valuable data from dusty tapes onto clean tapes. Now NERSC wraps its tape systems in a bubble to protect them when construction occurs.

"We have to build a bubble with a filtration system around the tapes. It's cleaner than normal," Hick said. The center built three of them to avoid putting user data at risk.

"The reason I'm sharing this is that it's an issue most sites won't talk about, Hick said. "But there are solutions. Dusty tapes are not a catastrophe. You just have to be smart about this risk." •

Colorado takes FirstNet for a test drive

The wireless LTE network supported responders' video, situational awareness, mapping and photo applications

BY STEPHANIE KANOWITZ

When a vehicle turned up where it shouldn't have during a ski competition in Colorado in February, new mobile broadband technology made the difference between a scramble by police to locate the vehicle and a quick, more targeted search from first responders.

Using new LTE technology set up for the event, an officer put a marker on a map noting the vehicle's location and then sent a screenshot of the map to about 200 other safety officials in the area connected to the network via mobile devices.

"We had officers from out of the city area helping us, and rather than having to ask directions on the radio or look at their Google maps and figure out how to get there, they had that map sent over the LTE network and were able to respond to the scene," said Jennifer Kirkland, operations support supervisor at the Vail, Colo., Public Safety Communications Center. "It saved time and resources."

The event in Vail was the 2015 International Ski Federation's Alpine World Ski Championship, where Colorado public-safety agencies gathered to test drive the First Responder Network Authority's (FirstNet) 700 MHz Band Class 14 Public Safety Long Term Evolution (LTE) Demonstration Network.

The FirstNet wireless broadband network was created in 2012 by Congress in an effort to build the first high-speed, nationwide wireless broadband network dedicated to public safety. Construction of the network requires each state to have radio-based networking gear that can connect to FirstNet's network core.

In Vail, first responders were test-driving a range of applications supported the wireless LTE network, including video surveillance, situational awareness and photo applications.

> "One of the key takeaways, from my perspective, is that this technology is pretty much a need-to-have right now."
>
> – BRIAN SHEPHERD, COLORADO OFFICE OF IT

In fact, the network proved to be critical to public safety officials' ability to do their jobs when commercial networks faltered in handling the digital crush of more than 150,000 people at the event.

"The [LTE] network performed exceptionally well," said Brian Shepherd, broadband program manager at the Colorado Office of Information Technology. "When commercial networks did degrade just due to multiple thousands of people in a one block square radius, we saw the public safety network remain stable, and we were able to provide good communications from Beaver Creek to Vail, which has historically been a challenge."

The Eagle County, Colo., Sheriff's Department and the Vail police and fire departments were involved in the broadband test, which was authorized for non-mission-critical uses. Meanwhile, networking firms brought in various components of the network.

Sonim Technologies, a supplier of ultra-rugged mobile solutions provided 35 ruggedized devices for use in the demo, while up to 200 responders and public safety officers used their personal devices to access the network via Wi-Fi hot spot.

In addition, four 2-by-3-foot General Dynamics eNodeB boxes were integrated into the nodes of a distributed antenna system that wireless infrastructure firm Crown Castle had recently deployed in Vail.

"We essentially just integrated the Band Class 14 infrastructure into the current distributed antenna system that Crown Castle owns and operates," Shepherd said. "Our goal was just to get devices into hands of end users and test the overall technology through the two-week-long event."

For the first time, responders were

Getting wireless cellphone coverage in the ski resort towns of Vail and Beaver Creek, Colo., has always been a challenge. This winter when 150,000 extra people arrived for the Alpine World Ski Championships, FirstNet Colorado and its partners tested a dedicated LTE broadband network using FirstNet-licensed 700 MHz spectrum. Over the course of the event, users – including local police, federal law enforcement agencies, the FBI, National Guard, FEMA and public safety support personnel – sent and received 1.96 terabytes of data using rugged cellphones with capabilities for voice, text, GIS, video and push to talk. The extended coverage and increased capacity and speed let first responders access vital information in real time.

FRANK MAY/AP IMAGES

able to use enhanced video surveillance from five surveillance cameras on Band Class 14, as well as upload photographs and conduct situational awareness and mapping.

To provide capacity at the race's finish line in Beaver Creek, a remote area that sits 8,000 feet above sea level in a topography known for poor network communications, the team deployed a mobile cell on wheels.

Push-to-talk was also integrated with the land mobile radio network that all responders accessed so the two networks could communicate.

"They really liked the push-to-talk functionality, which essentially turned a smart phone into almost a two-way radio," Shepherd said.

First responders also liked the situational awareness application enabling them to locate each other on maps. Typically, local public safety managers use automatic vehicle location on their computer-aided dispatch systems, but that shows only vehicles' position, Kirkland said.

"In this event, the officers were on foot for the vast majority of the time, so we had an awareness of their location that we wouldn't have had without it," said Kirkland, who enabled her personal device for use from a dispatcher's perspective. "It was great to be able to see where our responders were on a map. It was nice to be able to push to talk to them if I needed to. From a dispatch perspective, knowing where the officers and responders were and having that situational awareness was fantastic."

Training first responders to use the devices was easy, and they were up and running quickly, she added. "The end users – our police and firefighters – re-

ally, really enjoyed it."

Dwight Henninger, Vail's police chief, that it's usually difficult to make a simple phone call from the race site. "What we've been able to accomplish this week with really having great, comfortable technology that we need to share data back and forth…has been really positive," he said.

The idea for the demonstration first arose from Vail's police chief in June 2014, and the green light for it came from FirstNet and the Federal Communications Commission, on Oct. 16. Strategy work began in November, and "we really stood the network up in about two to three weeks," Shepherd said.

Looking ahead, Shepherd said he wants to get approval from FirstNet to make Colorado's special temporary authorization to use the Band 14 permanent.

"One of the key things we saw from the demonstration network is the immediate need for this," Shepherd said. "I think a lot of us in the states have been talking for a while about how this type of network would be a nice-to-have thing. I think one of the key takeaways, from my perspective, is that this technology is pretty much a need-to-have right now."

Still, some kinks would need to be worked out.

For instance, police officers can't perform crowd control duties while looking at a smart phone, said Kim Coleman Madsen, FirstNet Colorado public safety broadband manager. Instead, two officers would be needed: One to watch the crowd and the other the phone. Not to mention the negative response the public would have to officers staring at mobile devices, she added. "The assumption is maybe he's looking at the Internet," Coleman Madsen said.

Another area for further investigation is how this technology could replace current voice communication among first responders, she said. "We had really positive feedback wanting to use the technology in place of their mission-critical voice, which we would not encourage or support at this point."

Right now, the ball is in FirstNet's court, Shepherd said. In January, the state attended a FirstNet Initial Consultation Meeting at which 120 representatives met with FirstNet officials to talk about planning the nationwide public safety broadband network (NPSBN).

"My overall takeaway is that Colorado is dedicated and committed to making the NPSBN a success in their state," Dave Buchanan, the authority's director of state consultation, wrote in a blog post. •

Eagle County ready for text-to-911

Since January, people in Eagle County, Colo., have been able to send text messages to emergency responders through a new text-to-911 service. Now officials are just waiting for the first emergency texts to start trickling in.

"We wanted to offer that functionality to our citizens because it was something that was already expected," said Jennifer Kirkland, operations support supervisor at the Vail Public Safety Communications Center. "It's also something that we wanted to offer for the deaf and hard-of-hearing community. It gives them parity of access to 911, where they don't have to call a relay service or use a TDD machine. They can just access 911 like any other citizen."

The county worked with TeleCommunication Systems' Geospatial Emergency Manager 911, a web-based hosted solution, so no additional technology was needed. The system is accessed via a website, and each person must sign in to receive texts.

When someone texts 911, TCS routes the message to the correct Public Safety Answering Point (PSAP), or 911 center. A chime and a visual alert then opens a chat session on the PSAP worker's web browser. Staff can reply by typing on the keyboard or selecting a pre-written message from a drop-down menu.

"It works just like any other text relationship that you might have with a friend or a relative," Kirkland said. "The first text we send back when we receive one says, 'A voice call is best, but go ahead with your text if you're unable to call, and what is the location of your emergency?'"

"Text-to-911 is ideal for some situations, but a voice call lets call takers pick up on auditory cues, she added. "You just don't have the same relationship with a text," Kirkland said.

Currently, the county's text-to-911 program supports only data that comes in by Short Message Service, not videos or photos. It's accessible via any device that uses the major carriers AT&T, T-Mobile, Verizon and Sprint.

No one has sent 911 a text yet, Kirkland said, perhaps because people aren't conditioned yet to think to do that.

Also, "I think most people actually prefer to call than text," she said.

— *Stephanie Kanowitz*

IRS flips storage for cloud service offering

Unisys converted the IRS's storage systems into a virtualized storage-as-a-service offering that allows the agency to only pay for the capacity it uses

BY CAROLYN DUFFY MARSAN

The IRS is on track to slash its storage costs by 30 percent and speed the time it takes to deploy new storage systems from months to days, thanks to its Enterprise Storage Acquisition contract.

The 10-year contract, awarded to Unisys in 2012, could be worth as much as $139 million if all options are exercised. Under the terms of the deal, Unisys acquired all of IRS's storage systems located in seven IRS data centers and facilities.

Unisys then converted those systems into a new private cloud-based storage-as-a-service model that allows IRS to pay for storage capacity as needed.

"Virtualization of storage allows you to not have an overcapacity of storage and to not have stovepiped storage, but to manage storage as a single entity," said Peter Gallagher, group vice president for Unisys Federal Systems. "There are huge opportunities to save if you treat storage as an enterprise resource."

Unisys said it has migrated more than 90 percent of relevant IRS data to the private storage cloud it operates for the agency. The firm said it has more than 6 petabytes of usable allocated storage in the private storage cloud available to the IRS.

One advantage of the contract is that IRS can deploy storage systems in a matter of days, instead of six to eight months.

Because Unisys has created a virtualized storage pool with buffer allocations, IRS can provision some storage requests in hours. Very large requests for storage – more than 75 terabytes – take a month or more to deliver.

"Because the time to deploy new disk drives and new arrays was very lengthy, program managers tended to buy more than they needed. That led to a lot of unused capacity in their environment" said Kevin McCarthy, vice president for Infrastructure optimization solutions at Unisys. "With virtualized storage, we're able to maximize capacity usage and align the performance of the data with the application."

> "We help the IRS manage their data. As application needs change, we're monitoring that and moving the data to the right tier."
>
> **– KEVIN McCARTHY, UNISYS**

Unisys has deployed storage systems from IBM, NetApp, EMC and others in the private cloud it uses to support IRS. The company provides IRS with four performance tiers of data storage, from high input/output, low-latency down to lower speed disks, depending on the application.

Unisys has also developed management processes that were recently ISO 20000 certified for moving data around the storage systems to drive up utilization.

"We help the IRS manage their data. As application needs change, we're monitoring that and moving the data to the right tier," McCarthy added.

One of the challenges of the contract was developing a billing system that ensures the IRS only pays for the storage capacity it uses.

"The IRS business model has changed with this contract," Gallagher said. "Before, individuals from the IRS were incentivized to purchase as much storage as they needed for a project. [Now] we're incentivized to limit the amount of storage … We have people trying to minimize and optimize the footprint."

McCarthy said the IRS contract offers two key lessons to data center operators. First, you need to have well-defined processes for storage as a service. Second, you have to be very careful when you build a cloud-based storage system around legacy equipment.

"It takes a lot of coordination, a lot of migrating and testing, to make sure you get the performance you are promising the customer," McCarthy said. "If you don't have a large storage environment, the business case may not be there for a private cloud." •

PlugFest Plus aims to speed tech innovation

The Air Force is adapting an approach for testing software and equipment interoperability to help speed the contract award process

BY STEPHANIE KANOWITZ

The Air Force is testing a new approach to acquisitions that would enable vendors to have contracts in hand just weeks after demonstrating their potential solutions. The approach comes in the form of PlugFest Plus (PFP), an event similar to other PlugFests but with one major difference: the contracting angle.

"Regular" PlugFests give companies a chance to test equipment or software interoperability against standards and present live demonstrations of their existing technical capabilities. They also provide essential feedback to both agencies and the vendors whose products are tested at the event.

PFP is a component of the Air Force's Bending the Cost Curve Initiative, which aims to improve dialog with industry so it, "can better understand how processes, procedures and some of the choices we make can inadvertently contribute to rising costs, the stifling of innovation and slow processes," said Air Force Secretary Deborah Lee James in a speech at the Atlantic Council.

"Under our new PlugFest Plus approach, we will put in place a mechanism whereby a vendor could walk away with a contract just a few weeks after an event," James said.

"They're trying to expand their access to talent and to innovation through nontraditional means and through nontraditional defense companies," said Dave Chesebrough, president of the Association for Enterprise Information (AFEI), which hosted the first PFP on Jan. 20 at George Mason University in Fairfax, Va.

"So, the notion is taking an industry best practice – a PlugFest– and coupling that with an Other Transaction Authority (OTA) acquisition instrument. As a result of the testing done in the virtual environment, [the Air Force] can determine whether they might want to further fund some prototype developments."

> "Under our new PlugFest Plus a vendor could walk away with a contract just a few weeks after an event."
>
> – AIR FORCE SECRETARY DEBORAH LEE JAMES

Congress has approved the Defense Department to use OTAs "to expand the defense supply base through non-traditional contracts for research, development, testing and evaluation (RDT&E) activities," according to AFEI.

"OTA contracts are not subject to federal acquisition regulations (FAR) or any other body of regulation. This flexibility is intended to enable the Defense Department to overcome bureaucratic barriers that often prevent non-traditional defense contractors from pursuing government work."

The Air Force used PFP for its Distributed Common Ground System, which produces intelligence information from sensor-collected data. Vendors can virtually test their solutions by registering to use the Hanscom milCloud, an instantiation of the Defense Information Systems Agency's CONS3RT cloud management software.

Recently, the Air Force announced it would pursue a Plugfest Plus approach to the Multi-Releasable Intelligence Product Generation project, to help expedite releasabilty rules for intelligence analysts.

By combining PlugFests with OTAs, the acquisition process moves faster. "It speeds things up by converting what is generally considered to be a government acquisition through a neutral third party into a commercial acquisition so that things are not as bureaucratic and can happen much more quickly," Chesebrough said.

At this first PFP, about 150 attendees perused the showcases of 10 vendors and a team of GMU students. "The Air Force generally liked it," Chesebrough said. On the vendor side, some are skeptical of working outside the traditional acquisition processes, while others view this as an opportunity for innovation.

"They were just sort of testing the water," Chesebrough said. "I think their reaction was primarily positive, but they'd like to see whether the Air Force is able to make good on this whole idea of a PlugFest environment." •

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BY PATRICK MARSHALL

Lenovo's AnyPen eliminates the need for a stylus

ONE REASON I bought a Microsoft Surface Pro was so that I could jot notes at meetings without having to attach the keyboard and distract others by typing clacking away. And, truth be told, the device works great – as long as I remember to slip the battery-powered stylus into my pocket. All too often, I forget.

That's what caught my eye when I saw the press release on Lenovo's Yoga Tablet 2. It claimed to allow users to use virtually anything – a pen, pencil or even a paper clip – as a stylus. So I asked for a review unit.

The Yoga Tablet 2 has a lot going for it, especially for a device with a base price of only $299. I received the 8-inch version running Windows 8, though there's also a 10-inch version and Android is an option.

Weighing in at just under 1 pound, the Yoga Tablet 2 sports a dual-band 802.11abgn Wi-Fi adapter, front and rear 8-megapixel cameras, and up to 32 gigabytes of internal storage.

And despite being limited to 2 gigabytes of system memory, the Yoga Tablet 2 is a computer on which you can do all but the most memory-intensive or visually demanding work. It is, after all, running full Windows, and you can install productivity applications such as Microsoft Office. You can also attach a keyboard, though it is an extra-cost option.

But again, what makes the device really interesting is the new AnyPen technology. While Lenovo is keeping details about the technology close to the vest, Jeffrey Witt, director of the company's product review group, said the device uses custom sensor layers and software that filters out noise. "This allows the tablet to detect small graphite or metal points as well as palm rejection on the LCD panel," said Witt.

"There's no special panel involved," said Witt, "This is why we were able to keep the cost low and only add between $20 and $30 to the price over the previous version that didn't have AnyPen."

The pen, pencil – or any other object – that is to be used as a stylus has to be at least 1 millimeter thick and needs to have conductive material, such as metal or graphite, in the tip.

Also, users are advised not to use excessive pressure or sharp objects since the screen is vulnerable to scratching. In normal use, however, I didn't experience notice any scratching of the display.

I found the Yoga's AnyPen technology to be not quite as reliably responsive as the stylus accompanying the Microsoft Surface Pro. Occasionally, when I'd start to write, no "ink" was deposited. But this was rare and was easily corrected by starting another stroke. Also, take note that AnyPen doesn't support pressure-sensitive drawing.

But overall I was impressed with how precise and responsive the AnyPen system is even when I wrote or drew with a paper clip. And what a benefit for fleets of mobile workers to know that they can use the tablet's writing capabilities without having to have a proprietary – and easily misplaced – stylus at hand. •

YOGA TABLET 2 ANYPEN

Base price: $299

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Mobile: Dual-band 802.11abgn WiFi adapter

Camera: Front and rear 8-megapixel

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I/O feature: AnyPen

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