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SOLUTIONS FOR STATE AND LOCAL GOVERNMENT

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inside:

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Picture This: Smart cams slash police response times

Down and Dirty: Delivering fiber to the home via the sewer

CASH-STRAPPED AGENCIES SEEK LOWER IT MAINTENANCE FEES. VENDORS SAY **IT'S NOT THAT EASY**

PLUS: **Virtual Beverly Hills**

STEVE EMANUEL,
CIO, Montgomery County, Md.

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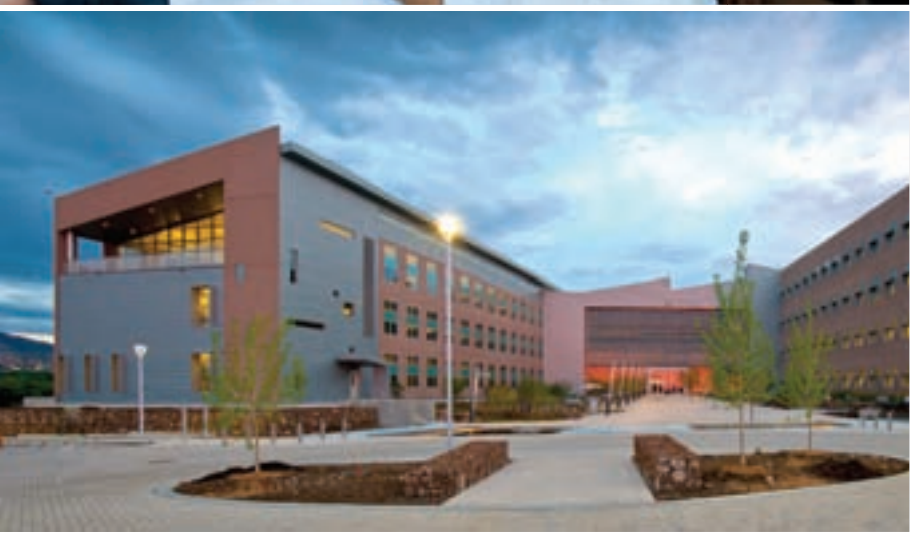

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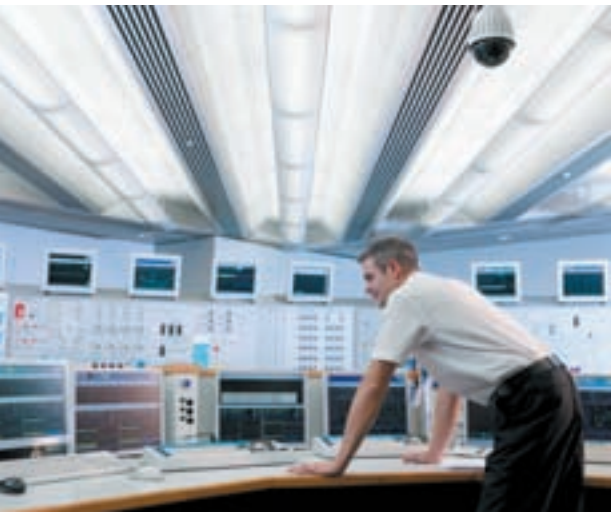

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BY CHAD VANDER VEEN, ASSOCIATE EDITOR

Technology Efficiency

In early September, I had the opportunity to tour the federal government's first net-zero building — meaning a building that can generate as much energy as it consumes. The building, the National Renewable Energy Laboratory's (NREL) Research Support Facility, recently opened its doors on NREL's Golden, Colo., campus. Buildings, it turns out, are among the leading sources of greenhouse gas emissions. In large cities, buildings easily surpass cars as the biggest polluters. NREL's new facility was designed to show that with a combination of energy-first thinking and modern materials, buildings don't need to be so environmentally detrimental.

What struck me most as I explored the facility was the fact that nothing used to create the building is beyond the reach of anyone looking to build or retrofit a structure. As I learned during my visit, the facility was built with energy as the top priority, not architecture. This is the converse of the norm — where a building is designed based on aesthetics, and energy efficiency is often an afterthought. Think of all the tract homes that have spread throughout every city and town. If builders gave more thought to a home's position relative to the sun, and to how ground and rainwater flow through the yard, the amount of resources wasted on cooling and landscaping could be dramatically reduced.

Energy efficiency, to a large extent, is far less about technology than it is about thoughtfulness. With that in mind, about the time you read this there may be a large class of incoming state CIOs who will have a number of complicated technology projects and problems to deal with. Undoubtedly some will try to eke out a few more dollars from next year's budget to procure still more technology to support the technology their predecessors deployed.

But I'd argue that maybe a thought process similar to that which built the Research Support Facility may help make these transitions easier. Maybe more technology isn't the answer, but rather a thoughtful assessment of available resources might make continuing existing projects less dollar-intensive. To that point, Features Editor Andy Opsahl has delivered in this issue a compelling story about the ongoing dispute between agencies and vendors over maintenance fees. Like the NREL, many agencies are forced to choose between third-party assistance or locally sourced solutions. There are advantages and disadvantages to both strategies. But it certainly wouldn't be a bad idea when building enterprise IT to think carefully about how technology is positioned relative to the external factors that will affect it. GT

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GROUP PUBLISHER: DON PEARSON dpearson@govtech.com

EDITORIAL

Editor: STEVE TOWNS stowns@govtech.com
Associate Editors: CHAD VANDER VEEN cvanderveen@govtech.com; MATT WILLIAMS mwilliams@govtech.com
Chief Copy Editor: MIRIAM JONES mjones@govtech.com
Managing Editor: KAREN STEWARTSON kstewartson@govtech.com
Justice and Public Safety Editor: JIM McKAY jmckay@govtech.com
Copy Editors: ELAINE PITTMAN epittman@govtech.com; SARAH RICH srich@govtech.com
Features Editor: ANDY OPSAHL aopsahl@govtech.com
Staff Writers: HILTON COLLINS hcollins@govtech.com; RUSSELL NICHOLS rnichols@govtech.com
Contributing Editor: JESSICA MULHOLLAND jmulholland@govtech.com
Editorial Assistant: COURTNEY HARDY chardy@govtech.com

DESIGN

Creative Director: KELLY MARTINELLI kmartinelli@govtech.com
Senior Designer: CRYSTAL HOPSON chopson@govtech.com
Graphic Designer: MICHELLE HAMM mhamm@govtech.com
Illustrator: TOM McKEITH tmckeith@govtech.com
Production Director: STEPHAN WIDMAIER swidm@govtech.com
Production Manager: JOEI HEART jheart@govtech.com

PUBLISHING

VP Strategic Accounts: JON FYFFE jfyffe@govtech.com
VP Bus. Development: TIM KARNEY tkarney@govtech.com EAST
Regional Sales Directors: LESLIE HUNTER lhunter@govtech.com EAST; SHELLEY BALLARD sballard@govtech.com WEST, CENTRAL
Account Managers: MELISSA CANO mcano@govtech.com EAST; ERIN GROSS egross@govtech.com WEST, CENTRAL
Business Development Dir.: GLENN SWENSON gswenson@govtech.com
Bus. Dev. Managers: JOHN ENRIGHT jenright@govtech.com; LISA DOUGHTY ldoughty@govtech.com; KEVIN MAY kmay@govtech.com
Exec. Coordinator to Publisher: JULIE MURPHY jmurphy@govtech.com
Regional Sales Admins: SABRINA SHEWMAKE sshewmake@govtech.com; CHRISTINE CHILDS cchilds@govtech.com
National Sales Admin: JENNIFER VALDEZ jvaldez@govtech.com
Dir. of Marketing: ANDREA KLEINBARDT akleinbardt@govtech.com
Dir. of Custom Events: WHITNEY SWEET wsweet@govtech.com
Dir. of Custom Events, Emergency Management: LANA HERRERA lherrera@govtech.com
Custom Events Manager: KARIN MORGAN kmorgan@govtech.com
Custom Events Coordinator: TANYA NOUJAIM tnoujaim@govtech.com
Dir. of Custom Publications: STACEY TOLES stoles@govtech.com
Custom Publications Editor: EMILY MONTANDON emontandon@govtech.com
Custom Publications Writer: JIM MEYERS jmeyers@govtech.com
Dir. of Web Products and Services: VIKKI PALAZZARI vpalazzari@govtech.com
Web Services Manager: PETER SIMEK psimek@govtech.com
Custom Web Products Manager: MICHELLE MROTEK mmrotek@govtech.com
Web Advertising Manager: JULIE DEDEAUX jdedeaux@govtech.com
Web Services/Proj. Coordinator: ADAM FOWLER afowler@govtech.com
Subscription Coordinator: EENIE YANG subscriptions@govtech.com

CORPORATE

CEO: DENNIS McKENNA dmckenna@govtech.com
Executive VP: DON PEARSON dpearson@govtech.com
Executive VP: CATHILEA ROBINETT crobinet@centerdigitalgov.com
Executive Editor: STEVE TOWNS stowns@govtech.com
Chief Content Officer: PAUL TAYLOR ptaylor@govtech.com
CAO: LISA BERNARD lbernard@govtech.com
CFO: PAUL HARNEY pharney@govtech.com
VP of Events: ALAN COX acox@govtech.com
Chief Marketing Officer: MARGARET MOHR mmohr@govtech.com

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Who Says?

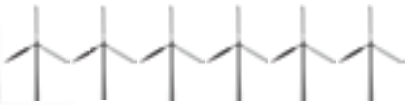
"Everybody loves this idea because basically it's doing something good with the dog waste."

www.govtech.com/whoaminovember

Web Comment of the Month

"People are the No. 1 security risk either knowingly or unknowingly. Policy must be put in place to protect companies. Then all people — even techies — must be held accountable for good, ethical computer usage."

By Jean on Sept. 22 in response to our story Top 10 Network Security Threats
www.govtech.com/networksecurity



40,000: The number of wind turbines a new iPhone app draws data from. www.govtech.com/wind

INDIANA DIGITIZES CIVIL WAR RECORDS

The Indiana State Archives and its more than 50 volunteers recently launched an online digital archive — which contains possibly the largest Civil War soldier database in the country. www.govtech.com/indiana

Top-Tweeted Stories

Michigan and Utah Lead 50-State Report Card on Technology in Government
WWW.GOVTECH.COM/DIGITALSTATES
51 tweets

County Experiments With Monitoring Social Media in Emergencies
WWW.GOVTECH.COM/CATAWBA
41 tweets

The Most Active U.S. Cities on Twitter
WWW.GOVTECH.COM/NYCTWITTER
28 tweets

$100 MILLION

The amount of delinquent taxes Hawaii collected, thanks to tax tracking technology.
www.govtech.com/Hawaii

Pay Bills With 'Bling'

Bling Nation, a Palo Alto, Calif.-based service, allows smartphone users to pay for items instantly at participating stores and other locations with one swipe of a tag attached to their device. A few municipalities, including Palo Alto, offer Bling Nation as another method for residents to pay their utility bills and parking tickets. WWW.GOVTECH.COM/BLING

Hot List

Here are the 10 most popular stories from Sept. 6, 2010 to Oct. 6, 2010.

1. **Bill Would Give President Emergency Cyber-Superpowers**
   Proposed legislation would let the president declare a national cyber-emergency when a huge network attack occurs.

2. **Michigan and Utah Lead 50-State Report Card on Technology in Government**
   'A-minus' grades go to Pennsylvania and Virginia in 2010 Digital States Survey.

3. **Could the Virginia IT Failure Happen to Any Government?**
   Following Virginia's IT troubles, Michigan Chief Technology Officer Dan Lohrmann suggests five things to ponder before IT fails.

4. **White House Launches Challenge.gov, Offering Prize Money for Innovation**
   Federal agencies crowdsource to generate solutions to pressing problems.

5. **Site Reveals Salaries of New York State Employees, Other State Financial Data**
   Conservative think tank launches website with comprehensive state financial data.

6. **Pet Poop Fuels City Park Light, Sparks Conversation**
   Science and art meet to provide alternative waste disposal method, which in turn is powering a gas-burning lamppost.

7. **Google Launches Midterm Election Projection Mapping**
   Creator hopes to 'make tracking the blues and reds a little easier for armchair pundits.'

8. **Top Digital States Use Technology to Face Fiscal Challenges**
   Oregon, California and New York are among the improved states in the 2010 Digital States Survey.

9. **Why Cops Don't Just Use Cell Phones**
   Public safety network backed by the FCC could bring cost efficiencies for both consumers and first responders.

10. **Top 10 Network Security Threats**
    Vendor researcher includes USB drives and smartphones as top security risks.

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big picture

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MODERN MARVEL

The 9/11 terrorist attacks forced government at all levels to examine the nation's vulnerable infrastructure. The iconic Hoover Dam in Nevada has long served multiple purposes. In addition to harnessing the Colorado River, the dam generates hydroelectric power and provides a crossing over the Black Canyon for vehicles traveling on U.S. Highway 93.

To mitigate the risk of a terrorist attack on the dam, Congress approved construction of a bypass. The $240 million, 1,900-foot-long Mike O'Callaghan-Pat Tillman Memorial Bridge soars nearly 900 feet above the river while doubling the traffic capacity of the roadway atop the dam. The bridge is scheduled to open to traffic in November.

BY *GOVERNMENT TECHNOLOGY* STAFF

Gopal Khanna

CIO, Minnesota

Minnesota CIO **GOPAL KHANNA** has brought about major technology changes since he came on board in 2005. In 2007, he delivered the state's first Master Plan for Information Technology. Under his leadership, Minnesota created standards for all desktops, servers, storage and cell phones used in state government. One thing he's proud of today is his state's work to leverage shared services for the benefit of multiple agencies. Khanna plans to retire this year, and his successor will undoubtedly have to work hard in 2011 to further the legacy that's been left behind.

1 What were some of the issues and challenges that you thought were significant this last year?

We have been facing a lot of challenges reconciling the declining revenue stream with the commitments of the government, but the good thing is that Gov. [Tim] Pawlenty was able to balance the budget this past year. And we did a good job not only in balancing our budget, but also making serious investments in technology to help make government better for the future.

2 What do you hope to see happen in 2011?

One great thing that we have been able to put in place right now, which is under way, is the Commission on Service Innovation, [which] was established by bipartisan legislation. This legislation seeks to create a commission — which is going to give the Legislature a recommendation by Jan. 15, 2011, in time for the new administration to start — to talk about how we can improve and create opportunities for enhancing innovation in government by leveraging shared services solutions or any of the solutions that might be available.

3 When you look back at your tenure as CIO, what are one or two things you're most proud of?

We've got very strong bipartisan support, and I'm very proud of that. I think that creates the framework for the next administration and the next CIO to do great things moving forward. We have put in place many initiatives that have leveraged shared solutions. In early September, we announced a groundbreaking agreement with Microsoft where, once again, we are taking an enterprise approach to deploying solutions that will benefit not just the executive branch, but also counties, cities and other units of government.

4 What advice would you give your successor?

My advice to the new CIO would be to continue working with the governor's team, with the colleagues across all agencies from a business perspective, and start leveraging not only the shared solutions, but also think in terms of re-engineering the business processes of government, and that's where the greatest benefit will come. We need to be citizen-centric. We need to recognize that citizens all across the country are demanding better performance from us. They're demanding and asking for more transparency, accountability and access to government. GT

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Steve Emanuel, CIO, Montgomery County, Md.

PHOTO BY DAVID KIDD

By Andy Opsahl *Features Editor*

Cash-strapped agencies seek lower IT maintenance fees. Vendors say it's not that easy.

A conflict is brewing among local government IT departments and vendors over the degree to which vendors should adjust their prices to save government jobs. Some revenue-starved municipalities are targeting ongoing maintenance fees paid to IT vendors as an area for cutting costs. Typically when an agency buys hardware or software, it also purchases an ongoing service plan for repairs and parts replacement. Maintenance fees can be lucrative for vendors, and the fees frequently increase annually. Some CIOs, like **Steve Emanuel**, CIO of Montgomery County, Md., believe today's maintenance charges no longer reflect realistic amounts governments can pay. He wants the county's vendors to lower their profit expectations for those services, but many vendors seem reluctant to do so, according to Emanuel. CIOs often see maintenance fees as gravy for vendors, while vendors insist that maintenance fees seed future product upgrades and ensure quality service.

Wa

PHOTO BY DAVID KIDD

> "IF WE'VE BEEN A GOOD LONG-TERM CUSTOMER, THEN THIS IS AN INVESTMENT THEY NEED TO MAKE IN ORDER TO KEEP THAT LONG-TERM RELATIONSHIP AS A PARTNER."
>
> — ***Steve Emanuel,*** *CIO, Montgomery County, Md.*

State and federal legislation frequently mandates changes in the way government systems operate, and these changes are included in vendor software upgrades. Government IT departments report that private-sector willingness to eat maintenance fees tends to depend on how easily government can switch vendors. Smaller companies seem more willing, while larger ones tend to dig in their heels. Emanuel said vendors risk losing government business if they don't adjust to governments' current fiscal realities.

"In some cases, it's going to drive us to other products," Emanuel said. "In some cases, it's going to drive us to other service providers. In some cases, it's going to make us take the risks we really don't want to take."

Vendors vary on their approach to revising maintenance fees, but most insist the charges amount to much more than gravy.

"We have a cost of doing business just like there is a cost of doing government," said Mark Testoni, president of software vendor SAP's Public Services division. "We have to balance that with our ability to make sure we don't degrade the service that we're offering to our customers."

Meaning of Partnership

Government agencies and vendors love to call each other "partners." It makes the two parties sound like they're on the same side. But many CIOs warn that willingness to cut maintenance fees will be a test of a true vendor partnership.

"If we've been a good long-term customer, then this is an investment they need to make in order to keep that long-term relationship as a partner," Emanuel said.

Testoni said a partnership is a two-way street on which governments must acknowledge that vendors need to survive this economy just as governments do. And agencies need to be careful about how much they ask vendors to sacrifice, said Dick Leurig, director emeritus of future technology and innovation initiatives at Montgomery College in Maryland.

"If they go out of business, there would be even less money for local government," Leurig said. "Local governments want to go out and do economic development, and in the next breath they're saying, 'Well, let's just get the vendors to [sacrifice] all the money they can.' There is a disconnect there. You need to encourage the vendors to work in your area, to help put money back in the economy, but also be fair to the governments."

But not all governments are demanding cuts that would ruin their vendors. According to Vicki Irey, director of IT for Overland Park, Kan., Oracle was the only one of her vendors that refused to renegotiate maintenance fees. Oracle's JD Edwards Enterprise powered the city's financial system, and Oracle's PeopleSoft supported human resources. Irey responded to Oracle's refusal by soliciting a third-party vendor to replace the software giant's maintenance support.

"I will say that Oracle called us and called us and begged us not to leave them, but they didn't want to negotiate," Irey said.

She hired software maintenance provider Rimini Street at half the price of Oracle's maintenance.

"We knew going into it if we left Oracle and went to a third party for support, we would no longer be able to receive any upgrades. That meant we were at the end of the road on that software," Irey said, explaining that she'd have to repurchase Oracle's software if Overland Park wanted to resume the company's maintenance.

Irey acknowledged that running Oracle's software without upgrades was only a temporary fix. She's convinced, however, that she can get a better price from Oracle by repurchasing the vendor's software. "That is the one and only time you're in the driver's seat with negotiation," Irey said.

Any government attempting this tactic should make sure to include fixed annual maintenance fees into the new contract, insists Catherine Maras, CIO of Bexar County, Texas. This way, she said, a CIO can be sure the vendor isn't offering a lower price up front with the intent of later backfilling it with maintenance fee increases.

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Rethink Possible

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Irey added that several attractive alternative providers have cropped up since Overland Park signed with Oracle in 2000.

"We have found [Rimini Street] supports us better," Irey remarked. "Their callback times are better."

Oracle did not respond to multiple e-mails from *Government Technology* requesting a response.

Smaller vendors tend be more willing to negotiate maintenance fee reductions, according to Cory Casazza, chief information management officer for Washoe County, Nev.

"Some of the smaller firms knew we could go somewhere else," Casazza said. "We leveraged the threat of open source against a lot of the vendors saying, 'Either do something, or we're going to end up replacing your product.'"

Casazza said he had to follow through on that threat with a few vendors.

"I think the bigger firms we deal with, like SAP and Esri for our GIS, know they have us locked in, and they were not as willing to negotiate," he added.

SAP increased its maintenance fees, Casazza said, which angered him given that Washoe County frequently invited potential SAP customers onsite to view the county's success with its products.

"Probably once a month we'll either host a site visit or we'll do reference calls for them. I think we're one of their better customers," Casazza said. "It kind of left a sour taste in our mouths, and I think we're a little more cautious and spend less time promoting their product now than we did before."

Steve Emmanuel says that vendors need to lower their maintenance costs or they'll risk losing government clients.

Testoni said SAP is willing to work with customers on any service revisions within the customers' existing contract stipulations. He said the company couldn't justify "arbitrarily" cutting fees for some customers and not others.

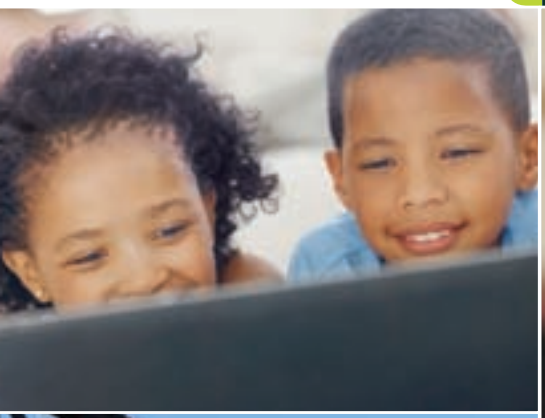
"We have contractual arrangements and agreements with tens of thousands of customers," Testoni said. "We can't just disenfranchise, or in the case of one group, say we're going to reduce and make up that cost from somewhere else."

In Casazza's office hangs an organizational chart with pictures of his employees that he used to make a point with providers. In vendor meetings, Casazza displayed the photos and asked vendors whom he should fire if they didn't lower their maintenance prices. He said the tactic worked occasionally.

Demands on vendors to cut maintenance fees also raise the question of whether vendors consider working with some governments worthwhile. Emanuel dismissed worries that forcing vendors to drop maintenance costs would cause them to ignore parts of the public-sector market. He said such a move on the vendors' part would look bad to other governments with which those vendors still wanted to do business.

"Guess what happens with that public opinion? It resonates through my partners. It resonates through my jurisdictional partners. It resonates through other agencies. That's not a good choice for business," Emanuel said. "They need to understand we are vocal."

> "YOU NEED TO ENCOURAGE THE VENDORS TO WORK IN YOUR AREA, TO HELP PUT MONEY BACK IN THE ECONOMY, BUT ALSO BE FAIR TO THE GOVERNMENTS."
>
> ***Dick Leurig,*** *director emeritus of future technology and innovation initiatives, Montgomery College*



School District of Somerset Goes Virtually One-to-One

DESKTOP AND APPLICATION VIRTUALIZATION HELPS ONE WISCONSIN SCHOOL DISTRICT ACHIEVE ITS EDUCATIONAL GOALS WHILE REDUCING COSTS.

ADVERTISING SUPPLEMENT

The School District of Somerset in Wisconsin, like many school districts across the country, has been trying to achieve a 1-to-1 computer-to-student ratio for years. But the district of 1,650 students and 225 faculty members is in no position to get extravagant.

"From a budgetary standpoint, we don't think we can ever fund a true 1-to-1 initiative without significantly more funding," said Ryan Sicard, the district's IT director. "And in this day and age of school funding, that's extremely unlikely."

Even if the district could afford to provide a PC to every student, said Sicard, it could not afford to refresh the devices every three to four years. So when the time came about a year and a half ago for the district to refresh its approximately 1,000 desktops and laptops, it decided not to take the path most traveled.

"We started strategizing about how we could create an environment that would allow us to extend the life cycle of our existing equipment, and use non-school-district-owned equipment to start satisfying our drive for a 1-to-1 initiative," Sicard said.

The thought of allowing students to use their personal devices to access educational programs is one that would make most IT administrators cringe. But Somerset found a solution that helped it reduce complexity and costs while leveraging personal student devices to reach its 1-to-1 objective.

The district, which had already virtualized its data center in 2005-2006, decided to use a desktop virtualization solution from VMware, called VMware View, to extend the life cycle of its desktops and let students safely use their own computers to access school content and applications. The solution helps the district contain ongoing operational costs and lets students stay productive in more places. Students and school administrators now access their school applications from any device; they simply go to the appropriate Web page, launch a Web View session, and their "desktop" is delivered to their machine.

Flexible Access

While allowing students to use their own devices provides the school with the advantage of not having to purchase computers for every student, it also gives students another benefit: easy access to their educational applications and data. Students no longer need to change computers when they go home from school, and even if they do, they will have the same computing environment.

"A lot of families have provided their own personal laptops to their children already," Sicard said. "We want to create an environment that leverages the devices that the children have and encourages them to use these devices to learn both on campus and off."

The solution supports a wide range of devices, he said, including traditional laptops, iPads and handhelds.

"As long as students can connect to an eligible client — whether that be a PC, a Mac, an iPad or similar device — we can still give them the same look and feel of the applications that they need to have for their learning environment at school."

Students and administrators can even use smartphones to access their desktops, Sicard said. While he concedes that these devices may not be the ideal way to view educational tools, he still believes that it is an advantage to support them as a learning tool since cell phones with

browsing capabilities are becoming more and more common.

Somerset's schools currently have carts of laptops available to students that can be checked out by a classroom. But with more student devices coming into the picture, Sicard sees this moving to an individual checkout model. Allowing students to check out computers will accommodate both students who don't have devices and those who may have simply forgotten to bring their usual device. The new desktop environment has been in place for school faculty for a full year. It was made available to higher grade students toward the end of last year, and was rolled out to all students at the start of the 2010-2011 school year.

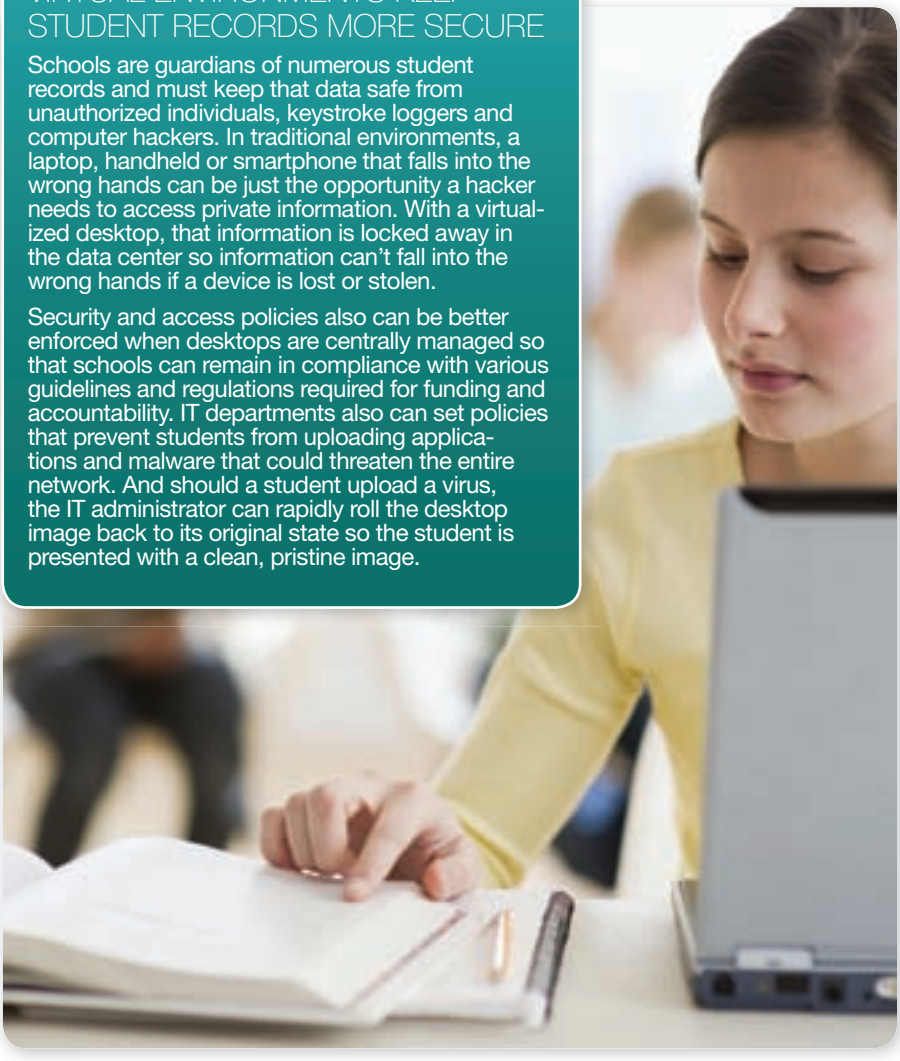
Longer Life Cycle, Easier to Manage

In a virtualized desktop environment, all applications are managed in the data center, rather than on the end-user's device. This saves the district time and money in several ways. The most attractive benefit up front, said Sicard, is the fact that the district can extend the useful life of existing computers. In a traditional setting, desktop replacement is typically necessary after three to four years because the software on the computers becomes outdated to the point that it is more cost-effective to purchase new hardware than try to maintain older machines. When the operating system, applications and data are decoupled from the hardware and residing in the data center, the state of the end device is moot — as long as it can access the Internet, students can continue to access their virtual desktop. This allows schools to extend the life cycle of their hardware from three to five years, to five to seven years. To this point, Sicard said the virtualization solution costs the district half of what it would have cost to replace Somerset's existing PCs.

VIRTUAL ENVIRONMENTS KEEP STUDENT RECORDS MORE SECURE

Schools are guardians of numerous student records and must keep that data safe from unauthorized individuals, keystroke loggers and computer hackers. In traditional environments, a laptop, handheld or smartphone that falls into the wrong hands can be just the opportunity a hacker needs to access private information. With a virtualized desktop, that information is locked away in the data center so information can't fall into the wrong hands if a device is lost or stolen.

Security and access policies also can be better enforced when desktops are centrally managed so that schools can remain in compliance with various guidelines and regulations required for funding and accountability. IT departments also can set policies that prevent students from uploading applications and malware that could threaten the entire network. And should a student upload a virus, the IT administrator can rapidly roll the desktop image back to its original state so the student is presented with a clean, pristine image.



In addition, with desktop virtualization, IT staff can support, provision, deploy and manage virtual desktops centrally in the data center, so a huge swath of support issues that previously tied up IT staff — such as keeping software on individual machines up to date, the complexity of upgrading devices with new operating systems and troubleshooting incompatible applications — essentially disappears.

"We don't have to maintain that desktop and all the things on that desktop that you traditionally have to manage," Sicard said. "You can have a desktop image for a lab, classroom or office area, and push this image to multiple devices."

In fact, according to an IDC white paper, *Quantifying the Business Value of VMware View*, which presented information collected from 14 VMware customers, VMware View

can reduce time spent on desktop management tasks, such as imaging, end-user support, patch management and security functions, by 55 percent.

Supporting such a large number of users and range of personal devices in a traditional environment would have been too complex, Sicard said. "If they come in with their own device, we don't know what version of an application or what version of Windows they are running, and sometimes the end-users don't know," he said. "We have a very tight budget. We don't have unlimited tech support to help those users, so if they can come in with a device that connects to our wireless network and can launch a View Web portal, they then have an environment that we can easily manage and support."

Tools included in the virtualization package also help IT staff provide better and faster service to teachers and students — especially in the area of new application deployment. Traditionally if teachers requested a new application for their class, IT staff had to install and test the application to ensure it didn't conflict with other software and then get IT support staff up to speed. The process could take several days. Now, Sicard said, it can be done in a day or less.

"In education, we see a lot of specialty applications, especially in the special education area, that can be very time consuming for my technicians to install, test and configure. Now they can drag and drop the application and it is on a teacher's desktop."

Overall, the school district's unique strategy is helping to keep costs down and keep the district on top of its technology game despite these tough fiscal times.

"With budgetary numbers the way they are, we're certainly not going to get more staff," said Sicard. "So we need to find more ways to be more efficient, get our support timelines shorter and shorter, and prove our customer service to our teachers and students. Virtual desktops are helping us improve our levels of service to the students and faculty."

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> "IF YOU BOUGHT A GOOD PRODUCT AND ARE ANY GOOD AT USING AND MANAGING IT, YOU SHOULDN'T NEED A LOT OF HELP."
>
> ***Michael Armstrong,*** *CIO, Corpus Christi, Texas*

PHOTO BY DAVID KIDD

Letting Contracts Lapse

A solution to high maintenance fees among some governments is to do the maintenance themselves or subscribe to scaled-down service plans, according to *"New Normal" Success: A CIO Survival Guide*, a white paper from Government Technology's Digital Communities Program, a network of public- and private-sector IT leaders that focuses on local government issues.

"If you bought a good product and are any good at using and managing it, you shouldn't need a lot of help," said Michael Armstrong, CIO of Corpus Christi, Texas, in the white paper.

Irey took that approach in Overland Park. She said she normally paid one of her vendors $30,000 annually for maintenance. To save money, she told the vendor to simply sell her spare parts and shifted the maintenance duties to her staff. As a result, the city paid only $10,000 to the vendor in 2009.

Testoni said eliminating maintenance fees is one option SAP points out to cash-strapped governments, but he discouraged that route. "You lose the ability to get the product enhancements from us," he said. "You lose the ability to file messages or engage with our support team when you're having difficulties with something that could be product related."

And restarting those services could involve penalties.

"Letting contracts lapse is very dangerous, and if you want to go month to month, prices will go up," said Paul Christman, vice president of state and local governments and education sales for Quest Software, in the Digital Communities paper. "Customers who stop paying now will have to negotiate and work with their vendors in the future to re-establish support."

"Maintenance payments are closely tied to the software's production readiness," added Mike Bilardo, director of government solutions for Hyland Software, in the white paper. "Today's maintenance payments fund tomorrow's new releases and increased functionality,"

The increased functionality argument can ring hollow, however, to governments lacking the resources to take full advantage of the functionality of their current software installations, said Bexar County's Maras.

Lowering Service Expectations

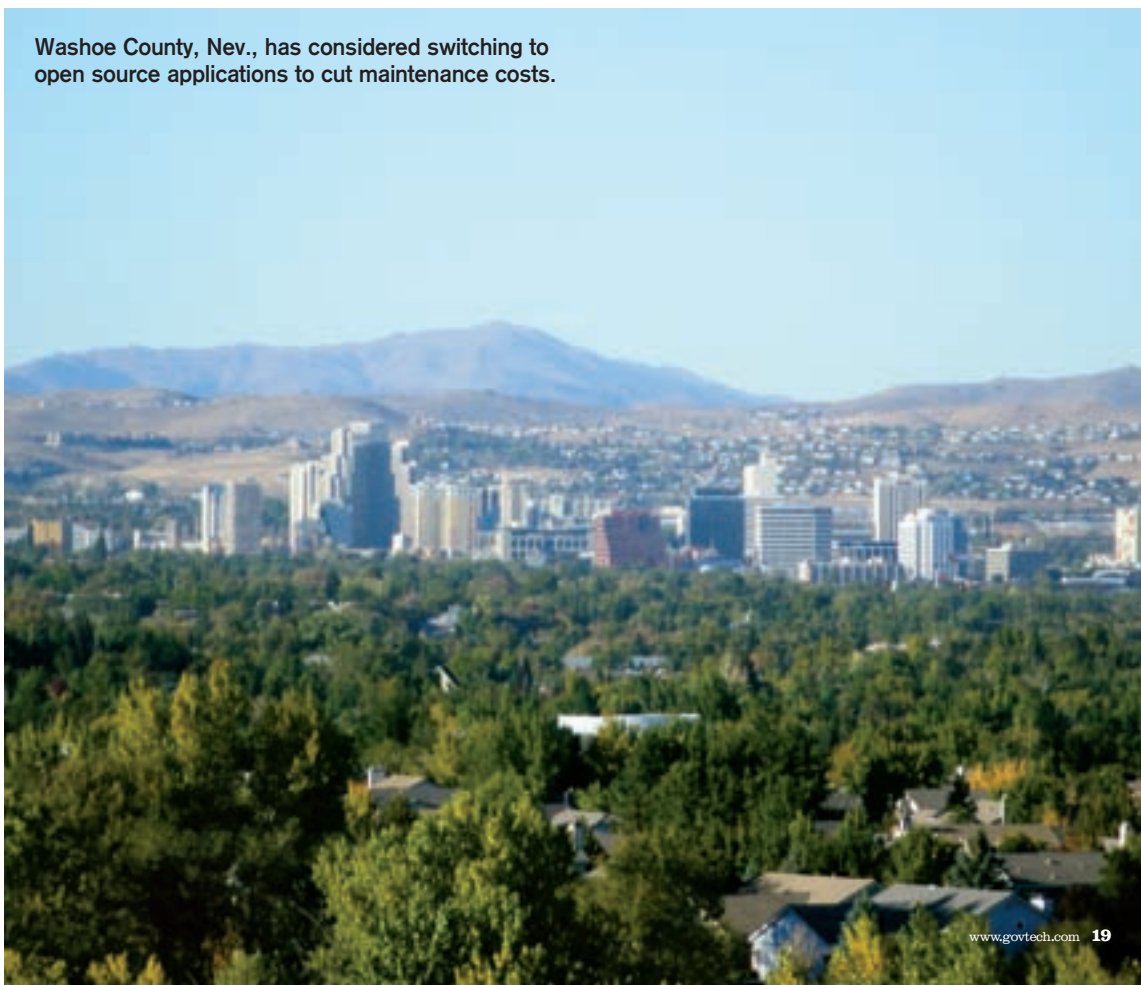
Settling for lower service standards in noncritical programs is a compromise facing numerous government agencies.

"We talk about service-level agreements, and I think there should be an expectation agreement out there — the expectation being maybe it will take a day now for someone to come and fix your PC. It used to be you would call, and somebody would show up," Leurig said.

Irey suggested maintenance for software used by building inspectors might be a good fit for that approach.

Christman cautioned in the white paper that lower service standards could result from vendors slashing maintenance fees.

"Bugs will take longer to get fixed. Expansion to new platforms will be delayed," Christman said. "We are just like our government customers. We are trying to figure out how we can best maintain a high-level support capability when government is facing difficult decisions about how much maintenance it can afford. Government and industry are in it together. Our success is closely linked." GT



Washoe County, Nev., has considered switching to open source applications to cut maintenance costs.

PHOTO COURTESY OF WIKIPEDIA/KC0616

NET

THE NATIONAL RENEWABLE ENERGY LABORATORY UNVEILS THE FIRST FEDERAL BUILDING THAT PRODUCES AS MUCH ENERGY AS IT CONSUMES.

BY CHAD VANDER VEEN
ASSOCIATE EDITOR

PHOTOS COURTESY OF NREL

ZERO

This U.S. Department of Energy facility in Golden, Colo., is one of the world's most energy-efficient buildings.

"Light louvers" over the entryway reflect sunlight into the interior of the building. This light is reflected downward by sloped ceilings, eliminating the need for artificial light.

As governments push to adopt sustainable practices, one holy grail is creating working environments that achieve net-zero energy consumption. That's the idea behind a newly opened office building at the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) in Golden, Colo. Known as the Research Support Facility (RSF), the structure is designed to create as much energy as it consumes, making it one of the world's most energy-efficient buildings.

The RSF, while certainly cutting edge, is not some isolated technology wonderland impossible to reproduce. Rather, what makes the building so energy efficient is a combination of thoughtful design, creative architecture, an understanding of the natural environment and clever repurposing of existing materials. Upon seeing the RSF, one is immediately struck by the building's peculiar footprint. Two long, narrow wings are connected near their center, creating what NREL literature calls a "lazy H" configuration. The lazy H maximizes the RSF's ability to capture sunlight while complementing the local geography.

Approaching the RSF's front entrance there are several elements that immediately draw the eye. Most prominently, the doors are surrounded by what look like massive metal mini-blinds, which are surrounded by a highly reflective façade. Both the mini-blinds, actually called light louvers, and the façade serve a specific purpose.

"They take that light and bounce it into the middle of the space," said Heather Lammers, a public affairs official with NREL. "We're trying to maximize all of that daylight going into the workspace."

The RSF is 100 percent day lit, but oddly the natural light at first seems very unnatural. Perhaps the sensation stems from traditional office environments, which are often lit with fluorescent lights. (Though the RSF has artificial lighting, it will only be used at night or during stormy weather.)

In the RSF courtyard, rows of solar panels peek over the roof line. Light-diffusing shades frame all the south-facing windows. LED lights line a walkway made of porous pavers that allow rainwater to seep back into the ground instead of flowing into a storm drain. There are retaining walls made not of concrete, but of rocks excavated during construction and contained in a mesh made of recycled wire. And all around are landscape features done in a xeric style, featuring vegetation adapted to the extremely dry climate.

"Water is king. It's almost bigger than gold out here," Lammers said. "Colorado is a very dry, arid climate. And so, because of water loss in Colorado, we can't retain water onsite to water [the landscape], but we can kind of use the water as it flows through the site."

A "lazy H" configuration maximizes the amount of natural light that reaches the interior.

Roof-mounted solar panels generate electrical power.

LED lighting and xeric — low energy, low water usage — landscaping help make the facility energy efficient outside as well as in.

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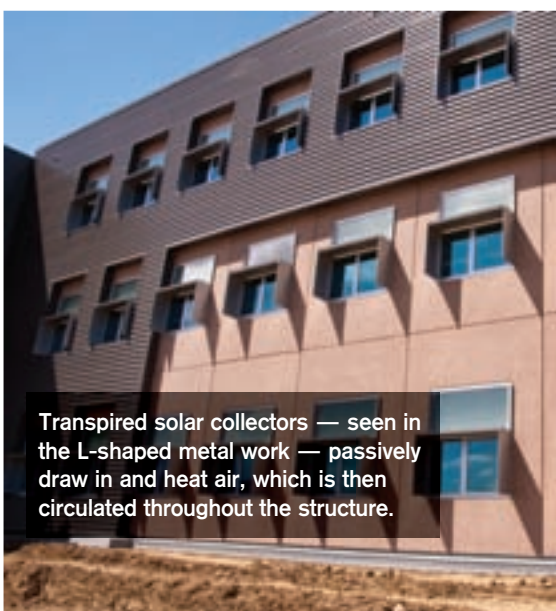

Transpired solar collectors — seen in the L-shaped metal work — passively draw in and heat air, which is then circulated throughout the structure.

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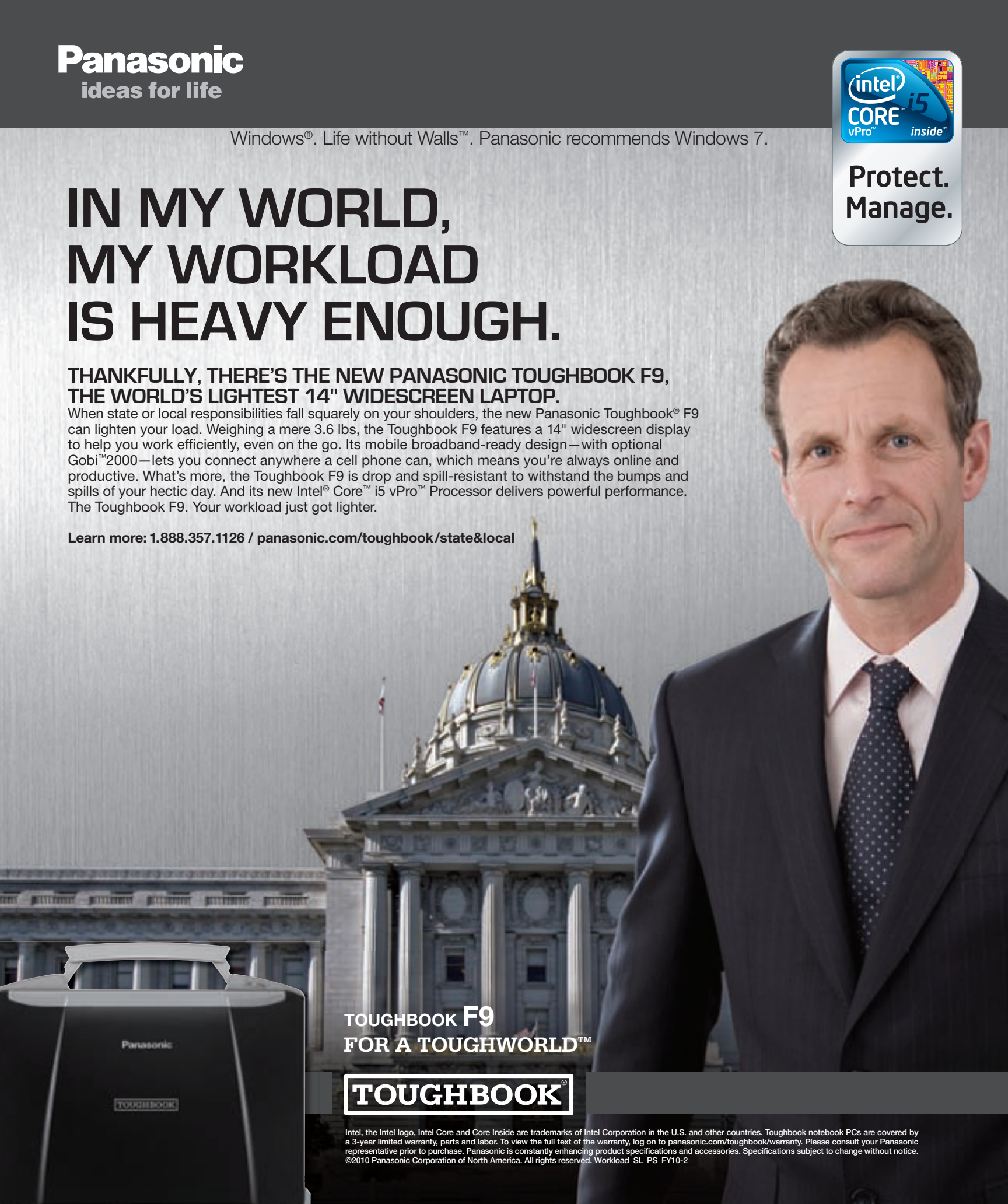

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The facility uses a clever runoff water collection and irrigation system that combines simple piping from the roof to the ground with intelligently designed terrain.

Other less obvious but equally important elements help make the RSF Leadership in Energy and Environmental Design Platinum certified. Much of the exterior consists of large panels that were preformed before arriving on site. The panels are made entirely of local aggregate and are layered over insulation and interior concrete walls. The panels dissipate radiant heat, preventing it from entering the interior.

"It helps really keep the building at a consistent temperature," Lammers said. "You think about the old cathedrals that you used to go into made of all that stone … [it's the] same kind of principle. You get some thermal mass and it helps dissipate the heat, helps slow it down from entering the building, and then at night it naturally cools off."

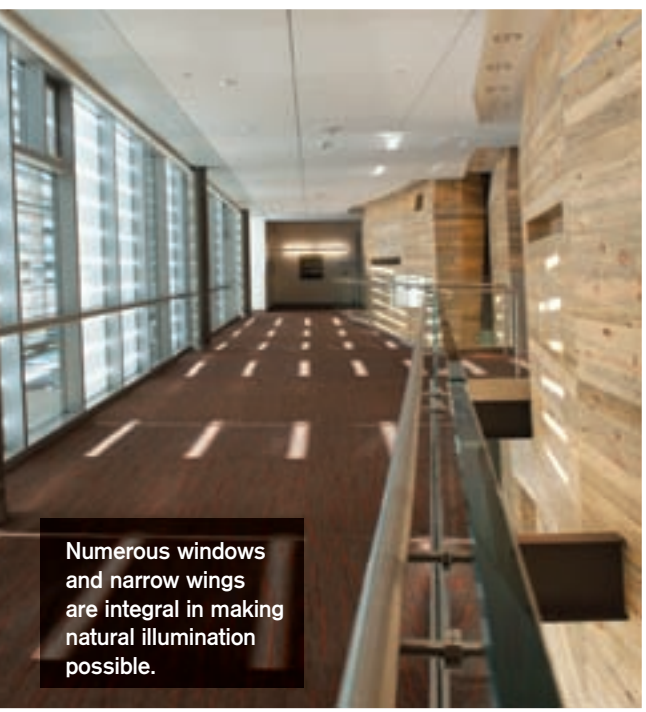
A portion of the building's south side is sheathed in another energy-saving feature — a large swath of corrugated metal. What appears to be decorative metal siding actually is the result of a technology developed at NREL known as transpired solar collectors. The wavy metal is punctured by thousands of tiny holes, which draw in air that's heated by the sun-warmed metal. The warm air is then pumped underground into the RSF's unique thermal storage facility. Like most of the structure's energy-saving features, the transpired solar collectors are completely passive, making them far simpler to duplicate in future structures.

Individual offices are open at the top, eliminating the need for separate lighting and air conditioning. Many of the facility's windows also open, some manually and others computer controlled.

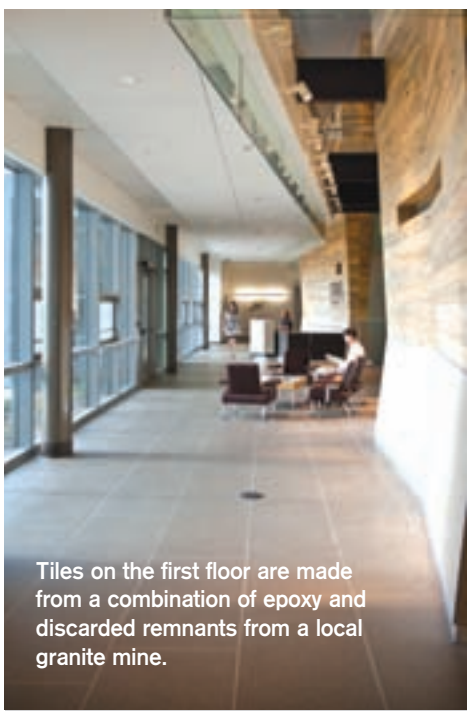
The transpired solar collectors, like the RSF itself, were in development for years before finally gaining traction. Jeffrey Baker, the Department of Energy's director of the Office of Laboratory Operations at the Golden Field Office, conceived of the RSF 15 years earlier.

"It took that long to get everything lined up, but once everything did get lined up in the budget process … such that we had money and support, the project went very quickly. It was completed in about three years," he said.

Inside the RSF, there are several elements Baker likes to call attention to. First is the sheer number of windows — sized to match the thermal characteristics of the building and each triple paned and triple glazed. Second is the wood paneling that adorns the



Numerous windows and narrow wings are integral in making natural illumination possible.



Tiles on the first floor are made from a combination of epoxy and discarded remnants from a local granite mine.

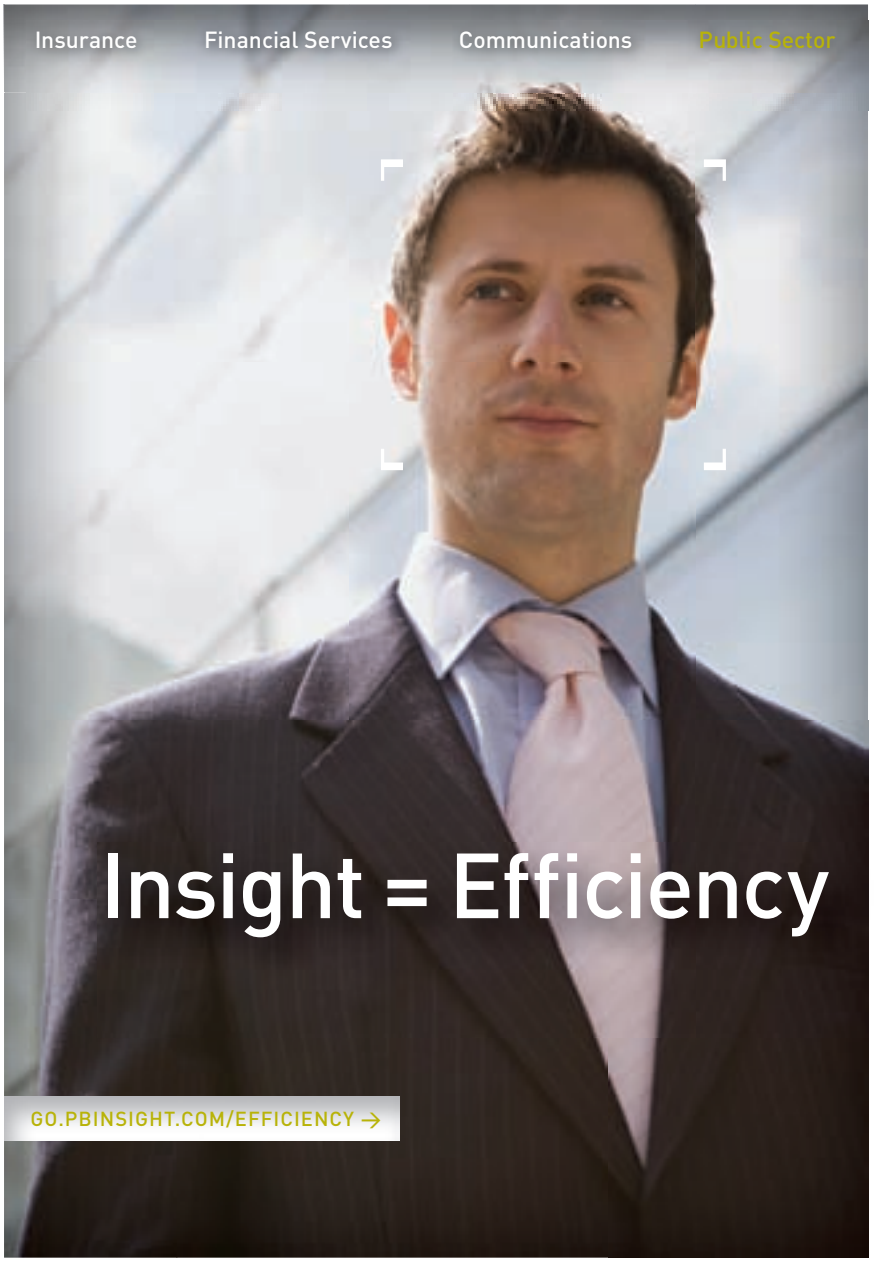
Much of the material used to build the facility is recycled, including wood from forests decimated by pine beetle infestations.

building. The wood, a beautiful pine infused with blue and gray, is salvaged from trees killed by a devastating pine beetle infestation. Last, Baker pointed out several ordinary-looking structural support columns that are concrete-filled pipes salvaged from natural gas wells.

"All the materials and techniques that we used in this particular building are available to anybody today. It all operates passively, so there's not a lot of very complicated technologies," Baker said. "What we've done here today can be duplicated by others."

Lammers also pointed out that the floor tiles are made of granite mine remnants mixed with epoxy and the receptionist's desk is made of ground sunflower seeds and laminate.

On the second and third floors are the office spaces. Scattered throughout these spaces are transparent floor plates, which provide a look at the inner workings of the labyrinth thermal storage facility. The labyrinth, actually just a crawl space, is below the first floor. From the labyrinth comes a piping system visible below the plates. Water in the pipes is heated by the solar panels and transpired solar collectors. The heat is dissipated into the RSF's concrete superstructure, which warms the interior. Conversely, to cool the building, the pipes go underground where the water is naturally chilled and again piped back up to cool the concrete, which in turn cools the interior. In total, 42 miles of heating and cooling pipe snake through the building, completely eliminating the need for a forced-air HVAC system. Interestingly the building was engineered with a pink-noise — a variant of white noise — generator that mimics the sound of a forced-air system. NREL



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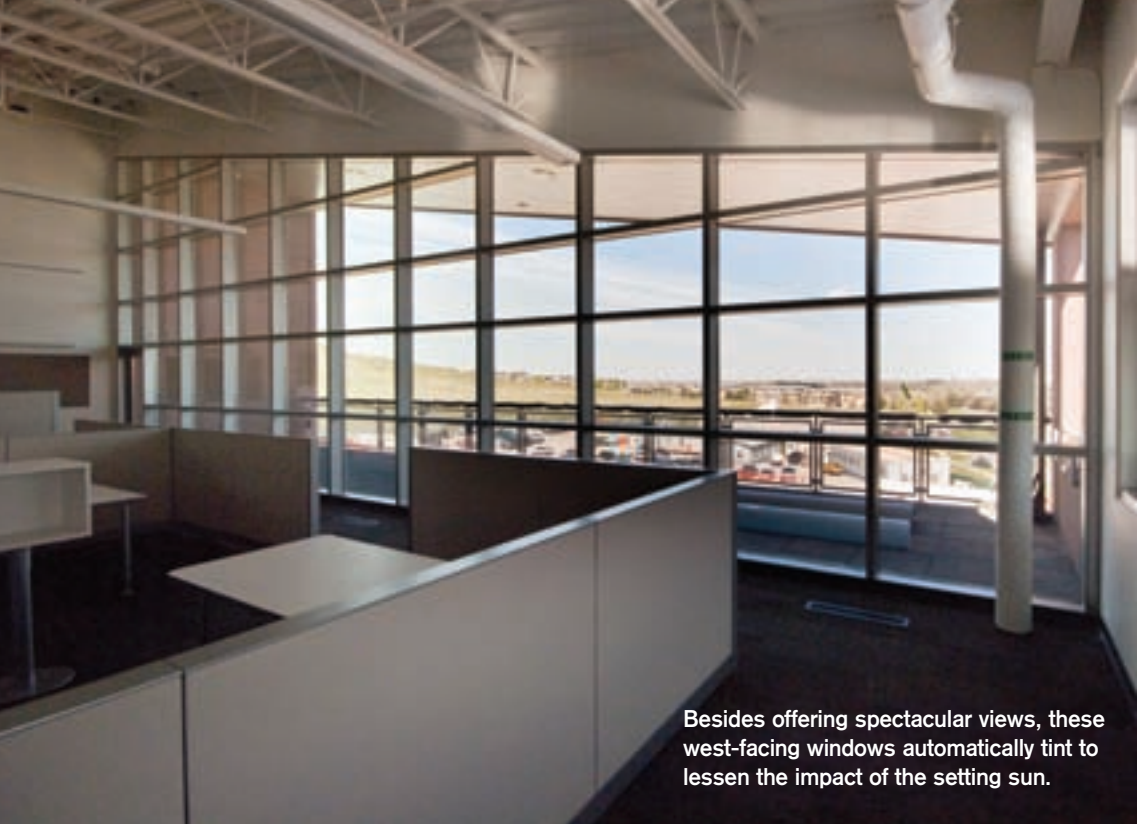


Besides offering spectacular views, these west-facing windows automatically tint to lessen the impact of the setting sun.

research showed that the lack of white noise in an office is distracting.

These office spaces also bear witness to how effective the RSF's natural lighting scheme is. The sloped, exposed industrial-style roof adds to a feeling of spaciousness. The ceiling and piping are all white and reflect the light directed inside down to the floor, helping to create a refreshing sensation.

The majority of the many windows also open — something sadly missing from most offices. Most windows are computer controlled, but some employees can open at their choosing.

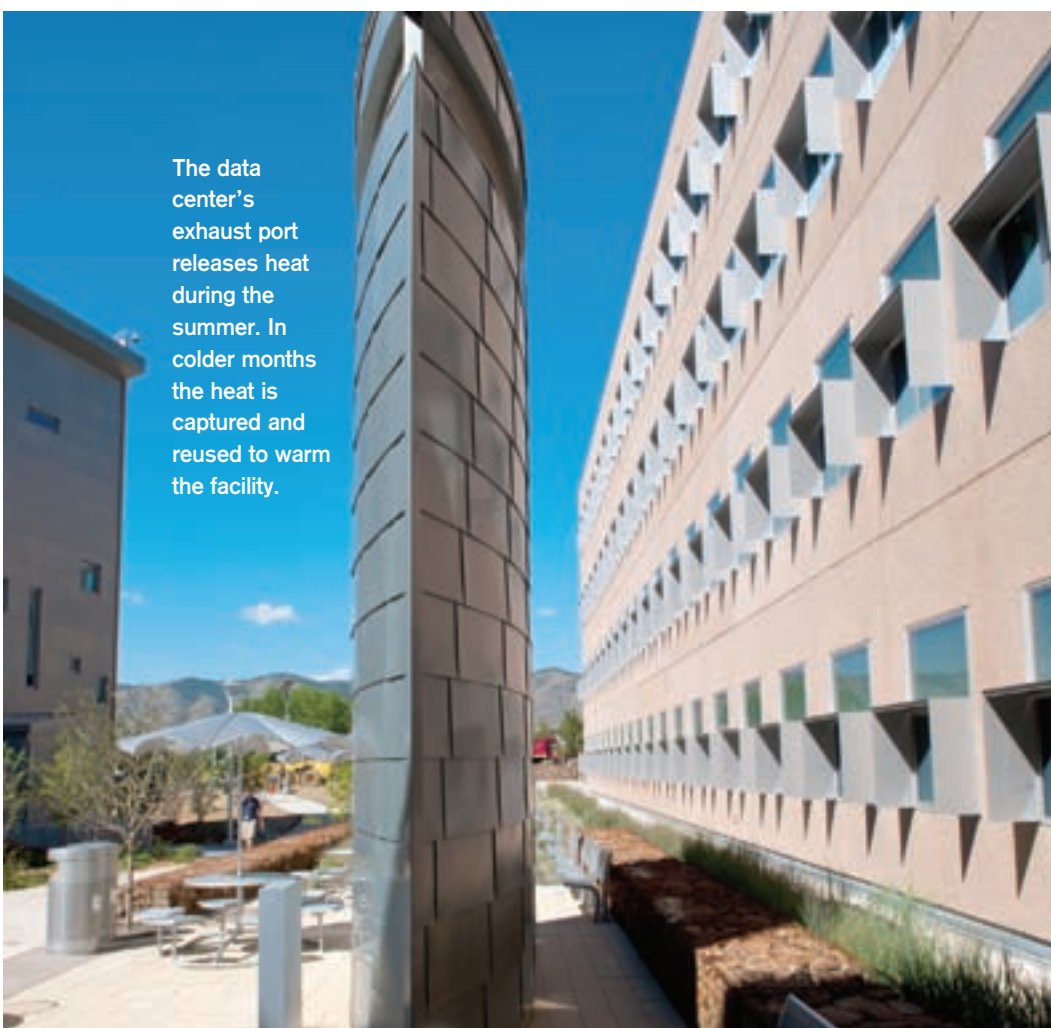
Also, like most office buildings, there are a host of cubicles with a small number of offices reserved for the bigwigs. Yet none of the offices have ceilings. They're all open on top. The open offices, together with the sloped roof and the vast number of windows make the space feel large and airy — a truly pleasant working environment.

On the west end of the office floor is a wall of windows that offers a grand view. It's also in the direct line of the setting sun. Late afternoon in Colorado can often be the hottest part of the day. So like a pair of high-end eyeglasses, the windows automatically tint themselves, letting light in and keeping heat out.

Come winter, 800 employees will fill the RSF and the building will be fully staffed. One might wonder whether the solar-heating systems are enough to heat the building on cold winter days. It turns out the RSF also can capture and reuse the heat generated by its data center.

What's most striking about the RSF is how energy efficiency is being achieved not with *Star Trek*-style gadgetry, but with thoughtful repurposing of existing materials and techniques. And by all accounts, the cost to construct the RSF is on par with traditional buildings. Baker said the cost of the building ran about $259 per square foot. So if cost, materials and construction are near-equal to that of a traditional building, the real impact of the RSF is not that it can reach net-zero energy consumption but that it shows anyone else can too — a sentiment Baker shared.

"The lasting value of this building is really demonstrated that we can do projects like this today, using today's materials and today's techniques at costs that are comparable to today's commercial buildings," he said. "Ten years from now, we want people to look back to the Research Support Facility and say this is where the nation's move toward highly energy-efficient design started. And these are the folks who actually demonstrated it could be done. I'm here to tell you it can be done today with the right approach, with the right mindset and we're happy to share our story with everyone so [they] can duplicate what we've done." GT



The data center's exhaust port releases heat during the summer. In colder months the heat is captured and reused to warm the facility.

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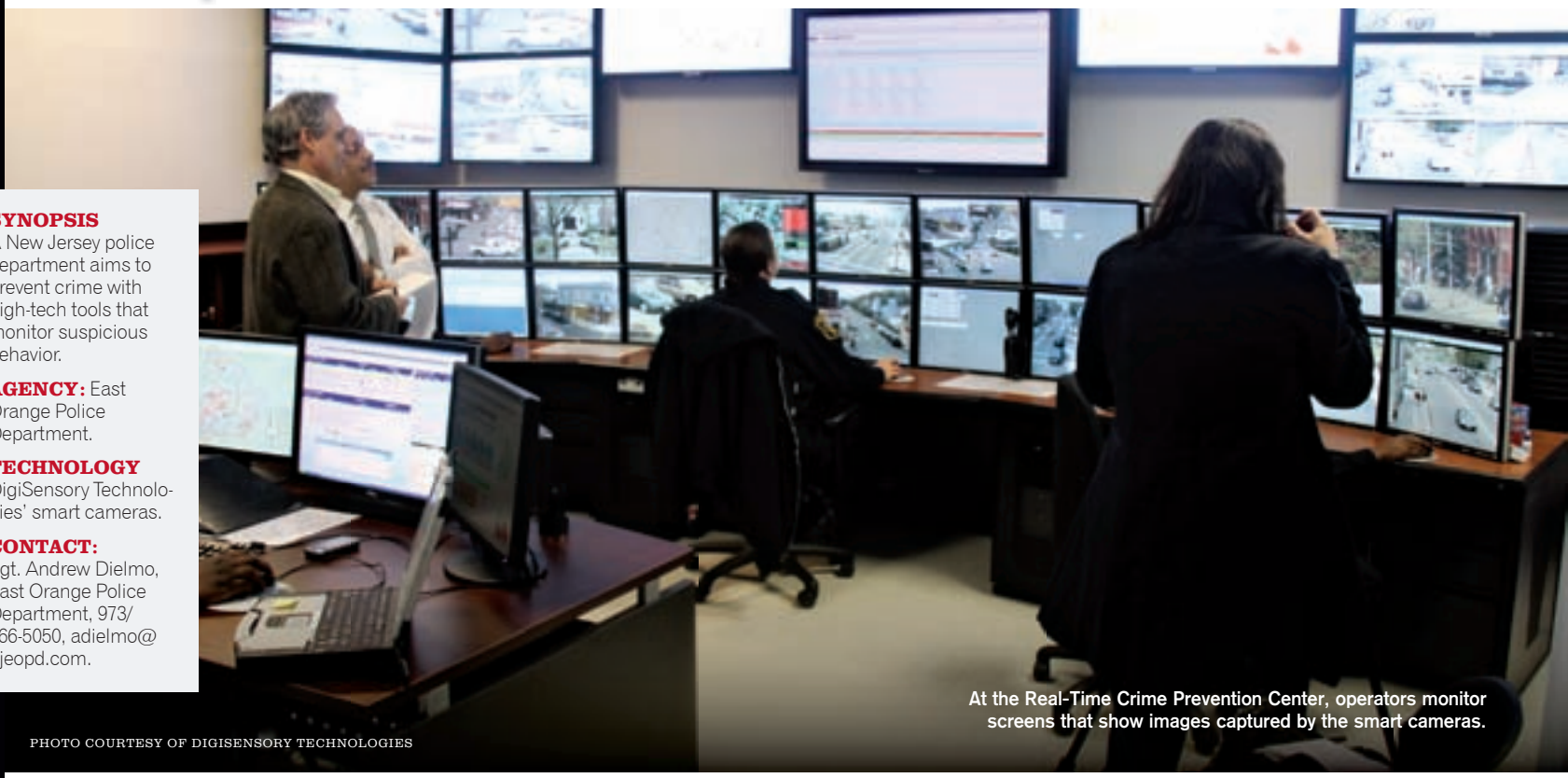


SYNOPSIS
A New Jersey police department aims to prevent crime with high-tech tools that monitor suspicious behavior.

AGENCY: East Orange Police Department.

TECHNOLOGY
DigiSensory Technologies' smart cameras.

CONTACT:
Sgt. Andrew Dielmo, East Orange Police Department, 973/266-5050, adielmo@njeopd.com.

PHOTO COURTESY OF DIGISENSORY TECHNOLOGIES

At the Real-Time Crime Prevention Center, operators monitor screens that show images captured by the smart cameras.

BY RUSSELL NICHOLS STAFF WRITER

Smarty Cams

Can "smart cameras" programmed to identify crimes before they happen help law enforcement agencies stay ahead of the curve?

At a strategic surveillance hub in East Orange, N.J., caution alerts triggered by sensors strategically located across the city flash on flat-screen TVs faster than the speed of crime.

When that happens, operators scan live video feeds to search for signs of suspicious activity. If it looks like a crime in progress, operators can dispatch the nearest available patrol units to the scene with the touch of a button.

Blink and you might miss the action. At the Real-Time Crime Prevention Center, the sensors, or "smart cameras," are among the latest high-tech tools in the East Orange Police Department's (EOPD) arsenal of gadgets aimed to stop crimes before they occur. The devices slash response times from minutes to mere seconds — a critical difference in a city plagued by drugs, gangs and shootings, said Jose Cordero, East Orange's police director. "It's no different from what we do on the street," Cordero said, "but now we have a system in place that can look at our data and turn information into intelligence in real time."

Crime Prevention Network

For the past few years, the EOPD has been building its $1.4 million state-of-the-art crime prevention network, which Cordero said includes gunshot detection systems, surveillance cameras, wireless computers and software that breaks down crime data instantly. In 2009, the department acquired 10 smart cameras for $195,000 to incorporate into the grid as a force multiplier. But in many ways, the sensor technology is so new, advanced and untested that some refuse to call it a sure-fire, crime-fighting solution.

"The notion that technology will pick out criminals and turn itself on at the right moment and enable the arrests that need to be made is a nice idea," said Dennis Kenney, a criminal justice professor at New York's John Jay College of Criminal Justice, "but there is no reason to believe it will work."

In the face of skeptics and privacy advocates crying Big Brother, local law enforcement officials fired back with striking statistics: Since 2003, violent crime in East Orange has dropped more than two-thirds.

"We didn't get to where we are by merely reacting to crime," Cordero said. "If we get information that something may happen and we want to prevent future incidents, we use virtual resources."

Candid Camera

The concept of stopping crime ahead of time has been around for ages, usually spilling from the pages of science fiction stories. But with the rise of forecasting technology in recent years, more government agencies want to look to the future to stay ahead of the curve.

Since 2006, for instance, the Memphis (Tenn.) Police Department has been using

software to evaluate incident patterns throughout the city and forecast criminal hot spots. With IBM predictive analytics technology, the department claims to have reduced crime by 31 percent. And in Florida, where 85,000 kids flood the state's juvenile justice system every year, the Department of Juvenile Justice also implemented predictive tools that analyze past offense history, demographics and other factors to determine which kids have a higher chance of recidivism.

But the sensors used in East Orange see things differently: Rather than peering into the past, these smart cameras catch potential criminals red-handed in real time. Developed by Australia-based company DigiSensory Technologies, the Avista Smart Imaging Sensor system consists of the 3.2-megapixel smart IP camera and management software. After early tests in Australia, the system was selected to support Sydney's World Youth Day in 2008, including a visit by Pope Benedict XVI, according to David Young, a spokesman for DigiSensory USA.

Now Avista systems are popping up in other parts of the world, from the United Kingdom to Louis Vuitton stores in China. Although the EOPD was the first U.S. agency to adopt the system, Young said a New Jersey housing authority is installing a 65-camera system and other agencies have been researching the product.

The UK Olympic organizing committee is also evaluating the camera system with London's Metropolitan Police's Victoria Station because it's interested in using the technology to support the 2012 games. While no other law enforcement agency has yet installed the East Orange model, the system has piqued the U.S. Justice Department's interest, Young added. From crowd control to public safety, the company sees tremendous public-sector potential in the system's possibilities.

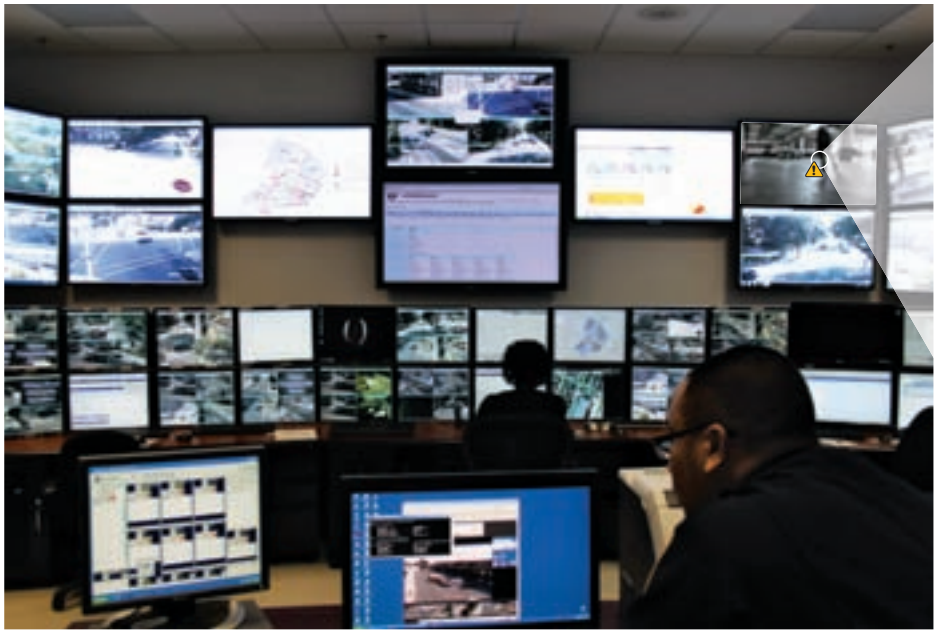
"The technology has wide application in law enforcement, school safety, government institutional safety, crowd management, transportation departments, prisons and more," Young said. "With bullying being one of the biggest problems occurring in American schools today, imagine if principals would be automatically notified of a potential incident moments after students began to loiter."

With sensors connected to surveillance cameras, the system is designed to identify specific behavior patterns that are linked to probable crimes: strange loitering, a group chasing an individual or a car creeping around the corner near a pedestrian. Crimes are recorded and stored in a database, so the system is always getting smarter.

But how can these sensors know the difference between a crime and a random, innocent act or gesture? That, Kenney said, is the age-old paradox.

"The problem is creating software that is able to examine human interactions and make determinations whether crime is occurring or not," he said. "What if someone is walking up to anyone at the ATM and the system kicks on and says a robbery might be taking place, but there is no crime? It could wind up being a tremendous drain on resources."

PHOTO COURTESY OF DIGISENSORY TECHNOLOGIES



HOW IT WORKS: The smart camera surveillance system at the Real-Time Crime Prevention Center in East Orange, N.J., records and analyzes real-time information based on many variables. Suspicious activities are given to operators who dispatch the nearest available officer.

According to Cordero, avoiding this problem starts by ensuring that operators monitoring the video study the potential victim's behavior.

"Someone who is in fear that they may be robbed or assaulted, they're going to react a certain way," Cordero said. "This is something that we need to look at to minimize

false positives by not trying to re-create all variations of a crime, but looking at victims of the crime and their reactions and working our way back."

Speedy Response

You can't have a predictive tool without running into the usual legal and ethical questions. For example: "Can you generate probable cause?" asked Peter Scharf, a public health professor with a specialty in criminology at Tulane University in New Orleans.

Scharf co-authored a study on gunshot detection systems used in Virginia. No matter how good forward-thinking technology may look, its success ultimately comes from credibility, Scharf said.

"You don't want to kill innovation, but you want to structure it so it has scientific, ethical and legal control over technology," he said. "Before you go screaming 'This is it!' you have to check it to make sure you're right."

76%

The percentage that overall crime dropped in East Orange between 2003 and 2009.

With the EOPD leading the charge for law enforcement, the department has little research to support the system's effectiveness. Cordero knows this, and even said the department sees itself as "the lab for what works" in the police force — trial and error comes with the territory.

As with the smart cameras, the EOPD realized soon after deployment that the caution alerts only gave patrol units a small response window, which Scharf considers a huge hurdle. "It doesn't matter how quick the information comes. How quick can you get there?" he said. "Unless cars go faster, you're not going to catch anybody."

With the early tests, Cordero said, the EOPD ran into this problem when a sensor picked up a potential car burglary. When the patrol units arrived on scene, the suspect was gone. They eventually found him, but Cordero wanted to find a way to minimize delays. "If you can't intervene," he said, "then this is merely crime-recording technology and not helpful in preventing crime."

A sensor picked up a potential car burglary.

In March, the EOPD launched an alarm-based automated dispatch system to work in concert with the smart cameras and cut down dispatch time. "From detection to validation, we have a car rolling within a second and a half," he said. "Criminals see that when one of these systems goes off, the police are all over the place in a matter of seconds. That's really where we drive crime reduction." GT

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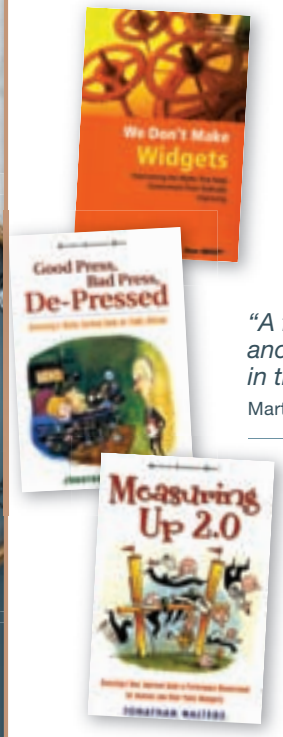

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CITY OF VANC

PHOTOS COURTESY OF CITY OF VANCOUVER

BY DELENE BOSCH CONTRIBUTING WRITER

VANCOUVER IMPROVES PRODUCTIVITY AND DECISION-MAKING ACROSS ASSET PLANNING, DESIGN AND MANAGEMENT.

REVAMPING PUBLIC WORKS

In December 2009, Vancouver, British Columbia, started a new chapter in the story of how it manages its infrastructure assets. Vancouver said goodbye to the days of planning, designing and managing assets using disconnected systems and processes. The city's new approach integrates asset information — including design, value, maintenance and location data — and makes it available across the organization.

Integrated information has transformed a number of key processes. Customer service staff can address citizen concerns more quickly. Financial decision-makers have instant access to vital asset valuation data. The city's engineers can coordinate projects with greater precision.

City customer service agents in Vancouver can access project information in order to answer questions from citizens on impacted streets.

According to Rowan Birch, assistant city engineer for Vancouver, business needs drove the integration effort. "Consolidating our asset data into a database was really just the beginning," said Birch. "By staying focused on the big picture, we've transformed the way data contributes to individual tasks and to our overall mission."

$8 BILLION
The value of Vancouver's infrastructure assets.

Meeting High Expectations

Vancouver always has taken a proactive approach to ensure that its public works infrastructure supports and serves Vancouver's residents. The city's efforts have not gone unnoticed. Vancouver routinely ranks as one of world's most livable cities, with clean streets, good public transit and reliable infrastructure making key contributions. However, as the technologies that people use every day have advanced, so have expectations.

"Today when citizens have infrastructure questions or concerns, they expect us to respond at Internet speeds," Birch said. "Before integrating our systems, the people answering customer queries didn't have good access to information about service status and projects by location. We also couldn't track requests easily. Customer service suffered as a result."

Aging Infrastructure and New Accounting Requirements

Beyond meeting citizen expectations, city decision-makers saw other challenges looming. Vancouver experienced a growth surge in the 1950s and '60s, and the infrastructure built to accommodate that growth needed to be rehabilitated or replaced in the near future. At the same time, Canada's Public Sector Accounting Board mandated that the country's local governments value assets more precisely. To effectively meet the mandate, Vancouver needed to count and value assets with greater accuracy.

"Again, disconnected systems slowed us down," said Martin Tilt, a GIS analyst with Vancouver. "Engineers designed projects using [computer-aided design] CAD-based software tools, but the design process wasn't connected to the GIS we used to maintain asset maps and other information. GIS specialists manually entered as-built information into the system after construction. The time-consuming process not only resulted in significant backlogs of as-built information, it also made accurate asset accounting more difficult because recently completed and ongoing projects weren't visible."

Extending Existing Technology and Processes

To overcome its challenges, Vancouver focused on finding a way to link existing technology and processes more effectively. The city wanted to bridge gaps between its GIS, customer service and accounting systems. Recognizing that integrated data must also be timely, Vancouver made eliminating its backlog of as-built design information a priority.

After exploring a number of asset management technologies, Vancouver chose Infor Hansen Asset Management software to

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manage its infrastructure, including water, sewer and transportation assets. The solution included service request management and integrated with the city's customer relationship management and accounting systems.

To deliver design and spatial information to the Hansen solution and the city's GIS, Vancouver chose Autodesk Topobase software. Built on the AutoCAD-based design software the city already used, Topobase let the city make asset designs immediately available across the organization. "With the new system, we create design data once and make it GIS-ready at the same time," Tilt said. "As projects progress, we manage the status of the information and update it as needed. There's no more as-built backlog, because the design data is in the system as soon as it is created."

End-to-End Visibility

Following the workflow on a typical sewer replacement project highlights the advantages of Vancouver's more integrated process. Predictive analysis helps engineering decision-makers spot sewer assets requiring rehabilitation. Engineering technicians then turn to their CAD-based software to design system enhancements. Designs enter the GIS directly as a pending project. Then engineers can review the designs, propose changes and develop multiple alternatives.

Integration with asset management and financial systems give people outside the engineering department insight into planned projects. Even customer service agents can access project information, enabling them to better address questions from people who live on the streets likely to be impacted by the project. The tight connection between the design process and asset management system helps ensure that work orders contain the latest design information. It also facilitates the coordination of construction schedules and helps the city identify opportunities to conduct any needed work on nonsewer assets likely to be exposed during the project.

At each stage of the process, sewer valuation information is available to Vancouver's accounting personnel. Through their SAP financial software, they have visibility into the number and value of current assets and planned project costs. Complying with new Public Sector Accounting Board accounting standards is easy. Just as significantly, the city has wider access to more accurate asset cost information.

Predictive analysis helps engineers in Vancouver spot sewer infrastructure that needs rehabilitation.

"When projects are complete, we add any as-built changes to the design and mark the data as active," Tilt said. "Design drawings instantly become current network information. The system also saves the history of the project, making it easier to leverage insights gained from past projects in planning. Start to finish, we're able to work smarter and more collaboratively."

Proactive Asset Management

Since launching its integrated approach to asset management, Vancouver has seen impressive productivity gains organizationwide. For example, people in the design department no longer waste time on duplicate data entry, and customer service agents can answer questions faster — and more accurately — than before. But the city is perhaps most excited about the prospect of using better information to drive cost savings through more proactive asset management over the long term.

"Now more than ever, serving the public means doing more with fewer resources," said Birch. "That requires insights into what really needs to done — when it needs to be done. Using a more comprehensive infrastructure model, we can make better planning decisions. We'll be able to do things like review maintenance histories, costs and failures by asset types. Real insights will help us to optimize maintenance schedules and cut costs while reducing failure risks. We've never been better prepared to proactively manage Vancouver's $8 billion infrastructure asset inventory." GT

DELENE BOSCH is the implementation project manager for Vancouver.

BY RUSSELL NICHOLS
STAFF WRITER

Raising the Cloud

Minnesota launches landmark Microsoft cloud collaboration.

As states battle deficits and struggle with outmoded IT management models, Minnesota will use cloud computing to deliver technology services faster and cheaper.

In September, the state's Office of Enterprise Technology (OET) signed an enterprisewide service agreement with Microsoft, which officials say puts Minnesota on track to be the first state to house key business applications in a private cloud.

SYNOPSIS
Minnesota signs an enterprisewide service agreement to shift its digital infrastructure to the cloud.

AGENCY
Office of Enterprise Technology.

CONTACT
www.oet.state.mn.us.

"We in the country face a serious problem," said Minnesota CIO Gopal Khanna, who will resign from his post in December. "Fifty percent of the government will be retiring in the next 10 years. If we don't re-engineer the process, we're going to be in serious trouble. Citizens demand 24/7 service, but government is still based on a 9-to-5, 1950s model."

Minnesota's new service agreement covers all executive branch agencies.

Communication and Collaboration

Under the agreement, the state's Enterprise Unified Communications and Collaborations services will be delivered through Microsoft's Business Productivity Online Suite (BPOS). The partnership allows the state to combine basic business productivity applications in a unified package, which includes e-mail, instant messaging, Web-based collaboration and conferencing provided through Microsoft's online hosting.

"We should not shy away from the disruption factor as long as the end goal is a more productive environment," Khanna said. "The agreement allows us to do that."

Budget Pressure

State and local governments generally have been cautious of cloud-computing due to privacy and security concerns. But with budgets shrinking, the noted infrastructure benefits — low costs, reduced redundancy, greater flexibility and higher speeds — have raised the level of interest in cloud solutions.

The private sector has taken advantage of cloud potential for years, capitalizing on remote storage to improve operations. As such, Minnesota officials don't consider the state to be in completely uncharted territory.

"I don't think we're bleeding edge," said Tarek Tomes, assistant commissioner for customer and service management in the OET. Broadly 40 million users have access to Microsoft's cloud-based BPOS, including 3.4 million government users. In the past 18 months, Microsoft has added 400 state and local customers.

Security Concerns

But the public sector's privacy and security demands differ from private industry's. Khanna said Minnesota officials have spent the past two years developing cyber-security policies and procedures. The new agreement helps with the state's security posture, as BPOS applications will be delivered online through a direct connection to Minnesota's secure network. No Microsoft employees can access it.

According to Minnesota officials, the scope of the new Unified Communications and Collaboration service delivery agreement encompasses all of the state's executive branch agencies. But other OET customers, including local governments, cities, counties and educational entities can participate in the agreement.

Early Adopter

In terms of cloud computing, Khanna believes Minnesota's agreement with Microsoft is only the beginning. In the near future, he envisions a world of multiple clouds in the public sector, where governments manage applications in-house, but utilize remote and secure private environments for storage.

"We cannot afford to be bashful about being an early adopter," Khanna said. "Why shouldn't government be at the cutting edge?" GT

BY JESSICA B. MULHOLLAND
STAFF WRITER

Down and Dirty

Quincy, Ill., runs fiber-optic cables via its wastewater system.

SYNOPSIS
A small town pilots a fiber-to-the-home network through its sewer system.

JURISDICTION
Quincy, Ill.

CONTACT
John Spring, mayor, Quincy, 217/228-4545.

Two streets in the river town of Quincy, Ill., are different than all others — under the surface, that is. The city is testing the option to run a superfast fiber-to-the-home (FTTH) network in an unusual way — through the wastewater system.

Before committing to full-blown FTTH via the sewer, the 16-square-mile city of 17,000 homes is using this pilot to test whether deployment in this fashion is the right approach. Fiber-optic cable was installed in 1,300 feet of the sewer system on Harrison and South 46th streets from Sept. 21 to 24. The cable rested there, untouched by the city for 30 days. And on Oct. 24, the city began evaluating the cables to determine if this method is a fit for Quincy. This will be the first sewer deployment in the U.S. for i3 America, part of i3 Group Ltd., which has deployed multiple FTTH networks through wastewater systems in the United Kingdom and Australia. The deployment comes at no cost to Quincy.

"We decided, after all the due diligence was done with our legal folks and my council, that we would allow [i3 Group] to come in and test a part of what they do," said Mayor John Spring. "We're looking forward to it. We're not sure what we'll find out, but they're pretty confident that if it's working in the older part of the world, it should work in the newer part of the world."

Fiber-to-the-Home History

Many current U.S. FTTH networks (in about 85 cities) deployed fiber underground via trenching or other alternatives. Trenching involves digging a three-foot channel in the public right of way, which is costly and highly disruptive. Then there are alternatives like microtrenching, though still in the public right of way, is less disruptive and requires a smaller duct — about half an inch wide and less than a foot deep. Microtrenching is estimated to cost less than half the cost of traditional trenching, according to *OSP Magazine*.

On the whole, 16 percent of North American households have FTTH broadband connections, compared to 34 percent in Japan, according to the Fiber-to-the-Home Council. Many of the international locales, such as Tokyo, Paris and Vienna, that offer FTTH use the sewer approach because the wastewater system already exists, so there are no costs to run separate lines for fiber-optic cables.

"From where we have all our active equipment, we actually run out using the sewer system — or any other existing conduits that are available — to take that fiber into the immediate neighborhood area," said Alasdair Rettie, technical director of the i3 Group. "And then we'll use traditional or other methods we've devised to connect to the homes. We've achieved a solution that reduces cost by 30 to 50 percent."

Laying Cable in the Sewer

Though Rettie said i3's solution has been successful in the UK and Australia for the past eight years, there are some concerns if it will work for Quincy. One concern, Spring said, is that in 2009 the city had approximately 52 breaks in both its water and sewer system. A break in early September closed a heavily traveled street for about four days. The city had to make the necessary repairs, place the underlayment and concrete overlayment, and then let it substantially dry before allowing heavy traffic back on the roadway.

This raises the question of what would happen if a fiber-optic cable set up through the sewer system broke. Luckily the recent sewer line break didn't disrupt residents' phone, cable TV or Internet service, Spring said. But had fiber-optic cable been installed, the sewer break could have caused more havoc.

"What'll happen is, if a street's closed off, that's OK with people," Spring said. "But if all of a sudden, they can't get their cable TV or can't get on the Internet with this high-speed fiber optic that the mayor has now presented them? ... Do you see what I'm getting [at]?"

In addition, weather concerns could derail the potential of a sewer-based FTTH deployment. "We're in a climate here where we have a lot of hot and cold variations during certain times of the year. It can be 15 degrees below zero here one day, and the next day it could be 55 to 60 degrees above," Spring said. "And with any component that's in the ground, whether water or sewer lines, the stress put upon them with the temperature change and the earth moving — along with the heavily traveled streets — it can cause problems."

But Rettie said the pilot will be successful. "Damage to the sewer network can happen," he said, noting that i3 installs video cameras so it can see issues as they occur. Rettie also said the i3 method is different than how other companies or municipalities deploy fiber in the sewers. Other installations traditionally tack the fiber along the top of the sewer with stainless steel bands, he said. "If those stainless steel bands become dislodged, damaged or corroded, that fiber will drop down in the sewer," Rettie said, "and that has the potential to cause a blockage." The blockage is less a problem for the fiber-optic cable as it is for the sewer, because the fiber is hanging from above, Rettie said debris can get caught.

The i3 Group's solution deploys the fiber along the bottom of the sewer so it lies flat. In addition, the fiber is attached to the sewer at each manhole point using patented manifolds or mats and a special epoxy adhesive. "As you can imagine, a sewer is very dirty and wet, and not very hospitable, but the epoxy has been used within the oil industry, and it can set and adhere in the sewer environment," Rettie said.

Overall, Quincy is looking forward to this pilot and the potential it holds. Spring said he has city engineers and outside consultants working on the project, as well as people who have fiber-optic experience. "We have a great team assembled; we're excited about this and hope it can become a reality for our community," he said. "I think overall it's going to be a really positive thing, but we have to get this pilot program started and take a look before we make any final decisions." GT

17,000

The number of homes that are piloting the fiber-optic network, which is being deployed underground in Quincy's sewer system.

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BY HILTON COLLINS
STAFF WRITER

Double Lives

Studies show that technology can be a tool for student success … as well as a distraction at home.

SYNOPSIS
Recent research raises interesting questions on how students use technology tools when they get home after class.

JURISDICTIONS
North Carolina; the United Kingdom.

CONTACT
Jacob Vigdor, professor of Public Policy and Economics, Duke University, 919/613-9226, jacob.vigdor@duke.edu.

Smartphones, laptops and Internet access are becoming so ubiquitous that places without them, such as some U.S. grade schools, seem backward by comparison.

Much fanfare has been made about the digital divide — the gap between those who have access to IT and those who have very little access or none at all.

Researchers study this divide, often at the grade-school level, to see how technology — or a lack thereof — affects student performance. The focus often is on how broadband access and computers impact students' work on campus, although recent research incorporates the digital divide's impacts in students' after-school and home lives.

Surprisingly some researchers are finding that the digital divide's impact at home may not be as great as is commonly assumed.

"The problem that kids are facing is that when high-speed Internet service comes into their home, it's leading them to do things like play games online, and chat or Facebook with their friends — and it's actually leading them to spend less time on their homework," said Jacob Vigdor, professor of public policy and economics at Duke University.

"We see that when broadband Internet service comes into a student's ZIP code, the amount of time they report spending using their computers for school work actually declined," he said.

Vigdor and his colleague, professor Helen Ladd, wrote a paper on the subject, *Scaling the Digital Divide: Home Computer Technology and Student Achievement*, that was published in June on behalf of the National Bureau of Economic Research. They studied the results of surveys conducted by the North Carolina Department of Public Instruction, analyzing what happens to children when they go from no computer at home to an environment where technology is accessible.

ILLUSTRATION BY TOM McKEITH

Vigdor and Ladd discovered that technology can be a distraction when there's studying and homework to do. "The basic thing that we want to figure out is, when you gain computer access as a child, what does it do? What are the impacts of that?" Vigdor said.

Digital Distractions

The professors examined the test scores of surveyed students in fifth through eighth grades before and after they reported obtaining home computers.

They wrote that there was very little evidence in existing research to support a positive relationship between computer access at home and academic outcomes. In addition,

Vigdor and Ladd analyzed North Carolina public school students' access to broadband between 2000 and 2005. At the beginning of the surveyed period, 58,000 households had a broadband subscription; by the end, 1.1 million had broadband subscriptions. The researchers didn't find a positive relationship between the expansion and the time students spent studying at home.

In fact, the opposite might be true: School performance seems to decrease. The introduction of high-speed Internet service was associated with lower math and reading test scores in middle grades, and also less frequent self-reported computer use for homework. The researchers wrote in the report that broadband Internet access "appears to crowd out studying effort, presumably by introducing new options for recreational use by students and other family members."

And there are arguments going either way, Vigdor said. "In theory, you could use the Internet to help do homework or to help do your term papers, or something like that," he said. "On the other hand, the Internet enables you to do a lot of things that more or less waste time and distract from your schoolwork. We weren't sure which horse was going to win that race."

The goal of many digital divide research projects is to analyze those who have computers and broadband access and those who don't. Since wealthier families usually have the most technology, it often boils down to an analysis of rich versus poor. By zeroing in on kids before and after their families acquired the technology, Vigdor and Ladd planned to find a unique sampling of subjects.

1.1 MILLION
The number of broadband services subscribers in North Carolina in 2005, compared to 58,000 in 2000.

After researching the topic, Vigdor believes that the correlation between income and the digital divide isn't the whole story, although it may be an indicator of other crucial factors that affect the relationship between students and technology. For example, the children who have computers at home tend to be wealthier. "They're more likely to have books at home," he said. "They're more likely to have parents who can help them with their homework."

A Holistic Approach

Another factor is parental supervision, or other forms of guidance and support, in students' lives. That can make a huge difference in how digital tools are applied, as researchers in the United Kingdom discovered a few years ago. The Information Communication Technology (ICT) Test Bed project ran from 2002 to 2006, and was funded by the British government to explore how ICT could support education reform. The government invested 34 million pounds (US $53 million) to supply computer equipment to 28 schools in relatively poor communities. But the project leaders didn't just blindly fork over hardware and software — the funding supported technical support and training for school staff.

In some cases, the support also extended to households. "Our schools in the northeast of England had a laptop loan policy. This was to aid more financially disadvantaged households. However, several schools went beyond loans and had parent and child technology classes," said professor Jean Underwood, an educator in Nottingham Trent University's Division of Psychology. Underwood was one of the lead researchers on the project, which was published in a June 2007 report.

"This proved an effective model in many ways," she said. "It increased parental engagement with the schools; it reduced technology damage."

Not everything has gone smoothly since the project's inception. Rolling out loaned computers was time consuming and cost prohibitive, and the planning was tough. They spent more money than they wanted to on software licenses and provisioning loaned equipment for Internet access, especially in homes that lacked land line phones. As time has passed, however, the emergent ubiquity of Internet connectivity and computer use in industrialized society has made many efforts to bridge the digital divide redundant. More than 90 percent of the test bed students now have ICT access at home, and students at all grade levels reported some use of home computing for homework. The percentage of students' parents in the test bed project who had a computer at home has increased steadily over three years — from 79 percent in 2003, to 85 percent in 2004, to 92 percent in 2005.

$53 MILLION
The amount of money the British government spent on the ICT Test Bed project.

Underwood said those students made time for both school work and play time on the computers.

"There may have been some overreporting, but two to three hours of homework is the norm in English secondary schools," she said. "And teachers were placing homework on the Net using the schools' virtual learning environment."

In some setups, students could send work to the school electronically instead of having to carry it with them, so convenience was a motivating factor. "Of course the kids goofed around as well," Underwood said. "But if you have to do the work, having it professionally presented and being able to find stuff fast encourages technology use." GT

Total Residential High-Speed Internet Subscribers by June 30 Each Year

YEAR	U.S. (MILLIONS)	NORTH CAROLINA (THOUSANDS)
2000	3.1*	58**
2001	7.8*	164*
2002	14.0*	406*
2003	20.7*	596*
2004	30.1*	870*
2005	**38.6**	**1,124**

* Includes both residential and small business subscribers.

** Includes all subscribers. Nationwide, about two-thirds of all subscribers were residential or small business in 2000.

SOURCE: FCC REPORTS, AVAILABLE AT WWW.FCC.GOV/WCB/IATD/COMP.HTML

BY CHAD VANDER VEEN ASSOCIATE EDITOR

Virtual 90210

Beverly Hills depends on cutting-edge GIS software to respond to emergencies and maximize resources.

SYNOPSIS
Virtual Beverly Hills combines a vast array of data to strengthen disaster preparedness and response.

JURISDICTION
Beverly Hills, Calif.

TECHNOLOGY
Esri GIS software.

Beverly Hills, the glitzy Los Angeles suburb, is known by most as a haven for Southern California's rich and famous. But beyond Rodeo Drive and the jet-setting "teenagers" depicted by the soap opera sharing the same name, Beverly Hills must grapple with reality just like every other city.

Beverly Hills also has needs that sometimes transcend the ordinary. Celebrities, politicians and dignitaries from around the globe demand that the city performs above and beyond when it comes to public safety. In addition, the city is nestled near Southern California mountains that are infamous for bursting into infernos. Add to that the fact of life that besets all of Southern California — the potential for catastrophic earthquakes — and it becomes clear that the goings-on behind the scenes in Beverly Hills can be anything but glamorous.

To help city officials and public safety better prepare for and react to emergencies, the City Council and Mayor Jimmy Delshad tasked CIO David Schirmer with developing a system that would allow users to visualize on a map, real-time resource data, disaster information, traffic conditions or anything else they imagined would be helpful. What resulted is a cutting-edge GIS application known as Virtual Beverly Hills.

Virtual Beverly Hills can provide emergency responders with real-time evacuation routes.

PHOTO COURTESY OF GIS.BEVERLYHILLS.ORG

More Than a Map

"Virtual Beverly Hills was developed to meet the needs of emergency responders and public safety of Beverly Hills with the intention to expand for regional use," explained Lema Kebede, the city's GIS systems integrator/program coordinator. "It has a major mapping component that is the central point of this application. But we took it beyond just basic mapping."

The program is built atop GIS software from Esri, which is based in Redlands, Calif. A Virtual Beverly Hills user is presented with an aerial map of the city, similar to those one would find using Google, Yahoo or Bing maps. But that's where the similarities end and the power of Virtual Beverly Hills begins.

Virtual Beverly Hills incorporates a vast array of data sets from internal and external sources. U.S. Geological Survey (USGS) data sets, for example, let users accurately map potential damage from an earthquake while internal city computer-aided design data sets provide emergency responders with precision detail about structures that might be affected in a disaster. With the click of a mouse, users can even access real-time video feeds from city CCTV cameras, which could be invaluable in an emergency.

All this data is stored in the city's geodatabase, into which Virtual Beverly Hills is integrated. External data can be processed and layered on the map in near real time, providing public safety with up-to-the-minute details should an emergency arise. The database also stores data as it's being received in case a disaster severs network connections. For example, Kebede said that Virtual Beverly Hills receives live data from the USGS during an earthquake. If the network connection is lost, the data is stored locally, allowing emergency responders to keep using the system.

While that's impressive, Virtual Beverly Hills is not just an earthquake-mapping tool — its capabilities go further. In this modern era of terror, other disaster scenarios beyond just the natural variety must be considered. For this reason, Virtual Beverly Hills also can map the potential damage areas produced by an explosive device or a chemical spill. The system also shows emergency personnel where evacuations might be required and even provides easy access to homeowner contact information.

"For situational awareness, the emergency responders can add data layers based on the type of event," Kebede said. "If there is a report of an explosive, first responders could automatically calculate the potential area to be evacuated."

To accomplish this, a user would simply select a point on the map, and using a drop-

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> "The good news is, for our partners, it's effectively free." — **David Schirmer**, CIO, Beverly Hills

down menu, select from a variety of explosives, each displaying values unique to their type. TNT, for example, has distinct destructive capability that's different from C4 or a simple pipe bomb. The values are also changeable if emergency personnel find themselves dealing with an unorthodox explosive.

With the appropriate explosive selected, Virtual Beverly Hills then shows where the affected population resides and can display the results by age if officials need to evacuate those requiring assistance. The system also identifies critical infrastructure that would be affected by a blast.

The process is similar for other kinds of localized threats.

"Say a chemical spill is reported, a user can identify what the perimeter is the first responder should focus on," Kebede said. "Users can select what type of chemical it is, whether it's day or night. It will identify the area to be evacuated and where the potential damage will be."

Past, Present and Future

Work on building Virtual Beverly Hills began more than a year ago. CIO Schirmer said Mayor Delshad was enthusiastic about building a next-generation mapping tool that could be used by the city, regional governments and eventually the state.

"We knew that we needed a new application to support our EOC [Emergency Operations Center], which was new as well," Schirmer said. "But we wanted to do more, to bring in lots of different data sources and create this common operating platform so that all the members [and] different branches of the EOC could be on the same platform."

So with the blessing of the mayor and City Council — who lobbied for and won $800,000 from the U.S. Department of Justice's Edward Byrne Memorial Justice Assistance Grant Program — Schirmer and his staff consulted with other agencies and states. The U.S. Department of Homeland Security (DHS) was an obvious first stop, but the city also worked with Maryland to learn about its mapping application, StateStat.

With their research complete, work on a prototype system began in 2009. Schirmer was careful not to neglect the end-users while the system was in development.

"It was a group effort," he said. "Our application development team was involved with it. But really working in conjunction with our end-users — the first responders, police and fire — they helped determine the functionality that would be important to them. We then did our own research and looked at what other states and municipalities are doing and tried to build upon that."

Though to date the city has been fortunate to avoid any real emergency scenarios that would have put Virtual Beverly Hills to the test, Schirmer and the city took the system for a test drive during this year's Los Angeles Marathon. The annual race also served as a platform for testing another of Virtual Beverly Hills' capabilities — facilitating integrated communications.

"We actually mobilized an EOC as if it were an event. And really it was just to exercise it and see how well these things worked," Schirmer said. "That involved Los Angeles, the L.A. County Sheriff's Department and other municipalities like Santa Monica. So it really had this regional context to it. We had a lot of mobile video out there that was ingested into the system. We had a lot of ad hoc wireless set up to facilitate communications, as well as our standard RF [radio frequency] police and fire radio. All of that was interoperable, and it seemed to work very well. We got a lot of praise from the people who saw it in action."

Going forward, Schirmer said he plans to extend the technology to other jurisdictions in the region and eventually deed the entire system to California. Virtual Beverly Hills didn't come cheap despite the grant money and some in-kind services from the DHS. But, Schirmer said, "The good news is, for our partners, it's effectively free."

And like any good emergency response tool, everyone hopes that Virtual Beverly Hills will never really be needed. But if a disaster strikes the real Beverly Hills, it'll be nice to know the virtual version is ready to help. GT

GTTV **TO WATCH INTERVIEWS** with David Schirmer and Lema Kebede and to see Virtual Beverly Hills in action, please visit us at **www.govtech.com/videos.**

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BY RUSSELL NICHOLS
STAFF WRITER

Positive Identity

Biometric devices help New Jersey county track delivery of homeless services.

SYNOPSIS
Fingerprint scanner links to homeless database to provide accurate metrics for social services delivery.

AGENCY
Bergen County, N.J., Department of Human Services.

TECHNOLOGY
Fulcrum Biometrics fingerprint identification system.

CONTACT
Susan Nottingham, Homeless Management Information System administrator, 201/336-7461.

Bergen County, N.J., has dealt with one particular dilemma for years: The Department of Human Services (DHS) needs to estimate how many homeless individuals receive services, such as food, medicine and shelter. But many people served by the department don't have accurate forms of identification, and without a precise tracking system, the DHS might have erroneously counted one person who visits the shelter 10 times, for example, as 10 different people visiting once.

And when it comes time to properly fill out grant applications to receive funding support, accuracy counts for the DHS.

"It's not like you can do a head count," said Susan Nottingham, the department's Homeless Management Information System administrator. "We could sit down and say, 'Can we talk to you for 45 minutes?' But we didn't want them to turn around and say, 'We're not that hungry.'"

Now with biometrics technology, Bergen County has implemented a solution that helps the DHS keep an accurate count of the homeless people who receive social services. In September, the DHS unveiled a fingerprint identification system developed by Fulcrum Biometrics, a San Antonio-based company.

Working with New Jersey Business Systems, the company used its Fulcrum Biometric Framework to develop a Web-based application that links finger image scanners at DHS service sites and a fingerprint-matching algorithm to the existing New Jersey Homeless Management Information System. While Fulcrum's Web services interface provides automated information exchange between the two systems, both systems operate independently.

"They realized that it was really difficult to get accurate metrics — who they're serving, how many times — without really having to harass homeless people," said Ken Nosker, president of Fulcrum Biometrics. "We gave them a custom solution that is actually not integrated with the large state database, but communicates with the database."

450
The number of homeless people the county has collected data from.

The data-sharing method reduces "check-in" time to seconds: no sign-in sheets or extensive interviews. DHS workers simply open a Web page and select the service and location. A homeless person comes in, places a finger on the scanner, and the computer captures the data and communicates with the state database to verify the person's identity.

The county paid $90,000 for the solution, Nottingham said, and so far the system has collected data from about 450 homeless people.

However, she added, the biometric device doesn't store pictures of fingerprints, but gathers numerical values that correspond to the unique points on a person's finger. This method protects the data and gives the DHS accurate numbers to work with.

The system helped the county recognize that food programs attract the largest crowds in the third week of the month — not the last week like officials originally thought. Such findings will allow the DHS to adjust its strategies to improve service delivery.

And the county can now tell funders exactly how many homeless people have been served by DHS workers in a given time and, in turn, how much their contributions have helped support homeless management efforts.

"It's opening all kinds of interesting opportunities for us," Nottingham said. "There's a very clear picture, and it makes us astoundingly accountable." GT

SEND PRODUCT REVIEW IDEAS
to chief copy editor Miriam Jones
mjones@govtech.com

1 CHERRY TABLET

The CherryPad America from Cherrypal is a low-energy-consuming, affordable 7-inch Android 2.1 tablet computer. It weighs slightly more than 1 pound and has a resistive touch display with 800x480 resolution and a 800 MHz processor. The tablet has 256 MB of DDRII RAM, 2 GB NAND Flash and a Micro SD (1x) reader. It offers OpenGL 2.0 graphics, six to eight hours of battery life and Wi-Fi 802.11 b/g. **www.cherrypal.com**

2 GRAND ENTRANCE

The HP Pavilion dm3t notebook PC combines advanced hardware and cooling software for a notebook that feels cooler and automatically adjusts cooling levels according to a customer's personal preferences. It comes with an Intel U5400 processor (1.20 GHz, 3 MB L3 cache), hard drive up to 640 GB and 8 GB DDR3 system memory. The Pavilion dm3 includes a 13.3-inch high-definition display and a keyboard with optional backlit feature. The notebook offers up to 7.5 hours of battery life and measures less than 1 inch thick. **www.hp.com**

3 SMART ZIO

The Kyocera Sanyo Zio smartphone features a customizable Android 2.1 operating system, a 3.5-inch WVGA touchscreen, 3.2 megapixel camera and 30-frame-per-second video record and playback. The Zio is equipped with 512 MB of internal memory, a 2 GB microSD memory card and support for up to 32 GB microSDHC cards. The smartphone also has a media player, full HTML Web browser and a library of more than 80,000 widgets and applications available from Android Market. Service is provided by Sprint. **www.kyocera-wireless.com**

Spectrum

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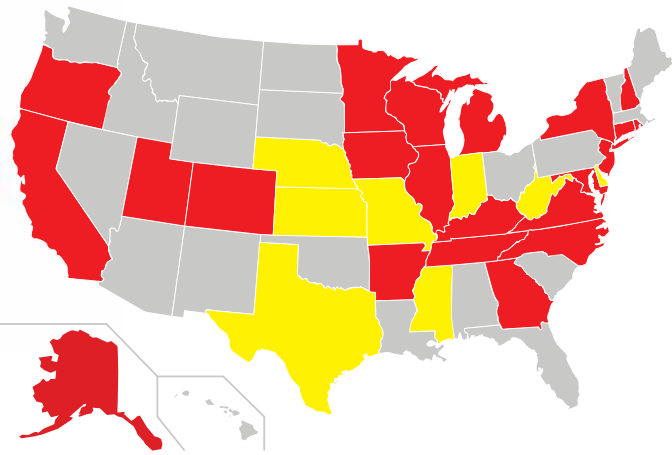
Happy Birthday

Recovery.gov, the federal site created to provide transparency on where and how stimulus funds are spent, turned 1 year old in September. Though the site has had inaccuracies, it's proven to be a model for transparency and a fraud deterrent, according to Recovery Accountability and Transparency Board Chairman Earl Devaney. The board and website expire in 2013. **SOURCE: USA TODAY**

Send spectrum ideas to managing editor **Karen Stewartson** kstewartson@govtech.com

TEXTING LAWS

Thirty states and the District of Columbia ban texting while driving, but recent research from the Insurance Institute for Highway Safety reveals that the bans don't work. And researchers at the Highway Loss Data Institute compared rates of collision insurance claims in four states — California, Louisiana, Minnesota and Washington — before and after they enacted texting bans. Crash rates rose in three of the states after bans were enacted. **SOURCE: USATODAY**



Texting while driving statutes in the United States:
- Banned for all drivers
- Banned for new drivers
- No statute

SOURCE: WIKIPEDIA

BABY FACE:

According to a study by Internet security firm AVG, 82 percent of children in 10 Western countries have a digital footprint, thanks to photo-sharing websites like Facebook. The four top ranking nations that have children under 2 years old appearing in pictures online are:

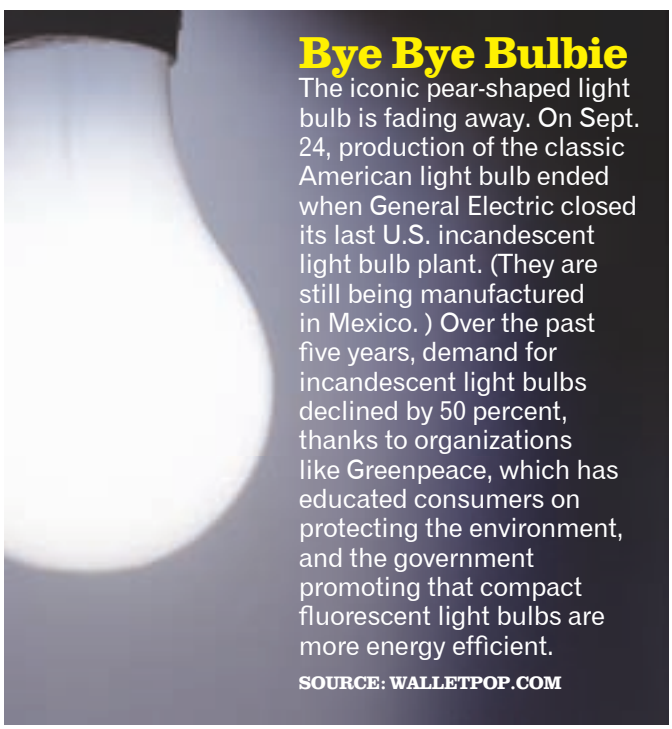
92% United States

91% New Zealand

84% Canada

84% Australia

SOURCE: CNN



Bye Bye Bulbie

The iconic pear-shaped light bulb is fading away. On Sept. 24, production of the classic American light bulb ended when General Electric closed its last U.S. incandescent light bulb plant. (They are still being manufactured in Mexico.) Over the past five years, demand for incandescent light bulbs declined by 50 percent, thanks to organizations like Greenpeace, which has educated consumers on protecting the environment, and the government promoting that compact fluorescent light bulbs are more energy efficient.

SOURCE: WALLETPOP.COM

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The Commonest Web 2.0 Tools in Government

SOURCE: HEWLETT-PACKARD 2010 SURVEY OF GOVERNMENT IT PROFESSIONALS

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