INTRODUCTION:
Thriving and Surviving Despite Adversity

Read this report to learn how cloud computing enables governments to provide services with fewer resources and keep serving their communities despite the challenging economy.

Cloud Service Delivery

Cloud services, whether they are storage, software, servers, a platform for software development or any of the new services yet to come, are delivered under the rubric “XaaS,” where “X” can stand for e-mail, software, platform, infrastructure (servers) or anything you want.

Cloud Trends

The cloud is changing the game for all governments with e-mail, GIS, permitting, multi-state collaboration and more.

How to Succeed With Cloud Engagements

Read these 12 tips to ensure your cloud project goes smoothly from start to finish — and you reap the rewards of lower costs, greater collaboration and increased productivity.
Since the Great Recession began, governments have struggled with budget cuts and layoffs. Although no technology can cure all of these ills, cloud computing is making a good stab at it.

This "new" technology rests on a foundation that has evolved over the last 20 years. It offers all government organizations low-cost opportunities to do things they’ve long wanted to do, but couldn’t afford. In almost all engagements, cloud computing lets these organizations do things they could not have done because there was simply no way to do them.

As the case studies and examples in this Center for Digital Government Special Report on Cloud Computing illustrate, this technology goes far beyond cost savings, greater efficiency or doing more with less. The preliminaries to cloud computing engagements — consolidation and virtualization — have been successful cost-savings initiatives. Cloud computing allows governments to provide services — sometimes entirely new services — with fewer resources, eliminate prodigious quantities of wasted time and effort for constituents and businesses, speed up processes and keep serving their communities despite the challenging economy.

This Special Report is the second in a new series created by the Center for Digital Government to illustrate 21st-century technologies that are critical to modern government. In this report, we define the technology, describe its benefits and challenges, show where it’s headed next, and, perhaps most importantly, present real examples of how governments just like yours (see pages 4 and 5) are using the cloud right now to solve problems similar to yours.

Cloud computing is here. This report will help you embrace it.
Oregon

What builder isn’t troubled by permit requirement delays? By moving to a cloud-based solution for issuing permits, Oregon is dramatically accelerating the approval process for contractors, builders and developers. Despite standard, statewide building codes, Oregon’s construction permits are issued by 134 separate jurisdictions. Builders must first find out which jurisdiction handles plumbing, electricity, water and sewer. Then come far too many contractor trips to city and county government offices to obtain paper permits. Oregon’s cloud solution will eliminate jurisdictional confusion and time-intensive paper chases. Oregon hopes all 134 jurisdictions will go cloud by 2017. Contractors and builders can’t wait.

Nebraska

Four years ago, Nebraska was nearly ready to replace its creaky electronic applicant tracking system with a new application. A little more research, however, revealed far greater possibilities than one lonely application. Fourteen months into its cloud implementation, Nebraska not only has a new, more efficient and flexible paperless applicant tracking system, but also an entire human capital suite that includes learning performance, succession and compensation management; a better benefits enrollment process; e-procurement; and a core human capital database. Under the new system, employees can seek jobs throughout the state instead of within a single agency and agencies will have an entire pool of current and prospective state employees from which to hire.
Hudson County, N.J.

Residents of Hudson County, N.J., had to witness the fall of the twin towers in New York City on September 11, 2001. Ten years after, disaster recovery remains foremost in county officials’ minds. A private county cloud that took just eight months to build now provides back-up for all critical data and applications. Even if county offices are compromised, personnel can log in from any location and keep things going. The Hudson County IT Division’s plan is to offer servers on demand to all the towns in the county, turning its private cloud into a community one.

Wyoming

One year ago, the state of Wyoming was operating 13 different e-mail platforms in its executive branch. Each system required dedicated staff to maintain it, and myriad platforms meant the state lacked a shared address book across all agencies. In less than nine months, the state has migrated to a single cloud-based solution, and moved 10,000 state employees to the new platform. The move will save the state more than $1 million annually, but cost reduction is not the only benefit. State employees are able to collaborate in ways that were not possible before. According to Wyoming Chief Information Officer Flint Waters, agencies can co-author documents simultaneously and see everyone’s edits in real time. Video chat allows staff to “meet” without leaving their offices, allowing questions to be answered quickly without requiring traditional face-to-face scheduled appointments. The move also gives the state greater storage capacity and cyber-security protection. The solution includes enhanced firewalls, encryption and password protection — as well as remote wipe capabilities should a device get lost or stolen.

Nashua, N.H.

For 30 years, Nashua, N.H., used an internal IT system that had, like a monster in a science-fiction movie, spread its tentacles into every agency in the city. When this system was replaced with a hosted ERP solution, the cost of IT services went down and the telecommunications budget was cut in half. City managers are able, for the first time ever, to see integrated numbers that show what’s really happening in the city, find and eliminate waste, and change processes when needed. That was just the beginning, too: next comes licensing, permitting and code enforcement.
Depending upon who you talk to, “the cloud” can be defined as e-mail, disaster recovery, data storage, servers-on-demand, office applications, geographic information systems … but none of these are really “the cloud.” In fact, these uses of the cloud do not define it at all. “The” cloud, “a” cloud, “your” cloud — any cloud — is a special kind of data center, often but not necessarily located remotely, often but not always connected to users via the Internet. And “the” cloud is a bit of a misnomer, since there are many clouds. Each one is provided by a different vendor or government entity, quite independent of one another.

How did the prosaic data center come to be identified by such a fuzzy and confusing term as “cloud”? According to the book “The Cloud at Your Service” the answer is that for over a decade, whenever people drew pictures of application architectures that involved the Internet, they would represent the Internet with a cloud.¹ All the rest is hype and history.

Today’s cloud can also be found in the form of huge public data centers operated by private vendors that offer many services out of those facilities to anyone in the cloud-enabled public or private sector. That is the case with the e-mail and office suite solution cloud provider for the Office of the New Mexico Attorney General, Multnomah County in Oregon, Pittsburgh, Orlando and many other government organizations.

Although important, applications or functions moved to the public cloud are not usually seen as mission critical or highly sensitive. This type of public cloud is the most commonly understood version of the category. However, there’s an occasional twist to the definition of a public cloud for the government sector.

What’s the twist? It’s a three-parter. First, some private cloud vendors find government agencies to be such good customers that the vendors have dedicated clouds solely to the agencies. Second, these clouds are available to any government agency, but not to the private sector or consumers. Third, and here’s the twist, the vendors label these government-only clouds as public, which flips the common definition of the term upside down. Nebraska’s private sector human capital cloud services provider offers just such a public cloud that is, despite the name, only available to government entities.

Now we come to hybrid clouds, where the meaning in the public sector is also turning out to be different from the common understanding of the term. In the business world, a hybrid cloud is a mix of private, internal IT assets with services or software like e-mail or customer relationship management purchased from a public cloud vendor.

This kind of “hybrid” just doesn’t fly in government, where so much data is highly sensitive and mission critical. Instead of the business sector’s public/private mix, the government sector hybrid is a community cloud. These clouds condense when multiple entities, such as several state agencies or a county and all the cities in that county, share a private cloud for one or more purposes. The state of Illinois operates such a community cloud for nearly 60 executive branch agencies, providing a unified “Illinois.gov” address to all parties instead of the hodgepodge that existed before — and saving millions of dollars in the process.

*The cloud is a special kind of data center, often but not necessarily located remotely, often but not always connected to users via the Internet.*
Cloud services, whether they are storage, software, servers, a platform for software development or services yet to come, are delivered under the rubric “XaaS,” where “X” can stand for e-mail, software, platform, infrastructure (servers) or anything you want. The “aaS” means “as a service.” So we have seen software-as-a-service (SaaS), platform-as-a-service (PaaS), and infrastructure-as-a-service (IaaS), but the candidates for the “X” are growing.

Organizations like the Office of the Attorney General of New Mexico and Multnomah County, Ore., have used SaaS. Both organizations went with the same e-mail and office suite cloud provider, and both organizations have saved money, increased productivity and eliminated headaches with that move.

New York City’s school system experimented with a cloud-based software development platform to give teachers the capability to perform real-time intervention when students showed difficulty in reading comprehension. The goal there was to replace a weekly or monthly tests-based system with day-to-day performance tracking so teachers could see immediately how every student performed.

Any organization that has purchased servers on demand has used infrastructure-as-a-service. This allows CIOs to expand server numbers for a major project, then do away with them when they’re no longer needed — without ever having to buy them, directly pay for maintenance and power, or provide physical space for them.

Newer cloud-based services now gaining ground include capabilities like permitting, code enforcement and ERP. Emerging competitors for the ever-evolving “X” in XaaS include compliance, security, identity, IT and virtual desktop infrastructure. You can be sure this list will grow.

The promise of cloud-enabled data centers is that almost anything, from servers to IT departments, could conceivably be delivered as on-demand services. This eliminates the costs of buying, maintaining and upgrading infrastructure, software licensing and updating, and many other costs that government would just as soon do without.

Besides turning everything into a service, the cloud also offers the potential of flexible resource allocation, so you can use what you want when you want it. According to “The Cloud at Your Service,” “In the world of the cloud, you pay for only the resources you use, when you use them. This is the revolutionary change: the ability to handle scale without paying a premium. In this realm of true utility computing, resource utilization mirrors the way we consume electricity or water.”

The “As-A-Service” Models

Cloud service delivery

Cloud Computing

Software-as-a-Service
Computing Hardware, Software Platforms and On-Demand Applications
- Full Web Services
- Software Applications

Infrastructure-as-a-Service
Computing Hardware and Software Platforms
- Operating Systems
- Database Management Software
- System Monitoring

Platform-as-a-Service
Computing Hardware
- Servers
- Storage
- Networking
- Racking
- Cooling
Security: Protecting Everything

Government leaders are responsible for keeping confidential citizen data secure. Therefore, moving hardware, applications, data storage or even IT itself to a remote, third-party cloud outside of one’s own control can be disconcerting to a CIO.

Publicized hacks into big-name cloud providers’ databases prove that security is a genuine cloud issue. State and local governments are right to perform stringent due diligence on potential providers, including serious testing during the demonstration phase of an engagement.

Yet, in many cases, the security found in the cloud may far exceed that achievable in-house. When the Office of the New Mexico Attorney General decided to adopt a cloud-based e-mail suite, which was critical to the organization’s performance of its mission, security was a top concern.

James Ferreira, CIO of the Office, closely examined the cloud provider’s standard security policy. “The attorneys looked at it, and they talked to the cloud provider’s attorneys,” he said. “We felt that the cloud provider had better security than we did, with 24/7 physical security and advanced monitoring of accounts.”

Some cloud providers have undergone Federal Information Security Management Act (FISMA) certification, which can help address qualms about their services. “We found that FISMA is comprehensive in its standards, guidance regarding security, and risk mitigation framework — more comprehensive than any one agency can be,” said Sherry Swackhamer, CIO of Multnomah County, Ore., which adopted the same e-mail cloud provider as New Mexico’s Attorney General’s Office.

Connectivity: Links to the World

Connectivity is a challenge because without it, access to a cloud provider’s services disappears entirely. Of course, this is true even when data and applications are housed locally — if your connection dies anywhere, you have to wait until it returns.

Redundancy is one answer. This does not only mean redundant connections themselves, but connections that utilize a different network path to the cloud provider. That way, even if one connection suffers a service interruption, there’s an alternate route to your data and applications. And with rapid, automated failover, no one may even notice a connection interruption.

Redundancy also provides at least a partial answer to connectivity issues such as bandwidth shortages or service demand spikes. A service level agreement (SLA) guaranteeing minimum bandwidth availability would help address these problems. Such an SLA should include financial penalties to the cloud provider that are activated in the event of a service disruption.

System Migration: You Can Get There From Here

System migrations are always hard work. With the cloud, the addition of the remoteness of the provider and its technical personnel can be a complicating factor.

For this process to succeed, of utmost importance is to have a strong champion of change. Ongoing communications with users are critical, and should be coupled with demonstrations of how the change will benefit them. Users should be given assurances that they will not lose something important, such as access to data or flexibility. If those points can be implemented in a positive way, change can be smooth.
Procurement: I’d Like To Buy That

To some extent, procurement is in a similar state today when it comes to the cloud. Established in the days when procurement meant buying a thing, the rules, practices and forms weren’t really set up to deal with paying for intangibles — even intangibles that once were physical things, like servers.

Procurement practices must be repeatedly examined in light of new technology. Regardless of the pain involved, they must be changed to keep up with the reality.

Dugan Petty, CIO of the state of Oregon, said that the state put together a team of agency CIOs and designated procurement officers and attorneys from the Department of Justice to develop a SaaS e-mail contract.

They then looked at the typical procurement process with SaaS “glasses” to cut out a number of unnecessary or outdated requirements, while streamlining the selection process. “We were able to set up terms and conditions that were more applicable to a SaaS contract and made the process more agile at the same time,” he said.

Petty says with SaaS contracts there are a number of important issues that can act differently than typical service contracts. Where does the data reside and who has the data? What laws will govern the performance of the various elements of the cloud contract web?

Governments should consider choice of venue — that is, if there is a breach of contract obligation by a downstream cloud provider and legal action must be taken, where will that legal action occur? If data has been breached, where is the location of the data that has been compromised?

These are only a few of the new questions that arise and that a contract should attempt to address.

Disengagement: Get Me Out of Here

How to disengage from the cloud can be concerning to CIOs. This is especially the case when something negative happens, such as a cloud provider’s business failure, a merger or acquisition that creates unforeseen and unpalatable changes, or if you are dissatisfied with what you’re getting. Although such problems attract more press when they occur for a public cloud, the same or greater risk exists with community clouds.

Before any of these things happen — indeed, before engaging with a cloud provider in the first place — it’s good to have a planned, orderly exit strategy that protects your data, applications or other services against the worst. That strategy could include back-ups outside of the control of the cloud provider, agreements with the provider as to how your data will be returned in the event of a separation, and plans for how you would replace cloud-provided services.

At a minimum, an exit strategy will, under the worst conditions, keep the mission-critical functions of your government or agency going. Ideally, such a strategy will let you transfer to a new provider or move functions back in-house with as little pain, loss and expense as possible.

Data ownership is another exit worry for cloud customers. This was an important consideration for the states of Montana, Colorado, Utah and Oregon, which are considering the feasibility of a public-cloud-based community repository for all four states’ GIS data.

In their evaluation of vendor responses about data ownership, the assessment team wrote, “All are clear on customer ownership of data and some vendors elaborated on their policies to safeguard customer data. Intellectual property ownership appears not to be an issue. … All claimed to effectively remove customer data when a customer ‘off boards.’ Some referenced Department of Defense wiping standards while others simply reformat the media and returned it to a storage pool. This may be adequate for most GIS data but would be a cause for concern with any confidential or personal identification data.”

As for getting data back when exiting an engagement, the team wrote, “Most of the vendors described their processes for returning customer data. The processes were relatively simple and didn’t appear lengthy. The risk is always that procedures can break down if a firm is under severe financial stress or staff is distracted.”

Whether data is stored in an agency’s own data center, or in the cloud, there is always risk involved. If data is stored in the cloud, government leaders can best protect themselves by being informed about the financial health of their provider, ensuring proper processes are in place in the contract, and potentially having back-up storage of mission-critical data.
Cloud Trends

As we’ve spoken with government leaders and industry experts for this Special Report, we’ve identified a handful of major trends. The biggest and most obvious trend is the rapidly increasing use of private/community clouds at all levels of government.

While it’s easy to move applications like e-mail and GIS to public clouds, that is not always the case with sensitive data and mission-critical applications. However, once a government entity establishes a private cloud for storing sensitive data or running critical applications (or both), it is feasible to invite other governments with similar concerns to share.

E-mail and GIS appear repeatedly as cloud entry points for smaller governments. Once those are complete, the cloud offers these smaller entities the opportunity to implement large, transformational IT projects on a pay-as-you-go basis. If smaller governments had to pay all costs upfront, they simply couldn’t afford those projects.

Larger governments seem to be focusing more on massive data storage and spinning servers up and down at will. However, they too are increasingly using the cloud on a pay-as-you-go basis for big IT projects they couldn’t afford otherwise.

The federal government has been an early adopter of cloud implementations. In late 2010, the General Services Administration (GSA) became the first federal agency to move e-mail to the cloud agency-wide and touted that the move would lower costs by 50 percent over the next five years. Also in late 2010, GSA announced that it would provide federal, state and local governments access to cloud-based IaaS offerings through Apps.gov — the government’s cloud-based services storefront.8,9

In December 2010, the Office of the U.S. Chief Information Officer unveiled the “25 Point Implementation Plan to Reform Federal Information Technology Management.” Among its ambitious goals was a call for government agencies to shift to a “cloud first” policy. More specifically, the plan stated that when secure, reliable, cost-effective cloud options exist, federal agencies should use them, particularly for commodity IT services.10

Regardless of the size of the government, though, two motives remain steady as drivers to the cloud: the need to save money and the desire to leverage capabilities. The examples that follow show some of these trends in action.

Developing Human Capital; Finding Talent

According to The Economist, “Even in these difficult economic times talent is in short supply and the world’s leading companies are competing fiercely for it.”11 It’s not just businesses that are looking for hard-to-find talent despite the high unemployment rates. Local and state governments are as well.
This need for talent helped drive the state of Nebraska to a cloud-based human capital management system with multiple components. Before the first components were implemented in the new system in mid-2010, the state had only an electronic applicant tracking system that had first been installed in 1999-2000. “It worked well, but it was starting to get creaky,” said Mike McCrory, personnel director for the Nebraska Department of Administrative Services. “Maintenance agreements were hard to come by.”

The human resource system was also siloed by agency, which meant employees were hired, trained and promoted by agency. They had limited lateral opportunities beyond those silos. For the state government as a whole, this meant that even with 18,000 employees, there was no real statewide pool of human capital from which to recognize, develop and promote talent.

Another human capital challenge was the 10-year-old coupling of the state’s self-service benefits enrollment process to a well-known ERP solution. “It provides financial management functionality, but not robust human resources functionality and tools,” McCrory said. “Employees were very vocal about wanting to improve the benefits enrollment experience.”

All of this meant there was no way to identify potential leaders, train them and build a strong leader-in-training bench. The absence of consistent statewide learning, performance, succession or compensation management applications also complicated issues. And that made it difficult to realize Gov. Dave Heineman’s vision of running the state government like a business enterprise.

The four-year path to a solution started as a search for a replacement applicant tracking program. However, McCrory and his staff quickly discovered that much more was available. By mid-2010, they had selected three vendors to provide the needed functionality for hiring, benefits enrollment, training, succession and compensation management. “We couldn’t find a single vendor with all the functionality we needed,” McCrory said. “We allowed vendors to work together.”

One of the three vendors provides the human capital management core component, including personnel data storage and benefits enrollment. The suite of applications is hosted by the contractor of record in its public cloud, which is dedicated to government customers only.

“One immediate benefit of the new system is that agencies are stepping up to collaborate with us and work together with our team members from Administrative Services. As a result, we are experiencing successful implementations,” McCrory said. “We have formed partnerships with other agencies, which are pushing us to go forward.”

Although the suite of storage and applications were still being implemented, the new applicant tracking system had been operating for 14 months as of September 2011. “Before this, we got 25,000 to 30,000 applications a year,” McCrory said. Of those, 70 percent came via the old electronic system, and 30 percent arrived on paper. “When we went to the new system, we eliminated the paper,” McCrory said.

A major benefit is the volume of new job applications: 100,000 since the new system went live. Not only are there more applicants, but the new tracking system is also much easier to use. Both the types of information gathered and the way it is recorded should make it much easier for managers across the state government to find the talent they need. “Applicants can fill out job interest cards, so even if there are no specific jobs available now, as they come open, we can match them with applicants,” McCrory said.

Having the cloud-based, standardized and consistent system “eliminates one-off and paper systems,” McCrory said. “Employees will be state employees, not agency employees. Agencies will be able to look much more broadly for talent, and we can do a better job of developing employees. This benefits both agencies and employees.”

**Sending Permitting Functions to the Cloud**

Since the late 1980s, the city of Tigard, Ore., used a commercial tracking system, hosted on city servers, for all permitting activities. As the system aged, it became more and more difficult to use, maintain and keep current.

“The old system could be three years out of date,” said Dianna Howse, building division services supervisor for the city. “It became incompatible with other software applications and the operating system.” In 2001, the old software package merged with another software vendor. While the existing software continued to be supported, the city spent the next five years evaluating other systems, and that was the inception of Tigard’s move of permitting functions to the cloud.

Although the city looked into hosting a...
new permitting system, the requisite hardware was so expensive “that it was more cost-effective to host it off-site,” Howse said. A traditional system, hosted in-house, would have also required IT support, and the city simply did not have the funds for that. The need for a no-IT support solution was another push to the cloud. Ultimately, the city required that the new permitting solution be hosted in a secure, off-site location that came with the necessary technical support.

Beginning in 2007, “it took less than 18 months to convert all the data from the old to the new system and customize the new applications,” Howse said. During that entire migration effort, “there was no IT involvement from the city,” she said.

In March 2009, the solution went live for internal city users. That includes real-time information for field inspectors, which supports mobility.

Some important functions are now also available to the public. These include the ability to check on the status of code compliance requests, permits and inspections. Builders and others can look up the status of permits and inspections by address using the city’s mapping system that integrates with the permitting system.

Tigard will continue to move permitting functions to the cloud, but it’s eyeing other cloud capabilities, too. “We see continued interest for cloud-based solutions in other areas,” Howse said. “The city installed a document management system that interacts with our permitting system. Once the documents are scanned, the public will have online access to permit records. Next year, the city plans to implement electronic document review using a new functionality also provided by our cloud-based permitting system.”

The benefits of the new cloud-based permitting solution are numerous. “We have already realized (hardware and software) cost savings,” Howse said. “All the software updates are rolled out and tested by the vendor, and we don’t have to rely on in-house staff or consultants for assistance. The software is always up-to-date, and we have eliminated our concerns about incompatibility, which are tremendous benefits.”

Last year, Tigard underwent a second round of lay-offs, and the new permitting solution helped mitigate the effects. “The city eliminated a code enforcement position,” Howse said. “In five weeks, we used the software to develop an online public self-service code compliance request application.”

The new solutions will benefit the building community, too. “We can provide online solutions to builders and developers that will save them time and costs by reducing visits to city offices,” Howse said, “whether it’s to submit building plans, pick up permits or search public records.”

Ensuring Prompt Disaster Recovery

Continuity of government in the event of a disaster was the genesis of the private cloud initiative in Hudson County, N.J. “Every city and county should have continuity of operations plans,” said Jim Delaney, CIO. “We take this very seriously. We go to a lot of effort in target hardening.”

The private cloud initiative’s first phase started as an upgrade of the county’s data center infrastructure. Both data storage and application servers were consolidated via virtualization, and the network bandwidth was increased from 10 Gb/sec to 20 Gb/sec to accommodate the additional traffic. A radio tower is being constructed to support a secure wireless mesh and additional dark fiber is being deployed to support the next phase of the project.

Phase one also included virtualizing selected desktops. “Virtualization of the servers was easy,” Delaney said. “Desktop virtualization is somewhat more involved. People are afraid of the unknown, making change scary for the end user. We had to demonstrate to everyone how this change will help them, and you must start deployment of virtual desktop at the top of the organization.”

To sell the desktop virtualization to county managers, Delaney argued, “A PC costs $1,600, and a cloud computing dumb terminal costs $600. Employees can access it anywhere, and during a disaster, management could operate from home in their jammies if need be, and so could everyone else.” Another method Delaney used to convince management of the terminals’ value was to tie their use to “things people already do, like using Gmail access and performing Google searches.”

To back up the data stored in Hudson County’s private cloud, Delaney negotiated...
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JIM DELANEY 
HUDSON COUNTY, N.J.

Geographical Information On Demand

Geographical information is used by builders, developers, utilities, planners, politicians, health care and surveyors. In fact, it's used by anyone who wants to find out where something is in relation to other locations. It is invaluable in importance, yet storing the data and running applications that use the data costs money. That makes it a candidate for cost savings, which was the raison d'être for a four-state cloud initiative that is still forming.

“It's not that complicated,” said Steve Fletcher, CIO of Utah. “We thought this would be an opportunity to drive storage costs down for each of the four states (Utah, Montana, Colorado and Oregon). But we aren’t going to limit it to them. There is a lot of interest in participation, and we might want to expand it to GIS application hosting. But we’ll start with GIS data storage.”

Although cost is the top rationale for the project, there are a couple of other reasons as well. One of these is a desire to obtain greater flexibility and scalability for their GIS data. According to the assessment of responses to the project RFI, “GIS may well be the most dynamic, rapidly changing area of IT. New applications, new types of data, unanticipated growth and new projects appear frequently, and with little advance notice…. By shifting expenses to the operating side of the ledger, cloud computing may increase the effectiveness of the states’ responses to the rapid-fire changes of GIS.”

A third reason is a desire to reduce each state’s need to provide exactly the same type of technical support for similar GIS projects. This is not about eliminating personnel. “By minimizing redundant support within states and offering efficiencies of scale, cloud computing may allow states to refocus some support resources to other critical areas of need within the states.”

An important aspect of the project is the public nature of GIS data. “We chose GIS data for the cloud because it doesn’t have all the security requirements of personally identifiable data,” Fletcher said. “No one will try to steal this data. E-mail needs protection, but GIS data does not.” Because GIS doesn’t need the kind of security that e-mail and other more sensitive data types require, Fletcher said, “It doesn’t matter how we host it, so we’ll likely use a public cloud.”

The project began in 2010, when Utah, Montana, Colorado and Oregon realized they might achieve volume discounts in GIS data storage prices if they partnered in contract negotiations. A first step was the development and release of an RFI, to which a number of cloud vendors responded.

The most significant conclusion the states reached after assessing the vendor responses regarded pricing. “There is significant cost advantage to using cloud services even at the volume levels of the four states currently participating in the project. Involving more states, local government units and, especially, federal agencies would present a major increase in volume and the opportunity for a dramatic reduction in cost of all participants.”
This and other conclusions led to a change in strategy. Although the participating states could achieve savings by negotiating a contract for just the four of them, much greater savings could be achieved by bringing in as many other partners as possible. Therefore, instead of negotiating a four-state contract, the participants turned to the Western States Contracting Alliance (WSCA) to negotiate agreements that any government entity belonging to the alliance — local, state, tribal, educational, federal — could use.

“The bottom line for any state CIO is whether it’s affordable,” Fletcher said. “We don’t have to have a commitment from other states [or other government entities]. They can participate through WSCA.”

Fletcher points out that both the “western” and the “state” in WSCA is flexible, since the organization’s members include such “western states” as Maryland, the commonwealth of Virginia, and the Canadian province British Columbia. And the federal government, headquartered in Washington, D.C., would be highly desirable as a contract participant, because the volume of data it owns dwarfs that of nearly any individual state and most of them in combination.

Utah has been designated as the lead for the WSCA contract. An RFP has already been drafted and is circulating among participants for comments. Fletcher said it will probably be released by January 2012. Once the cloud engagement is made, Fletcher said, “We are looking to achieve significant savings — a 30 percent to 50 percent reduction in storage costs.”

Assuming the cloud-based GIS data storage engagement is successful, Fletcher said that hosting existing GIS applications and purchasing new GIS applications as services might be next. Referring to a major GIS application vendor, he said, “Maybe instead of getting a state license for their application, we’d just use it on a pay-as-you-go basis in the cloud.” He anticipates purchasing other GIS applications on a SaaS basis as well.

Managing Medicaid and More

Moving well beyond GIS to national strategy, Fletcher sees enormous potential for cost-savings by having the federal government move major mandated programmatic requirements on the states to the cloud. Examples include information systems for Medicaid management, unemployment insurance, a benefit eligibility determination system, and the new health care exchanges.

According to Fletcher, most states spend about $120 million on their Medicaid management systems, $40 million to $80 million on their unemployment insurance systems, and $200 million to $400 million for their benefit eligibility determination systems (although Utah managed to build its system for a “very inexpensive” $81 million, he said).

Where each state must have these or other systems, Fletcher said, “Why not build [it] in the cloud as a service only one time instead of 50 times? Different state rules can be included as configuration, not development. They can easily be put into the cloud in modules — pieces at a time. Any federally mandated program that applies to all 50 states could be put in the cloud.” If Fletcher is right — and he almost certainly is — the savings for the states and the nation as a whole would be in the billions.

A New Class of E-mail

Moving Illinois’ executive branch e-mail to a private cloud in 2007-2009 was the culmination of a larger cost-saving, efficiency-raising, branch-wide consolidation effort that began in 2004-2005. That effort included everything from transportation and finance to legal and IT.

When the multiple award-winning project first began, “all agencies in the executive branch had their own IT departments, data centers, e-mail and everything else,” said Kevin Rademacher, chief technical officer for the Bureau of Communication and Computer Services, Central Management Services.

Once everything else had been streamlined, consolidating all e-mail within the Executive Branch began by mapping existing directories into the private cloud-based central one. After that, e-mail content could be moved to the new inboxes.

Rademacher’s group had to write some code to accomplish the directory mappings. Then his group used a commercial solution to migrate the e-mails themselves.

Not all 57 executive branch agencies agreed to the migration, but those that did not still get their messages routed via the cloud, even though they ultimately end up in each branch’s unique e-mail system. And every user of Illinois’ private cloud gets shared file and print services, storage, and land-based and wireless communications services.

“Everyone’s e-mail address is ‘Illinois.gov,’” Rademacher said. That’s a valuable, if somewhat intangible benefit, since the addresses used before were anything but intuitive or obvious. “Illinois.gov” is both, and that means constituents have an easier time...
1. For a cloud engagement to work, it requires committed executive sponsorship who is willing to take risks to succeed.

2. Preceding the engagement, be sure to conduct a thorough assessment. This review should not only address technology assets, but also applications, organizational readiness, processes and procedures. Be sure to also evaluate the risks involved in moving workloads like human resources to the cloud.

3. Before you move to the cloud, consolidate and virtualize eligible infrastructure. Be aware that not all assets, especially legacy infrastructure and applications, are ready for this step. Don’t throw these away if they are still valuable to the organization and/or too costly or difficult to replace.

4. Once consolidation and virtualization have occurred, measure the costs of everything. This exercise will produce a true basis for evaluating the costs of cloud services.

5. Determine how existing assets will integrate with cloud services and what workloads can move to the cloud. Not everything can.
If this is your first cloud project, then there are a few more things to consider:

- Define your business objectives. Have a clear understanding of where you are today, where you want to be tomorrow and how the cloud fits in.
- Don’t create a “cloud strategy.” Instead, incorporate the cloud in your business strategy.
- Incorporate mobility into your business strategy — including virtual desktop infrastructure and mobile devices.
- Know exactly what you are trying to accomplish in a cloud engagement: its requirements, exact scope, deadlines, critical resources and risks.
- Make a plan and stick to it. Cloud technology has so much promise that it encourages massive mission creep. For your first project, stick with an achievable plan, learn from it and go from there.

Develop a common service management approach, since it will no longer be providing “stuff.” Instead, it will be providing services.

Evaluate procurement processes to see if they can accommodate the intangible, flexible nature of cloud services. If they can’t, fix them before engaging with a cloud vendor.

Cloud sales processes should include both the CIO and IT managers. Everyone must be comfortable with the process, model and service paradigm.

Perform thorough due diligence on the cloud provider.

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reaching out to their state government, and government employees have an easier time reaching colleagues in different agencies.

Other benefits are more tangible. “Before, we had more than 200 e-mail servers,” Rademacher said. “We were able to decommission 209 of them, leaving 30 or 40. It costs $7,000 per year to manage a single server, including people, hardware, software, AC and power. You can get eight to 20 virtual servers on a single physical one. Most of our savings were from reducing personnel and server costs.”18

The e-mail consolidation saved $13 million between fiscal years 2005 and 2010, with average annual savings of $4 million in 2009 and 2010. Although the effort cost almost $8 million, it has returned nearly 86 cents of every dollar spent.19

Statewide Cloud-Based Permitting

Builders, developers, contractors and anyone needing permits for construction are all too familiar with the paper chase — spending hours trekking to city halls and county commissioner offices tracking down a permit’s status. And that’s not even including the tedious, time-consuming task of finding out which jurisdiction is responsible for the myriad permits required for any structure. It can be different for electricity, plumbing, sewer and water.

The paper chase and jurisdictional confusion were the root causes of Oregon’s decision to create a cloud-based permitting system that all 134 of the state’s independent jurisdictions can use. “Contractors and the development community were the main complainants,” said Patrick Allen, acting administrator of the Building Codes Division of Oregon’s Department of Consumer and Business Services — the state’s commerce department.

“It’s common for plumbing permits to be issued by the city and electricity issued by the county,” Allen said. “Plus there’s the general issue of not knowing the jurisdiction you’re in.”

In 2003, Allen’s division went to the State Legislature with a pilot project. “We had to demonstrate we could do this from a technical competency point of view,” he said.

Having demonstrated that competency, the Building Codes Division went back to the legislature in 2007 to get the OK for launching the full-blown program. Implementation began in August 2008.

Oregon contracted with a commercial vendor for all aspects of the project. Both the permitting data and related Web-delivered applications reside in the vendor’s data center in Utah, which is “public” in the sense of being available to organizations and entities involved in building permitting. The vendor has an off-site back-up.

In addition, “Oregon mirrors data and configuration for redundancy at servers in a state facility,” Allen said. “When we have enough volume to justify the cost, Oregon will have a hot failover facility in California. That will give us three back-ups and a primary.” Allen doesn’t expect the California facility to be set up for at least a year, perhaps longer. However, with a primary and two back-ups, the data and applications are pretty secure already.

When the cloud-based permitting system is completely rolled out, it will do much more than allow builders and contractors to find out a permit’s jurisdictional home and status, although that is game-changing for businesses. It will also allow CAD building plans to be electronically submitted and annotated in portable document format and allow inspectors to do their work on mobile devices out in the field. “We envision 100 percent paperless operations and 100 percent office-less, too,” Allen said. “If city hall is lost, we can still manage the building department from a Web browser at an alternate location.”

In mid-2011, 34 jurisdictions had signed up for the basic services level, i.e., enabling builders in those localities to go online to determine the status of permits that needed no building plans. Full service, which covers those permits that require building plans and includes the plans’ electronic submission, was already in use by eight localities, with six more pending.

“It takes about six months to roll out a jurisdiction,” Allen said. “That includes tailoring the state system to the local financial and workflow system. In most cases, Oregon is converting localities’ electronic permit systems to the state’s system.”

Persuading jurisdictions to join up is not something Oregon has the resources or the funds to do. Oregon was able to foresee this and negotiated a contract so that its vendor had “skin in the game,” Allen said. The state was concerned that even if the vendor did everything exactly right, jurisdictions still might not join up. To address that, the contract was written so that the vendor “gets an upfront licensing fee when a city or county joins and a stream of maintenance revenue after that,” Allen said. “This encourages the vendor to market the system to our other localities.”

This element of the contract has done more than bring new jurisdictions in or add to the vendor’s revenue. It has also created a long-term, highly productive relationship between the state and the vendor. “The long-term revenue promise means that the vendor is very interested in helping to solve any problems that occur,” Allen said. “That has resulted in about 15 contract amendments, but they are always the result of a joint agreement. It’s not adversarial. We have a collegial relationship. Rather than spending time finding loopholes in the contract, we work together to find solutions to problems.”

The e-permit project was proposed to the legislature as a 10-year plan. Ideally, it would be available to all jurisdictions who want it — though they’re not obligated to adopt it — by 2017. “2018 or 2019 is more likely,” Allen said.

As the cloud system rolls out, benefit realization starts right away. “The major benefits now and in the future include a huge amount of time and travel savings and confusion reduction for builders, easier compliance with building regulations, full transparency for builders of their permit process, and no software or server costs to the cities or counties,” Allen said.20
How Did You Pay For That?

Purchasing storage, migrating data and hosting applications in a cloud is quite a different story from purchasing software on a pay-as-you-go basis. And building your own private cloud will never look like buying a cloud service in the same way that you would pay for electricity or water.

Each of the real-life stories presented in this report was funded a little — or a lot — differently. Here’s a synopsis of how each government did it.

Tigard’s Building Division’s operations are entirely funded by the sale of permits. Prior to 2009, when permit numbers were rising, the division built up a reserve to pay for the soon-to-come e-permitting system. That reserve paid two-thirds of the costs of the new system. The rest came from the city’s general fund.

Nebraska’s new cloud-hosted human capital system was entirely funded through existing state monies for personnel management.

Hudson County’s new cloud-based disaster management and recovery capabilities are being developed in two phases, with phase one already completed. For the first phase, 90 percent to 95 percent of the monies came from the county’s capital improvement fund, with the balance picked up by the Department of Homeland Security. Two-thirds of the costs of phase two will be covered by DHS, with the rest being funded by the county.

Oregon’s new, cloud-based statewide e-permitting system was paid for by an increase of four percent to an existing surcharge on building permits — a total rise from eight percent to 12 percent. The increased surcharge was strongly supported by the building community, which considered the fees well worth the time and money the new system is expected to save them.

When Utah moves its GIS data to the cloud, costs will be paid just as they are now — from usage fees charged to state agencies for storing their data. “We don’t have to spend money to buy cloud services,” said Steve Fletcher, CIO.

Regarding the Western States Contract Alliance negotiations for the multi-government GIS public cloud storage, Fletcher made the following comments and recommendations to other public sector organizations considering participating in such joint contracts.
• Western States Contract Alliance is a vehicle trying to capture economies of scale to get good pricing. It has been very effective in doing that for many products.
• States must recognize that they can take advantage of contracts negotiated out of state. It doesn’t make sense to stipulate that your desktop computers contract must be negotiated in-state. It’s an attempt to keep jobs in your state, but it doesn’t necessarily work, and it’s better to get the best prices. Consulting contracts do make sense to negotiate in-state, but states must recognize that they can take advantage of [commodity product and services] contracts negotiated out of state.
• WSCA looks at who is best situated to be the lead state in whatever the product is, which may be because that state has a contract or experience. The lead state will write the RFP and lead the negotiation, but other states will participate in the RFP. It is a very collegial, cooperative process. States don’t want to negotiate 50 contracts for desktops when one will suffice.21

Conclusion

The cloud lets governments do so much more than stretch their budgets. It offers all new capabilities — new usage models and more agility — than ever before. Although the economy continues to be challenging, the cloud offers public sector organizations the opportunities to do more than they ever thought possible with fewer resources than they could ever have imagined.

Endnotes

2. Rosenberg and Mateos, Ibid.
3. All comments by James Ferreira from phone interview with CDG/Bridget Mintz Testa, November 16, 2010.
4. All comments by Sherry Swackhamer from phone interview with CDG/Bridget Mintz Testa, November 18, 2010.
5. All comments by Dugan Petty from phone interview with CDG/Jeana Bruce, November 3, 2011.
12. All comments by Mike McCreery from phone interview with CDG/Bridget Mintz Testa, September 8, 2011.
13. All comments by Dianna Howse from phone interview with CDG/Bridget Mintz Testa, September 15, 2011.
14. All comments by Jim Delaney from phone interview with CDG/Bridget Mintz Testa, September 12, 2011.
18. All comments by Kevin Rademacher from phone interview with CDG/Bridget Mintz Testa, November 15, 2010.
20. All comments by Patrick Allen from phone interview with CDG/Bridget Mintz Testa, September 8, 2011.
Enterprise solutions hosted in the cloud offer tremendous value for resource-constrained governments wanting to deliver excellent service. At multiple levels — such as providing seamless software upgrades, centralizing administrative tasks, disseminating information across multiple teams and devices, and achieving cost savings on maintenance and electricity — cloud-based software delivers what today’s strategically minded agencies need.”

“Cloud will substantially enrich citizen/government interaction, providing a preferred, efficient and modern interaction paradigm to long-standing processes and use cases. Whether private or public, the cloud will offer the ability for governments and the citizenry to collaborate in ways previously not possible.”

“Today, governments of all sizes are embracing cloud computing as an innovative way to reduce costs while providing better services to citizens. Web-based applications allow for easier collaboration and improved productivity, as employees can access their e-mail and documents from anywhere, on any Internet-connected device. Cloud computing can also provide stronger security, better reliability and more frequent innovations than on-premise solutions.”

“Cloud computing offers state and local governments a unique opportunity to extend a wide range of services to their constituents as well as other government agencies. As traditional boundaries are torn down and redefined, the information hosted, exchanged and collaborated with becomes the primary focus. Protecting this information and securing, managing and keeping it highly available becomes the main challenge IT organizations have to face.”

“Budget challenges do not mean that government must sacrifice quality of service to the citizens they serve. Cloud computing enables leaders to drastically cut costs across the enterprise by reducing storage needs and lowering administrative expenses. Meanwhile, government agencies are better equipped to keep citizen data secure and better prepared to respond to emergency situations should they occur. It’s a win-win for everyone.”
For the last three decades, computing has moved away from the use of big, centralized systems and toward the use of smaller personal computers, laptops, touch screens and mobile devices. Similarly, enterprise business software delivery models have evolved from on-premise deployments to off-site hosting to cloud computing leveraging SaaS. Cloud computing is efficient and cost-effective, enabling government organizations to modernize their administrative operations with business applications that are agile, transparent and easy to use.

By leveraging shared computing resources, higher utilization rates of computing hardware, and economies of scale, cloud computing is ushering in an IT revolution which promises far lower costs while greatly improving capacity and performance.

The evolutionary path to cloud must include public, community and private services…coupled with a commitment to merge the technology with business need. The inflexion point for cloud technology is flexibility, security and automation; all enshrined in the delivery of an optimal customer experience. Cloud service includes seamless access, adherence to service level agreements and a proactive computing infrastructure.

Faced with increasing IT complexity and budget pressures, government IT leaders are deploying cloud infrastructure solutions to meet recent directives cost-effectively, efficiently and securely. The efficiency and agility benefits provided by a cloud model are significant and add tremendous value to environments across the public and private sectors.

IT is on the verge of dramatic change. We have to remain focused to ensure we get it right. This will be a journey and we will realize benefits such as efficiencies, cost savings and increased productivity while ensuring trust is critical to spurring cloud adoption. There should be tangible improvements in information security that will come with the shift to cloud that is underway.

By leveraging shared computing resources, higher utilization rates of computing hardware, and economies of scale, cloud computing is ushering in an IT revolution which promises far lower costs while greatly improving capacity and performance.
BIG DATA IN THE CLOUD

*EMC leverages experience, tested solutions for government clients.*

**IN TODAY’S ON-DEMAND DIGITAL AGE,** information is an organization’s most precious resource. From social services to construction permitting, agencies depend on vast amounts of electronically stored data to conduct their daily business. And the sheer volume of that data is growing at a surprising rate.

**DESKTOPS VIRTUALIZED**

In addition to simplifying back-end data management for large public organizations, EMC offers a comprehensive desktop virtualization solution. This solution allows users to gain access to their information from anywhere, using any device including a smartphone, tablet, home computer and more.

Experts predict that on average, it takes only 18 months for an entity to double the amount of data it stores.

In many cases, governments are required to store digital information for longer than the private sector. For example, military personnel records must be kept for more than 65 years.

Compounding the data storage challenge is the fact that traditional storage infrastructure was not built to handle this kind of volume. Storage becomes physically fragmented and prohibitively expensive, and information retrieval becomes a lengthy, convoluted process.

IT infrastructure solutions specialist EMC is enabling a long list of public organizations to leverage the benefits of the cloud for their big data. They can scale their operation and reap cost-savings from the cloud. With a breadth of experience, enriched by strategic partnerships with respected industry leaders, including VMware and Cisco, EMC assists governments on their path to virtualized cloud environments. Tested solutions ensure that both structured and unstructured data is safe, well managed and easily accessible when needed.

**EMC INFRASTRUCTURE SOLUTIONS**

**MULTI-SITE DATA MANAGEMENT** enables uniform administration of large volumes of content across multiple locations, domestic and worldwide, no matter where it is produced, accessed or stored.

**INTRA- AND INTER-AGENCY DATA SHARING** provides disparate user groups secure storage, rapid data sharing and superior confidentiality, managed from a single point.

**ANALYTICAL AND SCIENTIFIC RESEARCH** gives authorized staff easy access to actionable data, regardless of the data’s origin or storage location.

**RESOURCE POOLING** scales all resources stored together in the cloud to serve all users, regardless of location.

**ON-DEMAND SELF-SERVICE** enables users to provision storage resources as needed from their own workstations, independent of service administrators.

**RAPID ELASTICITY** allows all data pooled in the cloud to be quickly provisioned without restrictions on time or quantity.

**MEASURED SERVICE** maximizes agency resources by giving users and service providers transparent access to real-time service usage information.

For more information, please visit [www.emc.com/publicsector](http://www.emc.com/publicsector).
Protecting Assets in the Cloud

Symantec enables safe cloud transitions.

ORGANIZATIONS AND ENTERPRISES throughout the world are taking advantage of the cost savings and flexibility that are hallmarks of cloud computing. But concerns persist about whether cloud security can stand up to current threats.

Security leader Symantec partners with numerous public organizations that are early adopters of cloud technologies. A trusted name in security, Symantec is uniquely positioned to help governments minimize risks, comply with applicable regulations and protect resources. After all, that’s what they have been doing outside of the cloud for nearly two decades.

The Evolution of IT

“Cloud is nothing more than the maturity of an IT infrastructure, providing its different applications and services, in a secure and managed, high-performing service delivery model,” says Carlos Valarezo, National Manager of Systems Engineering for Symantec.

Many agencies are currently undergoing large-scale IT consolidation efforts to make the most of their technology budgets, and for agencies pondering a move to the cloud, consolidation is an important first step. Organizations trust Symantec to secure their IT infrastructure, and root out potential vulnerabilities, like exposure to viruses and malware, before any resources are migrated to the cloud.

“If you have security gaps in your data center or your environment, those gaps will be exposed more easily when you are in the cloud,” added Valarezo. “That’s where we can help.”

The majority of government users migrating to the cloud store their applications and data in a private cloud, either inside their own firewall or in a private space in a cloud provider’s data center. But for those seeking a faster return on investment, a small number of agencies are choosing the public cloud.

Symantec’s public cloud strategies ensure infrastructure is in top form, enabling optimal performance before assets and services are transitioned to a cloud provider.

Symantec believes in a comprehensive cloud governance model that recognizes data as its most precious resource. In service of that data, Symantec advocates a thorough, three-pronged approach with a full suite of products to achieve optimal outcomes in the cloud:

- **Policy**: Symantec helps agencies develop rules to control how and when users, devices and networks can access their data.
- **Protection**: Authentication centers verify that access to cloud data and services is granted according to the agency’s policies, preventing all unauthorized access.
- **Monitoring**: Pervasive real-time tracking of data security governance ensures that access procedures are transparent and auditable.

Symantec.cloud Initiative Gains Momentum

Symantec has also taken its signature security solutions and developed specialized cloud-based tools around each one. Their hosted options include endpoint protection for Windows-based computer systems, email archiving and system backup, and message security for threats introduced via email, instant messaging and the Internet.
Going Google

Enabling better collaboration at a lower cost

Governments with a watchful eye on the bottom line and a desire to equip their workforce with modern tools are going Google. Public-sector customers are embracing Google’s comprehensive suite of intuitive, Internet-based applications, increasing productivity and collaboration, while reducing costs.

Governments from Los Angeles to Maine and Wyoming to Orlando, Fla., have switched to Google Apps to benefit from cloud computing. With cloud computing, software and information is sent over the Internet to computers, cell phones and other devices. People quickly turn on applications and innovation from any Internet-connected device, like a utility, instead of having to install and maintain their own applications.

Google offers many tools designed to encourage collaboration, with team members able to contribute from anywhere with an Internet connection. The simple, recognizable Google interface keeps training needs to a minimum, reducing costs for agencies. Agencies also avoid costs for licensing legacy office productivity packages and staff time previously dedicated to on-site application support.

E-Mail, Website and Collaboration Tools
Google Apps for Government is a productivity suite that features 25 GB e-mail accounts, simple website management tools, real-time document sharing, calendaring, instant messaging, video sharing and more. Using only their Internet browser, public agencies on Google Apps can streamline communications and increase productivity.

For a low annual rate of $50 per user, Google Apps users enjoy updates and added functionality on a continuous basis. IT teams no longer spend their time applying patches and performing upgrades, freeing up valuable time and resources for mission-critical initiatives.

Google Apps received a “moderate” Federal Information Security Management Act certification (FISMA), the first suite of Web-based e-mail and collaboration applications to meet these rigorous standards. More than 4 million customers depend on Google’s 99.9 percent uptime guarantee, with redundancy ensuring optimized business continuity and disaster recovery capabilities.

Manage Mobile Devices Online
One of the fastest growing mobile operating systems in the world, Google’s Android platform offers hundreds of thousands of apps available for download to smartphones and tablets. Enterprise and government customers now have the ability to manage Android devices, as well as iPhones, Windows Mobile phones and other ActiveSync devices directly from the Google browser. Tablet users can look forward to having this capability for their devices in the future.

Chrome Browser, Operating System Offerings
Google developed Chrome, an open source Web browser, as a simple, fast and secure Internet browser which also features Web-based applications. Chrome comes with specialized tools to streamline enterprise deployments. Organizations that continue to use Internet Explorer for legacy applications can use the Google Chrome Frame plug-in to get the same benefits as Chrome users. The new Chrome OS offers several advantages, including speed, security, ease of use and affordability.

Transition Tools Available
Google also offers a number of tools to integrate with existing systems, allowing organizations to begin reaping the benefits of cloud computing even if they need a more gradual transition. Bridge products from Google are available for users of the Microsoft Office suite, including Microsoft Outlook, BlackBerry Enterprise Server, LDAP or Active Directory, and Microsoft Exchange.

Google’s innovative products help transform the way government employees work together, with products designed for team collaboration and built for the Web. Google technologies for mobile, Web browsing and office productivity are easy to use, quick to deploy, fast and scalable. For more information, visit www.google.com/apps/government.
STORING MORE WITH LESS

Data management with NetApp maximizes technology investments

The majority of IT departments in public organizations have a leaner staff than they did five years ago. And public budgets are under greater scrutiny than ever due to the state of the economy. Governments are looking to capitalize on new opportunities in consolidation, virtualization and the cloud to optimize efficiency and get the biggest return on their technology dollars.

Surprisingly many agencies overlook data storage as part of these initiatives, which can be a costly mistake. Streamlining data storage infrastructure with NetApp ensures the greatest possible benefit from consolidation, virtualization and cloud strategies.

With a full suite of storage and data management solutions, NetApp architects storage systems that build in new efficiencies, cut capital outlays on hardware, and position your organization for future growth.

DRAMATIC COST SAVINGS
Keeping traditional storage systems in these new environments guarantees that storage infrastructure needs will continue to spiral as data increases over time. NetApp has proven to be a vital part of consolidation and virtualization efforts for many government agencies because its storage virtualization and deduplication tools reduce the need for new hardware as data increases.

Virtualizing data storage along with computing infrastructure, NetApp routinely cuts customer data center space requirements in half, which has a significant impact on the bottom line. NetApp offerings also support environmental initiatives, since data consolidation lowers energy use by using less power, cooling and physical space.

SCALABLE AND FLEXIBLE
NetApp solutions simplify data management by enabling uniformity across an organization’s storage infrastructure, since its tools can also manage devices from other providers. And with NetApp, many routine tasks are automated, leaving more staff time to focus on strategic initiatives.

When storage needs change, NetApp dynamically allocates space resources to ensure the necessary agility to meet customer service needs. Storage is only used when needed. And likewise, unused blocks of space are freed up as soon as data is deleted. Storage also can be scaled in minutes, rather than hours, no longer requiring planned system downtime or manual storage adjustments to be performed on evenings or weekends.

TRUSTED SOLUTION
Included in NetApp’s storage platform are sophisticated tools to ensure effective data backup, expedited disaster recovery, regulatory compliance and high availability. In fact, agencies using NetApp boast greater than 99.99 percent uptime.

Security is also built into NetApp solutions. One of the few storage providers to be certified by the National Information Assurance Partnership Common Criteria Evaluation and Validation Scheme (CCEVS), NetApp’s storage operating system strictly protects confidential government records, counting several military organizations among its clients. The CCEVS certification, along with many others, demonstrates that public agencies’ trust in NetApp to securely manage large volumes of sensitive data is well founded.

Whether you are consolidating storage, virtualizing or making a move to the cloud, NetApp can architect a storage solution that will help make the most of your IT investments while meeting your needs for reliable and secure service delivery.

www.netapp.com
Government is at a point of technological convergence. The PC is being “demoted” as the center of digital life for government workers and the public, and the cloud is taking its place as a digital hub. Why? Because IT departments are increasingly called upon to disseminate data and applications to multiple types of office and mobile devices, and cloud computing facilitates that.

Accela’s flagship enterprise software platform, Accela Automation, has long been available in a hosted cloud model, the Accela Cloud. Hundreds of governments around the world use the software to automate critical tasks associated with permitting, licensing, code enforcement, community development and planning, asset management, emergency response, and more. Given the sea changes happening in government IT, a large and growing percentage of Accela customers are choosing the Accela Cloud.

More than simply being a remote server, the cloud offers important benefits for government IT departments struggling to juggle growing demands with fewer resources.

**SCALABILITY** — Having all of an agency’s software and data on someone else’s servers means the agency has the flexibility to consume services as needed, rather than buying and installing more hardware, and it saves on electricity and maintenance.

**VIRTUALIZATION** — The virtualized environment of the cloud allows for the centralization of administrative tasks, and it lets agencies access the processing power they require as their usage increases or decreases, as with any other utility.

**REDUNDANCY** — For government agencies chartered with high availability, having remote, redundant copies of everything means another location will step in and carry on when one location fails.

Finally, information in the cloud is automatically and instantly synchronized across devices, so users can access data from any device and location. For example, if a user opens a record on his desktop and leaves the screen on Record 12345 and then goes to lunch, launching the same app from his tablet at the restaurant would open it up where he left off in Record 12345.

It’s hard to find a better example of the value of the Accela Cloud than in New Orleans following Hurricane Katrina, when nearly 80 percent of the city experienced flooding; 110,000 of the city’s 180,000 houses were flooded. Conducting damage assessments of these structures was a daunting task, but New Orleans had one important advantage: all critical building, permit and other land information was intact, stored in the Accela Cloud in California, and inspection results were recorded on mobile laptops running Accela software. The data was automatically transmitted in real time to the city’s database within Accela’s cloud infrastructure, allowing New Orleans to disseminate information to the public and FEMA, and expedite the procurement of relief funds for rebuilding and recovery.

The Accela Cloud is the right solution for many governments today, and Accela is delivering the secure, robust platform they require.

**ACCELA**

Government Software

[accela.com/cloud](http://accela.com/cloud)
FOR PUBLIC AGENCIES OR PRIVATE ENTERPRISE, managing critical business processes effectively makes good business sense and provides far-reaching benefits. Software AG works with governments across the globe, offering customized options to ensure that clients receive maximum value from their business process investments.

Software AG offers end-to-end business process management solutions that allow organizations to capitalize on the efficiencies and scalability of cloud computing in a way that’s best suited to their particular needs.

Whether you are considering a public cloud, a private cloud, an on-premise model or a hybrid option, Software AG brings 40 years of experience in technology innovation to bear, leveraging strategic partnerships to ensure the best possible outcomes for your organization, and ultimately, your constituency.

Software AG’s Cloud Ready offering is guided by the principle of extreme collaboration, in which business processes are enriched by augmenting stakeholder input to include those with skill sets beyond just administration and IT.

Twitter, Facebook and Wikipedia are common examples of extreme collaboration, where feedback and analysis are encouraged from people with diverse backgrounds, interests and understanding of process efforts and requirements. Extreme collaboration enables interactions and input in real time from a larger circle of influence — both internal and external — that informs effective decision-making, saves money and improves the performance of the organization.

While some companies believe that software should help your business run smoothly, Software AG takes this one step further with its belief that enterprise software should enable new business models and drive new value. Simply put, technology shouldn’t just help you serve constituents. It should help you serve them better.

Cloud Ready
Cloud Ready positions Software AG to support extreme collaboration with sophisticated tools to enhance business process initiatives. With Cloud Ready from Software AG, decisions are informed by real-time data, ensuring projects are aligned with overall agency objectives.

Leading process analysis platform ARIS allows continuous transformation and improvement to your business processes. Decision-making templates consider key performance indicators and offer analysis to consider impacts of potential process changes. Streamlined communications help critical results get to key audiences more quickly, allowing expedited responses. Maximum flexibility ensures that you can configure ARIS to suit specific user groups’ individual needs.

webMethods expedites process improvements, task management and workflows with sophisticated task organization, monitoring and integration tools. Routine and ad hoc tasks are efficiently routed, escalated and delegated as appropriate. Workflows are enhanced with advanced simulation and process modeling options. A metadata library allows simple asset searching, saving time by preventing work from being duplicated. webMethods also supports commonly used forms, and allows tracking of document life cycles with check-in/out and versioning capabilities.
A Simpler Workday

Cloud-based ERP solutions preserve resources, enable efficiencies.

Traditional on-premise ERP systems can represent a significant percentage of an agency’s IT budget. Besides initial infrastructure investments, maintenance and upgrade costs can be expensive.

The current economic climate is prompting governments to explore new ERP solutions in the cloud. Workday, a trusted global software-as-a-service ERP provider, delivers secure unified human resources, payroll and financial management solutions at a predictable subscription rate. Workday lets agencies easily capitalize on hundreds of built-in best practices while allowing them to configure workflows to their own needs. Workday integrates with other solutions used by the agency. And agencies benefit from continuously updated capabilities not available with legacy systems — at no additional cost. Its modern interface is easy to use, and many vital functions are just one click away.

Workday solutions help governments significantly cut IT investment and maintenance costs, while delivering a secure, integrated, easy-to-use solution that governments can rely on for efficient enterprise resource planning.

Informing Internal Decisions

Workday’s customers represent a variety of industries and include organizations such as Chiquita Brand; Flextronics; Salesforce.com; Sony Pictures; Thomson Reuters; and Time Warner. A growing list of public agencies, such as the State of Nebraska, Brown University, Cornell University, Georgetown University and the University of Southern California will now benefit from Workday’s rapidly deployable cloud-based solutions to expertly manage many elements of their operations:

Human Capital Management (HCM) tracks employee records from hire date to retirement, enabling quick access to compensation, absence and leave information, performance, benefits and more. Other capabilities include at-a-glance organizational charts; benefits administration; and multi-faceted individual, section and organization-wide trend analysis, enabling effective succession planning and career development.

Payroll offerings from Workday provide the control, accuracy and flexibility to ensure efficient payroll operations. Tax updates that impact payroll functions are provided automatically. Authorized users can view and edit employee information in one click, and they can export information to Excel or PDF files just as quickly. Self-service options are available for employees that include the ability to view pay slips, payment elections and year-end tax statements. Analysis tools include comprehensive auditing using self-selected criteria.

Financial Management tools empower decision-making based on real-time performance information, satisfying both external reporting requirements and internal information needs. Sophisticated resource management offerings track the procurement, management and accounting of physical assets as well as services. Compliance standards are built in, along with tools to measure performance against strategic goals. Access to real-time, actionable financial data enables the necessary agility for a swift response.

For more information, please visit www.workday.com
Building on its well earned reputation as a technology leader, Dell provides secure, enterprise-class cloud solutions to organizations around the world, including fully managed cloud services, private cloud infrastructure, infrastructure solutions optimized for public cloud use, and every combination in between. Wherever your organization is in the journey to the cloud, Dell has the right mix of technologies and expertise to meet your needs.

Enabling an end-to-end cloud ecosystem, from the desktop to the data center, begins with understanding customer needs and opportunities, assessing current infrastructure, and planning and implementing the right technologies on the right time table. Effective infrastructure consolidation and virtualization strategies lay a strong foundation for taking advantage of the cloud’s benefits. With a commanding presence in the government market, Dell knows how to make consolidation and virtualization efforts successful.

A comprehensive services portfolio includes consulting, application integration, managed services, hosting and support services. In addition, Dell leverages expanded capabilities from strategic partnerships and acquisitions of core technologies, including Boomi integration solutions, which enable your organization to connect onsite and cloud solutions in the manner that best suits your needs; the SecureWorks portfolio of services aimed at securing cloud infrastructure; Dell Advanced Infrastructure Manager solutions (formerly Scalent), and InSite One cloud storage services.

Dell’s cloud solutions are built to be open, capable and affordable — helping you build, manage and deliver the cloud infrastructure that best aligns with your organization’s business needs. Dell’s experts will work with you to make your organization agile, streamlined and energy efficient, so you can optimize service delivery to citizens and make the most of IT dollars.
**Solution Spotlight:**

**Leverage Cloud Computing to Modernize Your Enterprise**
CSC is the perfect partner to help your agency reap the benefits of cloud computing. Our expertise and investment in enterprise cloud computing — combined with our experience as a global systems integrator, our proven security credentials and our understanding of the public sector — ensure that we deliver innovative cloud-computing solutions that reduce risk, enhance ROI and increase agility.

**Right Cloud, Right Way**
While cloud computing can deliver great benefits to government, it is not a panacea. Government agencies need to carefully consider a number of key factors such as risk tolerance, business requirements and IT specifications when contemplating a move to cloud computing. CSC’s Right Cloud, Right Way approach offers an independent perspective to securing opportunity in the cloud. We carefully assess your needs and recommend the right cloud solution for your agency based on your strategy, security and risk profile.

**Full Lifecycle Services**
CSC offers everything that a public agency needs to move confidently into the world of cloud computing. From the strategic assessment, in which we analyze your core processes and deliver recommendations to get the best value, through planning and design into implementation and integration with your existing systems and ending with delivery and management, CSC will be with your agency every step of the way.

**Security You Can Trust**
The types of data and applications appropriate to move to the cloud must be matched to appropriate security in an overall risk management approach. CSC is assisting federal agencies to develop roadmaps that outline risk profiles of data sets and identify appropriate cloud solutions.

CSC Cloud Adoption Assessment is a business process-centric analysis that will help your agency:
- **Identify** the right business services on which to focus
- **Score** each targeted process to determine its present and future cloud suitability
- **Rank** potential applications by their business value
- **Identify** the right technology to use
- **Develop** a comprehensive Cloud Adoption Roadmap

At CSC, we offer everything you need to implement cloud-computing solutions that accelerate your agency’s enterprise modernization programs. From strategic assessment to design and implementation to ongoing management, you can count on CSC and our Trusted Cloud solutions to help modernize your enterprise and facilitate a more connected government.

For more information about transitioning to the cloud with CSC, visit [www.csc.com/govcloud](http://www.csc.com/govcloud)
Caught between shrinking budgets and a growing need for services, government IT departments are looking for a more flexible and cost-effective model for computing—one that allows them to operate much more efficiently and respond faster to the needs of policymakers, agencies and constituents. Leveraging virtualization, VMware® enables government agencies to transform their existing IT departments into modern, cloud environments that can respond to the increasing demand for IT services while reducing IT infrastructure and operating costs.

Charting an Evolutionary Path to the Cloud
The VMware vision for cloud computing focuses on enabling government IT to embark on an evolutionary path to building the most important cloud—your cloud. With virtualization as the foundation, VMware lets you adopt cloud while preserving and extending existing investments in applications and infrastructure without the need to “rip and replace” existing solutions.

Virtualization is the foundation of cloud computing because it removes the dependencies between the software and the hardware that runs it. IT departments are no longer restricted to the traditional inefficient ratio of 1:1:1 for servers, operating systems and applications. This decoupling enables IT to turn underutilized infrastructure into an elastic, resilient, partitioned and secure pool of compute resources available to users on demand. With virtualization as the foundation, you can build cloud architectures that are flexible enough to support a private, hybrid or public cloud infrastructure to deliver agility, security, flexibility and cost savings.

Providing the Greatest Freedom of Choice
VMware gives you the freedom to select how much to virtualize, and how and when to move to a cloud deployment model. Based on open standards, VMware solutions ensure application mobility and portability between clouds—public, private and hybrid—within a common management and security framework. In fact, all five cloud service providers placed in the Leaders Quadrant in the most recent Gartner, Inc. Magic Quadrant for Cloud Infrastructure as a Service and Web Hosting are VMware based. With more than 25,000 partners, VMware gives you the flexibility to choose hardware, operating systems, application stack and cloud service providers.

The Leader in Virtualization and Cloud Infrastructure for Government
VMware virtualization solutions are run by all 15 Federal executive branch agencies; all Department of Defense agencies, services and joint commands; all 50 U.S. state governments; and throughout thousands of local government agencies. In government entities of all sizes, VMware is enabling significant benefits, including cost savings, greater agility, increased efficiency, faster application development and deployment, decreased power and energy consumption, increased space savings and more.

VMware is the global leader in virtualization and cloud infrastructure. From the datacenter to the desktop, more than 250,000 customers rely on VMware solutions to provide an evolutionary path to cloud computing that preserves existing IT investments. Visit www.vmware.com/industry/government.
The Center for Digital Government, a division of e.Republic, is a national research and advisory institute on information technology policies and best practices in state and local government. Through its diverse and dynamic programs and services, the Center provides public and private sector leaders with decision support, knowledge and opportunities to help them effectively incorporate new technologies in the 21st century.

www.centerdigitalgov.com

Public CIO, a division of e.Republic, is an award-winning platform dedicated to technology thought leadership in federal, state and local government. Through print, online and a portfolio of events, Public CIO provides CIOs and key enterprise leaders with career critical insights on leading and navigating the innovative trends creating efficiencies, driving collaboration and impacting government services.

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John Miri, Editor-in-Chief, Center for Digital Government
After a successful career as a private sector software executive, Miri was appointed by the Texas Governor to the top regulatory board overseeing statewide electronic government. He went on to lead transformational projects for two successive Texas State Chief Technology Officers and has become an advisor and close confidant to leading state and local government CIOs around the nation. As the former Director of E-Government and Web Services for the State of Texas, Miri led the state to breakthrough results of 829 online services, 83 million citizen financial transactions, and $5 billion in online revenue. He helped found three web-based technology companies that leveraged Web 2.0 and cloud computing to achieve dramatic results for clients in the commercial markets. Miri has been a passionate advocate of next generation Internet technologies for more than a decade and is a nationally recognized speaker and author on government technology.

Bridget Mintz Testa
Bridget Mintz Testa has been a full-time writer since the dot-com boom. Prior to that, she worked as an aerospace contractor at NASAJohnson Space Center, first in lunar and planetary exploration and then in space station robotics. She has written on a wide variety of topics, including Internet and networking technology, telecommunications, electronics, energy, residential construction, human resources, urban planning, business strategy and information technology. She has performed feasibility assessments and market research for small businesses seeking capital for start-up or expansion. She currently lives in the greater Houston, Texas, metropolitan area.