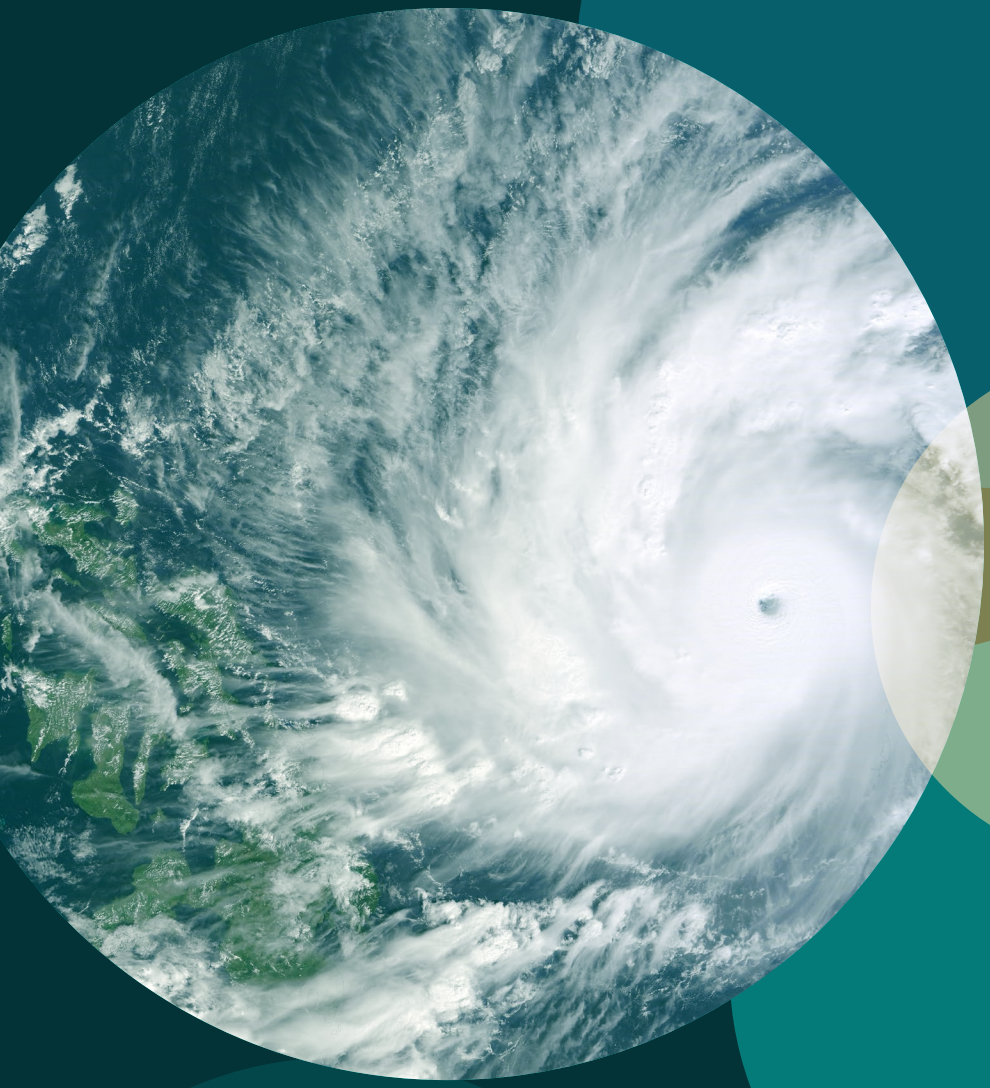


FORECASTING THE CLOUD

EIGHT WAYS THE TECHNOLOGY IS CHANGING GOVERNMENT

CONTENTS

the forecast is clear:

CLOUD IS HERE TO STAY.

Executive Summary

Today, everybody from government information technology officials to the president are talking about cloud computing, a technology that is revolutionizing the way federal, state and local governments operate. Whether they use public clouds, private clouds or a hybrid of the two, govies agree on one thing: Cloud is the way of the future.

But that's where the certainty ends. So far, standardization on adoption, procurement, security and use cases has been elusive. That's because, although cloud has been around for a while, the technology is still in its infancy in many ways.

"I think the state of cloud in government is really in the early stages," said Teri Takai, former Chief Information Officer (CIO) at the Defense Department, former CIO for California as well as Michigan and now CIO and Executive Vice President of Meridian Health Plan. "The interest level and the desire to move to the cloud are very strong, but I think some of the challenges of actually understanding how to do it, how to actually do the migration, and then how to manage the security and the contract terms and conditions are still being worked out."

Cloud became a star of the government information technology realm in February 2011, when then-Federal CIO Vivek Kundra issued the **Federal Cloud Computing Strategy** — better known as the Cloud First policy. Part of the Office of Management and Budget's "**25 Point Implementation Plan to Reform Federal Information Technology Management,**" the strategy was "intended to accelerate the pace at which the government will realize the value of cloud computing by requiring agencies to evaluate safe, secure cloud computing options before making any new investments."

Since then, other agencies have released cloud guidance:

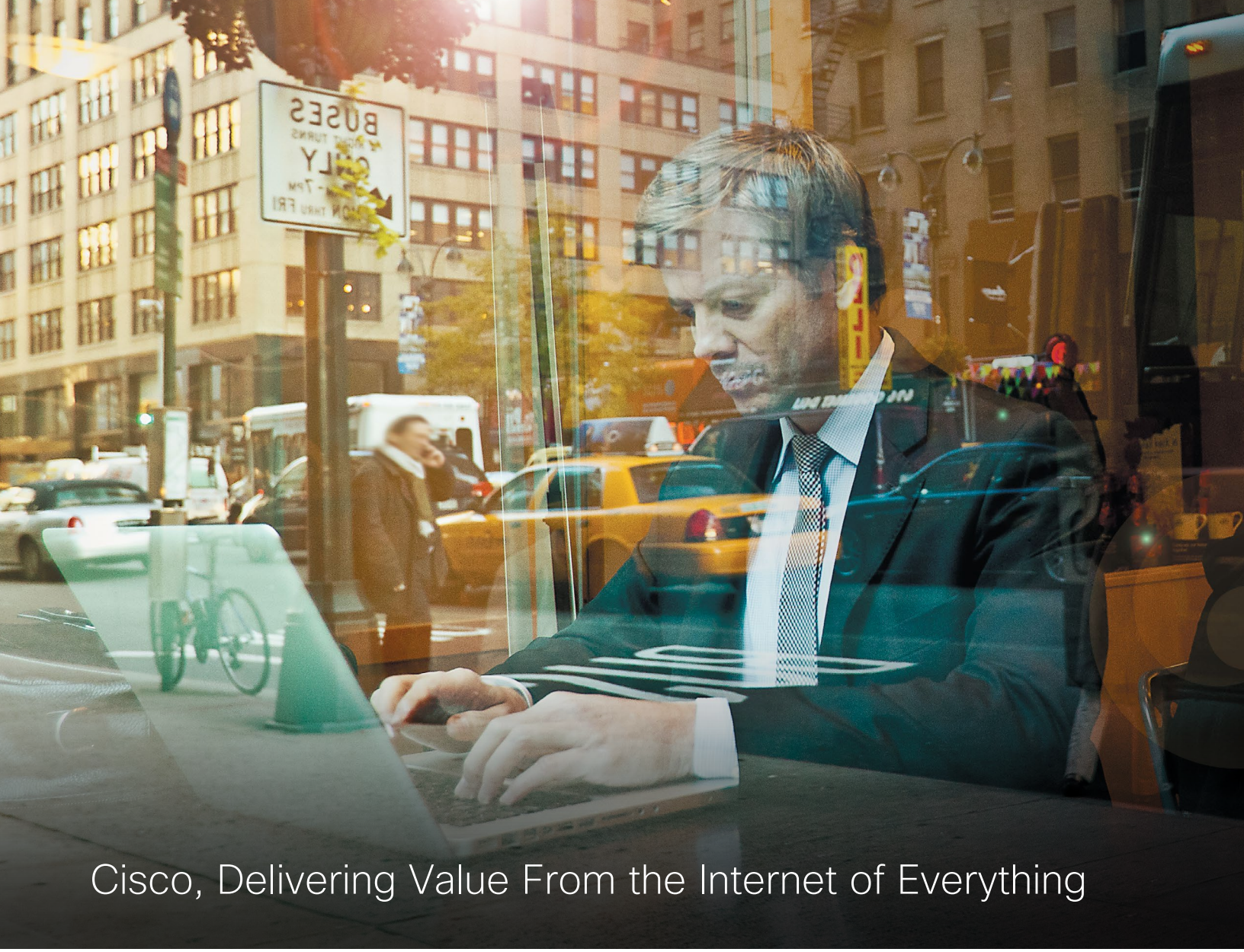
- The National Institute of Standards and Technology released in October 2014 the final version of its "**U.S. Government Cloud Computing Technology Roadmap, Volumes I and II**."
- The Commerce Department has a **cloud computing policy**.
- The General Services Administration (GSA) has extensive **cloud IT services information.**
- The **CIO Council** has a "one-stop source for federal cloud computing information."
- Last year, the Office of Management and Budget gave **a presentation** at the final FOSE government technology event on adopting a secure cloud environment.
- The FBI issued **recommendations for implementing cloud solutions** according to the Criminal Justice Information Services Division.
- The Defense Information Systems Agency (DISA) has a **Cloud Services page.**
- In November, The Department of Defense (DoD) issued the "**DoD Cloud Way Forward**" document, which gives "cradle-to-grave" direction for cloud providers and the department.

Arguably, the most sweeping cloud-related guidance is GSA's **Federal Risk and Authorization Management Program** (FedRAMP), "a governmentwide program that provides a standardized approach to security assessment, authorization, and continuous monitoring for cloud products and services," according to its website. "This approach uses a 'do once, use many times' framework that saves an estimated 30-40% of government costs, as well as both time and staff required to conduct redundant agency security assessments."

With so many options and rules surrounding cloud, it can be tough to get your head around the technology. That's where we come in. In this guide, we:

- Define cloud.
- Provide four examples of innovative cloud use at the federal level and four at the state and local levels.
- Explain the benefits and challenges of cloud implementations.
- Get input from experts, such as David Logsdon of TechAmerica Foundation, Jerry Mechling of Gartner Research, Doug Robinson at the National Association of State CIOs and Todd Sander at the Center for Digital Government.
- Give you the resources to help you get senior managers' support for trying cloud.

Is your agency ready to take advantage of cloud? With this guide, you will be.



As government networks get faster and the whole world goes mobile, the number of digital connections is growing at an unprecedented rate. The advent of mobility, big data and hybrid clouds calls for an architectural approach to achieve desired outcomes in a secure way. In order to mitigate risks, government leaders must understand how these technology mega-trends impact the culture and the IT within their organizations. The payoff comes from the synergy achieved with orchestrated convergence.

Learn more at cisco.com/go/convergencegov

INTERVIEW

The Future of Cloud Computing? The Convergence of Big Data, Mobility and Cloud

An interview with Mike Younkers, Director, U.S. Federal Systems Engineering at Cisco

Cloud computing is not a new idea in the world of government IT. But Cisco believes there is a new future opportunity of cloud computing – and for them, it's all about an innovative concept of convergence and an interconnected cloud.

GovLoop sat down with Mike Younkers, Director, U.S. Federal Systems Engineering at Cisco, to learn more about why the future opportunity for cloud computing is connecting it with mobile, big data and social environments.

Younkers explained that currently, the way much of cloud computing operates is in distinct silos – silos that lock end users into a single public cloud provider.

"That ends up meaning there's challenges with making connections and moving workloads back and forth," Younkers explained. "We believe that those clouds should be able to connect freely between one another, regardless of whether they're public or private. And so we've come forward with the intercloud fabric – our technology that allows these various clouds, wherever they are, to be connected in a transparent, secure, and reliable way."

But for Cisco, this conversation goes beyond just cloud computing – way beyond.

"We talk about the cloud and technologies that connect cloud together, and that's important," said Younkers. "But it's not sufficient. We're not telling the bigger picture. And what the bigger picture is about is the convergence of some very large technology areas."

The big picture, to Younkers and Cisco, is all about the synergy that's created as organizations connect their mobility, cloud and big data environment – a synergy that transforms government.

"The cloud is an enabler," explained Younkers. "As things come together, the convergence of social media, mobility, and cloud, we can do some interesting and powerful things. So cloud for cloud's sake is just infrastructure. But the services we can provide to constituents, when we start to bring in the ability to let people access data from wherever they are, that's the mobility side."

To illustrate his concept, Younkers shared a recent example from the Smithsonian Institute's National Zoo in Washington, D.C.

In 2012, there were more than 30 million visitors to Smithsonian museums and the National Zoo, more than 100 million website visitors, and more than 8 million digitized records available online. The Zoo's Panda Cam alone received more than 1 million clicks by people watching the new baby panda. Between museum visitors sending pictures via the Wi-Fi network, 7,000 employees sharing large files via email, researchers transferring digital images, and Panda Cam watchers, the Institution's network was under tremendous strain.

"They faced a problem of convergence," explained Younkers. "They're serving connectivity to their users, who are posting images and experiences on social media. At the same time you have researchers that are using the data that the Smithsonian has, and now we're starting to see a big data problem emerge. You have various people doing research from literally around the world, on lots of different types of devices, because they have access to it through various mobility techniques."

Cisco came in to solve the Smithsonian's issues with a new network that had better than 99.999 percent availability and reduced latency from more than 20 milliseconds to less than 20 microseconds – a 1,000-fold improvement.

To Younkers, this example showcased why the convergence of mobile, big data and social environments is so important and transformative to government.

"The government is really focused on finding ways to communicate with its constituency," said Younkers. "Providing services is key. With mobility we're able to put these services in the hands of the constituent. Through a mobile device we communicate differently and have a more transparent reach."

"Next, I'd want to push my resources using various apps closer to my constituents," Younkers continued. "And that's the power of the cloud, because now with the cloud, I can distribute resources in a way that gives a better experience to my end customer."

But just pushing compute resources out, and putting the app in the hands of the user isn't enough, said Younkers, because it doesn't change the user experience unless they're able to do something useful with it.

"This is where the idea of big data comes along," said Younkers, "because now when I have the compute power and app where I need it, I can analyze whatever it is that I'm doing and receive valuable real time intelligence to make better decisions."

Added Younkers, "I really believe this is how you can see these three trends coming together. Government is able to provide better service to its citizens."

INTRODUCTION

Defining Cloud — and Identifying Its Benefits

Before we can appreciate the benefits of and complications surrounding cloud, we must understand what cloud is. Generally speaking, it's "a broad movement to treat IT services as a commodity with the ability to dynamically increase or decrease capacity to match usage needs," according to Cloud First.

The National Institute of Standards and Technology (NIST) gets **more specific:** "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

Per NIST, cloud comes in four deployment models:

- **Private** — An on- or off-premise cloud that is operated only for an organization, which a group or vendor may manage.
- **Community** — Several organizations with common concerns such as policies or security requirements share the infrastructure.
- **Public** — The infrastructure is available to the public and owned by an organization selling cloud services.
- **Hybrid** — A combination of two or more models that remain separate but are bound together by standardized or proprietary technology.

NIST also determines three service models for cloud:

- **Software as a Service (SaaS)**, which puts cloud management and control in the hands of a cloud service provider (CSP), rather than consumers.
- **Platform as a Service (PaaS),** which gives consumers control over deployed applications but not the cloud infrastructure.
- **Infrastructure as a Service (IaaS)**, which lets consumers control operating systems, storage and deployed applications, but, again, not the cloud infrastructure.

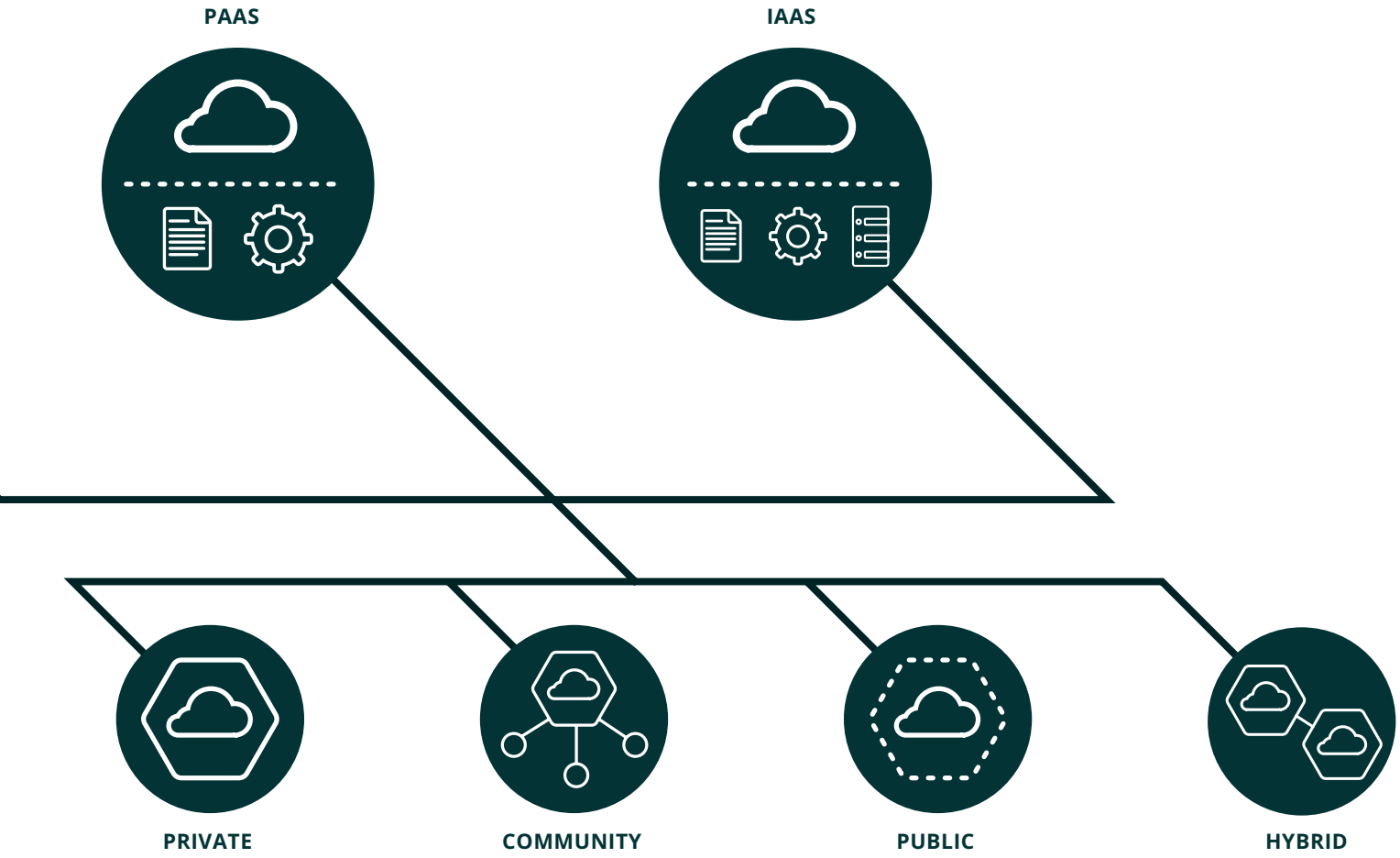
To get cloud off the ground, Cloud First mandated that agency CIOs migrate three services to the cloud within 18 months. Often, the low-hanging fruit, such as e-mail and storage, move first, while more mission-critical or sensitive applications wait on the back burner.

Overall, cloud has made good headway, and for good reason. The benefits of the technology are many. For instance, cloud provides improved asset use, scalability, on-demand provisioning, shared infrastructure, pay-as-you-go pricing and agility.

Additionally, cloud saves government entities money. Agencies save 25 percent to 50 percent by moving to the cloud, according to a **Brookings Institution report**, and a MeriTalk **study** found that adopting cloud, especially the PaaS model, can save the federal government $20.5 billion a year in application development costs.

To realize the savings, agencies are making the investment. Federal spending on vendor-provided cloud computing services is expected to grow from $2.45 billion in fiscal 2014 to $6.5 billion in fiscal 2019, according to a **November 2014 Deltek report**. Most telling, perhaps, is that President Obama's **proposed 2016 budget** calls for $86 billion for IT spending, with 8.5 percent of that going toward cloud.

What's more, cloud helps the government achieve goals, such as:



- The Federal Data Center Consolidation Initiative, which aims to consolidate the federal government's 2,000-plus data centers by at least 800 data centers by this year. "Cloud computing can accelerate data center consolidation efforts by reducing the number of applications hosted within government-owned data centers," according to Cloud First.
- Telework policies, such as the **Telework Enhancement Act of 2010** and a r**ecent White House memo**. One way that agencies are working to meet these mobility and flexibility objectives is by offering virtual desktop infrastructures that employees can access via cloud.

Cloud is also enabling state and local governments to collaborate more easily with one another and to share resources with the federal government. For instance, Hanscom Air Force Base's Hanscom milCloud supports other agencies, such as the Defense Logistics Agency, which uses the milCloud test capability. But non-Air Force activities use it, too, said Tim Rudolph, Air Force Life Cycle Management Center Chief Architect and Chief Technology Officer. Hanscom is also working with Massachusetts on **Massachusetts Open Cloud** to combine the "best capabilities of an open cloud with the more security-focused capabilities of our milCloud in a way that keeps the right traffic in the right place, but it also allows that combination of forces, if you will, to solve large and complex problems," Rudolph said.

"It also promotes not only that collaboration organizationally, but new ways to look at how the cloud could be used," he added. "How you could charge customers for the cloud if we're a cloud provider, which milCloud is through DISA, or locally through our Hanscom milCloud?"

"All states have some type of cloud environment, and that's predominantly private clouds," said Doug Robinson, Executive Director of the National Association of State CIOs, which has been tracking cloud adoption for five years. According to its **2014 state CIO survey**, 20 percent of the states said that they were highly invested in cloud services, up from 6 percent in 2013. Additionally, 73 percent said they had some application in the cloud and 6 percent said they were still investigating.

The main differentiators between states that are highly invested and those that are not are cost savings and efficiency. "It's the cap ex vs. op ex discussion," Robinson said. "The old model of buying a set amount of hardware and software to use for five years and then replace it all is expensive. With cloud, cost is tied to consumption."

What's more, states are sharing services via cloud models. "It might be a private cloud that the state CIO in fact is delivering as a service to other state agencies," he said. "They're the internal service provider." (See Oakland County, Mich., on **Page 20**)

State and local entities tend to use cloud for customer relationship management, enterprise resource planning and disaster recovery applications, said Todd Sander, Executive Director of the Center for Digital Government.

"They're understanding the opportunities to be able to access major infrastructure improvements on a kind of a pay-as-you-go model," Sander said. "That's been particularly important in the local governments — the cities and counties — because the past several years of recession has seen a lot of them reduce their technology staff in-house. And so, as the money starts to come back, as the economy starts to improve and the revenues to government start to improve, they're starting to make investments again. But they don't really have, nor do they necessarily want, to go out and rehire all of those people that maybe worked there five or six years ago. So, looking to as-a-service ... [is] a way for them to make progress in a way that is really cost effective and keeps them from having to recreate the past."

INTERVIEW

Securing the Cloud of Today

An interview with Aaron Faulkner, Chief Strategy Officer at InfoReliance, and Ken Kartsen, Vice President of Federal Sales at Intel Security

It's widely agreed that 2014 was the year of the cloud in the federal government. More and more agencies and organizations tested moving data to the cloud, learned about deployment, and worked through security and compliance issues related to cloud computing.

If 2014 was the year of testing the cloud, though, it looks like 2015 will be the year of full implementation – and of large migrations of data and services to the cloud, especially in the Department of Defense and the intelligence community. To learn more about what cloud adoption will look like in 2015 – and the new methods of security – GovLoop sat down with Aaron Faulkner, Chief Strategy Officer at InfoReliance, and Ken Kartsen, Vice President of Federal Sales at Intel Security (formerly McAfee).

"What we saw in 2014 on the federal side," said Faulkner, "was agencies starting to get that first crack in the ice. The typical pattern for a first-timer has been migrating a public facing web site or implementing a disaster recovery strategy using the cloud instead of an on-premise SAN or tapes. Once they begin leveraging the cloud and get that first authority to operate in-place from their CISSO, we have seen time and again an unprecedented adoption of technology throughout an agency with ever increasing complexity of workloads."

With the big leaps that happened in 2014, Faulkner predicted that what agencies will be dealing with in the coming year is the work of learning how to migrate and optimize applications and data in the cloud.

"The cloud conversation is finally shifting from the philosophical and 'what if's?' to the pragmatic approach and business considerations that departments and agencies need to make as they transition from on-premise computing to fully managed cloud services that are delivered on a consumption basis," Faulkner added.

This move from testing cloud services and discussing their benefits, to more practical deployments of cloud computing, means that agencies need to focus more on the pragmatic aspects of adopting cloud computing With those services, Faulkner added, security is still a primary concern. "Our perspective is, we always make sure that the same exact security capabilities and security topology that the customer has on premise today is available to them in their cloud environment. That is the simple bottom line."

Kartsen agreed that the conversation around cloud has changed and now needs to focus on security.

I think the dynamics around what the cloud provides end users and customers, its capabilities to deliver applications on demand and systematically move or enable infrastructure in the cloud and what that means for security, has changed over time," Kartsen explained.

"What people are discovering is your security is only as good in the cloud as the security, policies and procedures in configuration management that you apply to your cloud infrastructure," Kartsen added.

"The GSA FedRAMP program in particular has done an outstanding job of providing assurances to departments and agencies, including the DoD, that certified cloud service providers have met rigorous security standards and controls," Kartsen said. "In fact, from the physical security of the datacenter itself, all the way through and to the hypervisor, government customers can count on having a highly secure, highly available, and highly auditable infrastructure. However, the moment that they migrate their data, their applications, their network configurations, etc., the accountability and the responsibility for security shifts from being solely that of the cloud service provider to that of both the provider and the agency – a shared responsibility security model."

Kartsen continued by stating that Intel Security recognized early on the criticality of ensuring that their customers have the ability to secure their cloud environments in the same manner they have done on-premise. Beginning in 2014 a series of new products, such as the Public Cloud Server Security Suite, as well as engineering efforts for key tools such as SIEM, IPS, and DLP, have all been underway in order to support all major platforms, to include Azure and Amazon Web Services, with certain products even being made available on a consumption basis.

Finally, both Kartsen and Faulkner stressed the need for the government to look at updating its contract vehicles and acquisition process so that users can really see the full advantages of cloud.

Faulkner advised that vendors need to have a partnership with the government to come up with more of a commercially driven acquisition and procurement strategy to be able to buy, use, and report the use, consumption and cost of cloud the same way a private sector company would.

"That's the only way the government's going get the true benefit of the cloud services and capabilities that are so incredible and moving so fast," Faulkner said.

Challenges in Adopting Cloud

Despite all the checks in the pros column, cloud is not without its cons. Challenges include slow adoption rates, cost considerations, security, procurement, cultural acceptance and workforce gaps.

In 2014, the Government Accountability Office **reported** that seven major departments, including Agriculture, Homeland Security, State and Treasury, "are still only investing a small fraction of their IT budgets on cloud computing."

"The government, with cloud, as with a lot of other information technology things, had a lot of innovations to channel, [and] ended up being slow," said Jerry Mechling, a Vice President at Gartner Research. "And it's slow partly for very good reasons. The government is very large, and if the government makes a mistake, that's very, very concerning."

Sure, we did just say cloud can generate cost savings — but as we also noted, standing up cloud infrastructure takes money. Governments have plenty of legacy systems and infrastructure that would have to be replaced.

"The legacy stuff has not been addressed, and it won't be addressed until there's a crisis," Mechling said. "But a lot of the legacy stuff is old enough that it will create crises. And once the action gets taken, I don't think that people will reform the old systems by just putting them on a new locally controlled machine. They will take advantage of cloud economies of scale at that point. It's just not happening as fast as people hoped it would."

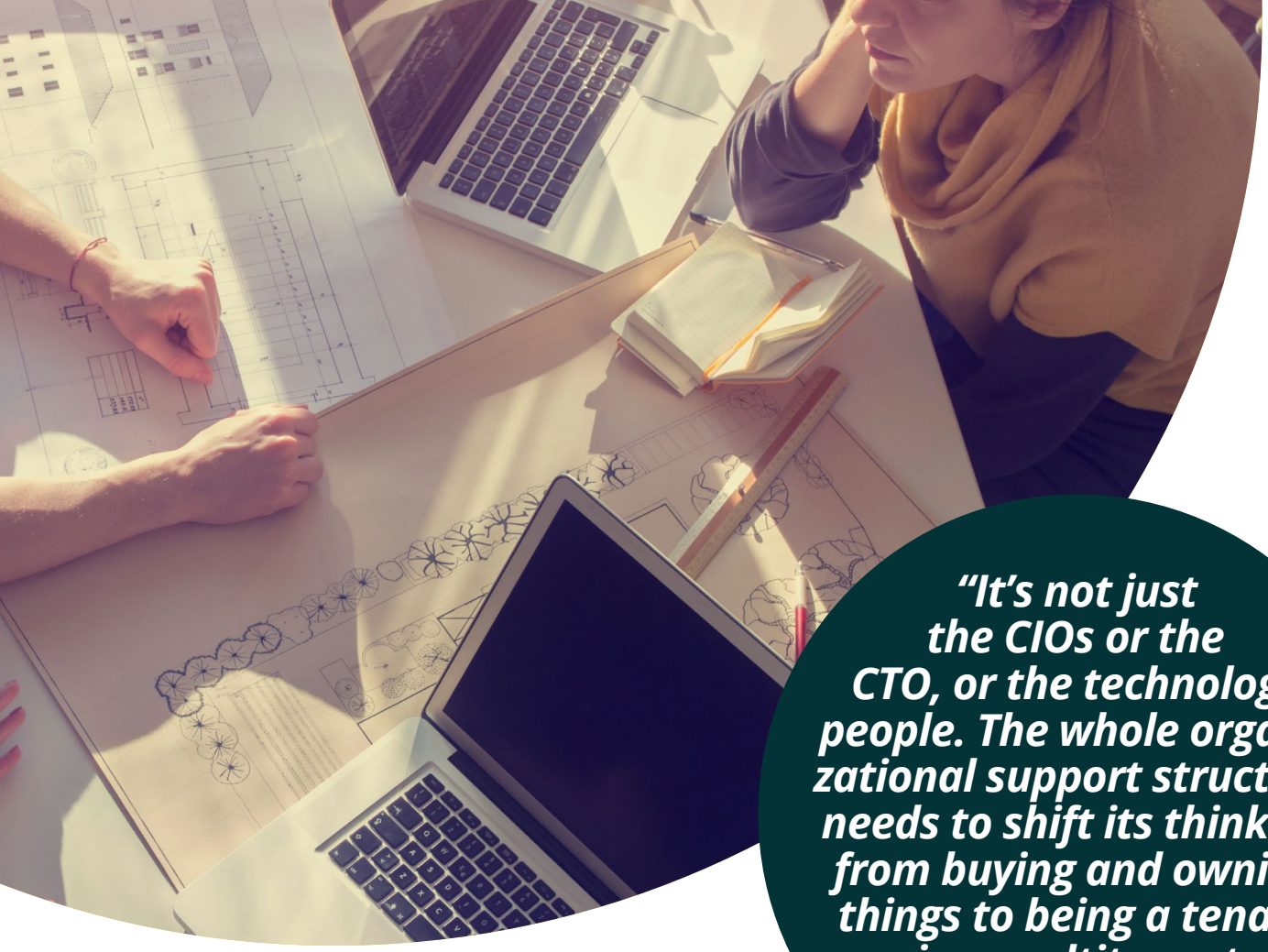
Security is one of the top-cited reasons for hesitation when it comes to cloud. New guidance continues to address this concern. Most recently, FedRAMP, based on NIST baselines, released a **draft baseline of FedRAMP high**, which would enable agencies to use commercial cloud environments for high-impact information.

"When we launched FedRAMP, it was only covering low and moderate information systems," Matt Goodrich, the Director for the Federal Risk and Authorization Management Program, told GovLoop's DorobekINSIDER during a recent interview. "And while that covers roughly 80 percent of federal data and federal systems, that remaining 20 percent of systems with a high level, that represents actually a majority of spend in federal IT because of the sensitive nature of that and the amount of protections we need to have around it."

"We're hearing a lot from providers that they're not only willing to go to the high, but have capabilities that can meet these new demands," **Goodrich told GCN**. "I think it's really good for agencies, because I think it's really helping us promote the Cloud First initiative and giving [agencies] the ability to use cloud across the entire enterprise in a different way, that they might not have been able to before."

DoD has **its own set of security rules** when it comes to cloud procurement. "Unlike those in FedRAMP, some DoD systems are National Security Systems (NSS) and thus are subject to control baselines specified by CNSSI-1253," according to "The Cloud Way Forward." CNSSI-1253 is an instruction by the Committee on National Security Systems regarding security categorization and control selection. In other words, some NSS are subject to more controls than FedRAMP provides.

Cultural acceptance is a huge factor, too, because cloud adoption is not about technology alone.



> ***"It's not just the CIOs or the CTO, or the technology people. The whole organizational support structure needs to shift its thinking from buying and owning things to being a tenant in a multitenant environment."***
>
> Todd Sander
> *Center for Digital Government*

"It's not just the CIOs or the CTO, or the technology people," the Center for Digital Government's Sander said. "The whole organizational support structure needs to shift its thinking from buying and owning things to being a tenant in a multitenant environment."

Lastly, cloud demand is there, but the workforce to handle it is under development, said David Logsdon, Senior Director of the federal civil, public sector at TechAmerica Foundation. As a large chunk of the federal workforce prepares to retire in the next five years, new employees who are familiar with emerging technologies such as cloud will be ready to take those spots.

"As more and more millennials are filtered into the federal IT workforce, I think there will be a cultural change in the federal workforce, and it will be more comfortable utilizing emerging technologies such as cloud," Logsdon said.

To attract such workers to the public sector, some agencies are recruiting out of private tech firms and doling out senior-level positions. "If I am a college student getting my degree, and I know that Megan Smith is now the Federal Chief Technology Officer, and she's had a lot of innovative ideas while she was at Google, and is now trying to implement them within the federal community, that may be an impetus to join the federal IT workforce," he said.

"The culture of technology as a tool for government to use tends to be defined early, as it's a technical problem," Mechling of Gartner Research added. "The real problem is it's an institutional change problem, where technology can be very important, but the solution is to negotiate leadership that will allow people to accept new jobs … If we don't address that, then all of the work we can do on thinking about cloud, and investing in technology, is going to miss the elephant in the room, which is the institutional change."

In short, cloud is a wonderful thing, but it's not a panacea.

"One of my pet peeves is that people tend to think of cloud technology as solving all problems," Meridian Health Plan's Takai said. "It doesn't solve all problems; it just changes the problems. And it changes the way that you look at how you deploy technology. There isn't any silver bullet out there that makes the world better."

Maybe not, but there are many government entities using cloud in innovative and interesting ways to meet their objectives. Let's look at eight of them.

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INTERVIEW

Protecting and Preserving Your Data

An interview with Kyle Langdon, Engineering Manager, ThunderCat Technology

Today, the latest buzzword in government agencies is data. The need to store data is continuing to grow at a rapid pace as agencies are finding new ways to collect and use data to provide better services. As the data becomes more valuable, so does the need to ensure it is protected and preserved for archival and compliance reasons. However, this continuous increase in storage requirements creates stress on current IT operations and budgets.

Today's IT infrastructure and processes are increasingly finding they must adapt to these new requirements.

To deal with these new demands, GovLoop spoke with Kyle Langdon, Engineering Manager at ThunderCat Technology, about how agencies can manage storing and protecting their data in the cloud in better ways.

"One way that agencies can cope with these demands is to ensure their data storage platform is cloud ready and therefore scalable and simple to manage," Langdon explained. "By leveraging a platform that can manage data whether it lives in a public cloud, a private cloud or a traditional storage array, this provides significant operational and technological advantages."

Langdon noted that this approach also reduces data silos and provides the ability to place data in the location that best meets the performance and business needs.

"As the amount of unstructured data grows, the traditional means of storing and managing this data begins to reach it limits," Langdon said. "An object based storage system provides the ideal storage space for unstructured data because it offers extremely high storage capacity, low price point, high reliability and the ability to manage a single system across multiple geographical locations."

An object based storage system, Langdon explained, is cloud-based and provides cost effective storage of unstructured data. With an object store, data is stored as objects as opposed to files in a directory tree. Objects are then accessed using industry standard web protocols or via an API.

"In most instances the objects are read and written programmatically and end users do not directly interact directly with objects," Langdon said. "The end user or application does not need to know where the data is stored."

This allows for an object store to scale to 50+ petabyes and 100+ billion files, much higher than a typical network attached storage array. This data can be spread across multiple geographical regions to ensure that data is continuously available as well as provide data locally from a region to its users.

Langdon also discussed why it is critical for agencies to have their data with a cloud provider. This enables agencies to quickly and cost effectively stand up critical systems in the event of a failure in the primary data center.

"Agencies spend enormous amount of time and resources ensuring that in the event of a failure critical systems are able to either stay online or be recovered quickly," Langdon said. "Typically, this is done by having a secondary location with equipment and resources that sit idle until a failure occurs. This equipment needs to be staffed, maintained and upgraded to ensure that it is in lock step with the production resources or it risks losing its effectiveness."

But by leveraging a cloud provider, Langdon explained, an agency can remove many of the costs while maintaining that same state of readiness. Typical cloud models charge when services are used not when sitting idle. By standing up the critical resources in a cloud, agencies can remove many of the costs of maintaining physical equipment. Data is still replicated and agencies can still provide the same level of responsiveness ensuring the critical systems are able to be recovered.

"Data is the lifeblood of the agency," Langdon said. "Even the most the complex IT systems have system failures and providing data recovery solutions is a requirement. Whether it is a user deleting the wrong file or a hard drive failure, the ability to quickly and reliably recover lost data is vitally important to agencies. With some of our customers they need to be able to go back six months or longer and recover. Today this is typically accomplished by leveraging a solution that includes disk and tape. This solution is complex and results in logistical issues relating to the physical management of tapes."

Langdon said the best new alternative is to leverage a cloud storage solution (including object storage) to cost effectively retain data for extended time. By leveraging solutions from traditional backup software providers or appliances that handle the migration to the cloud, backup teams are able to securely migrate data for long-term retention to the cloud.

In short, an object storage solution enables a transition to a more automated and resilient architecture that prepares clients for a transition to a full private or hybrid cloud solution.

Four Ways Cloud Computing Is Changing Federal Government

RECOVERY.GOV

TAKEAWAY:
Look to internal experts already well-versed in cloud to help you with your own implementation.

RECOVERY.GOV

The first federal agency to move a governmentwide system to the cloud "borrowed" IT experts from other agencies to get set up quickly.

Recovery.gov was in the right place at the right time when it was stood up as the website of the Recovery Accountability and Transparency Board, created by the American Recovery and Reinvestment Act of 2009 to prevent fraud, waste and abuse, and promote transparency of the Act and associated funds. The board's status as an independent entity, the need to move quickly and openly and a lack of personally identifiable information — enabling it to be FISMA-certified — created the perfect combination for trying cloud.

At 9:48 p.m. on April 26, 2010, Recovery.gov migrated to an IaaS public cloud model, saving the board $334,800 in fiscal 2010 and $420,000 the next year, according to **a migration document**. Before that, most servers were physical servers.

"This law had just been passed ... and we were charged with having to get this website up in months," said Nancy K. DiPaolo, Chief of Congressional and Intergovernmental Affairs at the board. "And so we said, 'How do we do this? How do we get the best and brightest and most creative IT people to help us?'"

The answer was to borrow them from other agencies.

"If you're an agency head or you're running an IT department, you're not going to give your best people up for a year," she said, "but you're willing to give up your best person for three months, right? So we did these short details."

It took about 22 days from assessment to production in a commercial cloud solution, said Hemanth Setty, the board's CIO since October.

The board is due to sunset on Sept. 30, 2015. Its legacy, Setty says, will be a great how-to for maturing a website. The team documented the journey in a white paper titled **On the Road to Accountability and Transparency**.

"We have the entire story, and we have the entire process," Setty said. "That's the most important thing — the people and the process, that we know exactly what it takes us to get there."

TAKEAWAY:
When moving to the cloud, you must think about how to optimize legacy applications. It can't be business as usual. There's a whole set of different ways to think about the cloud.

NASA

NASA

In migrating about 160 applications to the cloud, the space agency, long a frontrunner in cloud technology, revamped its web services.

When Roopangi Kadakia, Web Services Executive at NASA, started working on a request for information in 2012 to replace an expiring contract, she didn't take a conventional approach. "I didn't want business as usual," Kadakia said. "Instead of having a requirement that was based on any kind of hosting environment, I made it very clear that it had to be a cloud-based hosting environment or a cloud-based service."

The result was the WESTPrime contract, awarded in December 2013. One of five agencywide service contracts under **NASA's IT Infrastructure Integration Program**, the contract provides IaaS, PaaS and SaaS for the web.

She also used the opportunity to strategically align web services requirements with next-generation applications. In the process, she and her team cleaned house, identifying and, at times, eliminating technology that was duplicated, outdated or underused.

"We're requiring new applications to really use some more cloud-optimized technologies and also development practices," Kadakia said.

Her team took a phased approach to the migration of about 160 applications to commercial public and private cloud installations. The first phase focused on standardizing operating systems and software to ensure there were no critical vulnerabilities. The second phase was about optimizing infrastructure.

The result is a more consolidated, standardized and consistent set of applications in the cloud. Kadakia has also saved about 35 percent to 40 percent in operations and management costs in the past two and a half years.

"What has been really kind of interesting about the whole migration is it brings a lot of transparency into what you're doing, and it brings a lot more consistency in the types of metrics and utilization numbers you can see," she said.

TAKEAWAY:
Consider developing a cloud testing environment to make sure you're able to do your homework ahead of a cloud migration.

AIR FORCE

THE AIR FORCE

To try out a new procurement model, the Air Force is giving vendors access to a portion of the Hanscom milCloud..

Vendors planning to participate in the Air Force's PlugFest Plus in May can access the Hanscom milCloud to test and demonstrate their solutions for the Distributed Common Ground System — an innovative combination of two proven procurement techniques: PlugFests and Other Transaction Authorities (OTAs). PlugFests are events at which companies can showcase how their technology interoperates with an open architecture, but no procurement action is associated with them. PlugFest Plus incorporates OTAs — DoD acquisition authorities that are not subject to the Federal Acquisition Regulation — so that prototype contracts may result from the event.

"What the companies will need is access to some sort of sample data that they can work with, so as they're developing systems that they're going to plug in, they know how well they're performing, but also, preferably, a virtual environment that simulates the system that we're going to insert the technology into," said Camron Gorguinpour, Director of Transformational Innovation at the Air Force. "That's where the milCloud comes in for us. The Hanscom milCloud, at least in this initial demonstration, and hopefully beyond, will be used as the virtual testing environment for companies that are interested in participating in our May acquisition event."
Hanscom milCloud has been around for about three and a half years and currently serves as DISA's development cloud, said the Air Force's Tim Rudolph.

"MilCloud allowed us to basically create capacity to allow those types of providers to innovate rapidly through an accredited infrastructure and to be able to scale up to support those demands," Rudolph said. "Without that, we'd have to stand up effectively — a whole separate set of computers within a data center — or we would have to find out some other hosting or provisioning arrangement. But because we had milCloud, because the homework had been done to make sure we had the right security to go along with that new environment, we were able to do it, A. rapidly and B. elastically."

Once companies contact Hanscom Air Force Base to get a milCloud key, they have a simulated environment that they can plug into to demonstrate interoperability and to score their systems against a reference baseline, Gorguinpour said.

"It's a very easy, low-cost — in fact, for us, no cost — approach," he said.

It could also reduce the acquisition process significantly, Gorguinpour added. "Because the companies are showing up and plugging in and they're going to be evaluated at the event, generally you don't want white paper, because the white paper isn't going to tell you anything more, typically, than what demonstrating the product will do," he said. "If you get the acquisition process down to less than a month, you can start acquiring at the pace of innovation."

GSA

TAKEAWAY:
Cloud technology evolves so quickly that contracting options for it need to include more flexibility.

GENERAL SERVICES ADMINISTRATION (GSA)

To see how cloud use has evolved, look at the progression of GSA's cloud contracting vehicles.

On Feb. 11, 2015, the Cloud Computing Services Program Management Office (PMO) inside the Federal Acquisition Service's Integrated Technology Services Office at GSA released an **RFI** to assess the need for a new contract vehicle. It would replace the five-year IaaS blanket purchase agreement that's expiring in October — the first contract the Cloud Computing PMO put in place.

"The services that are offered on that contract — which are storage and virtual machines and website hosting — it was thought that this would be the low-hanging fruit, the things that agencies would be most comfortable moving to the cloud in order to meet some mandate that OMB put out," said Stan Kaczmarczyk, PMO Director.

Since issuing that first Blanket Purchase Agreement (BPA), GSA put out an E-mail as a Service BPA in 2012 and a Cloud Broker Proof of Concept in 2014. It's currently working on an IT Schedule 70 Cloud Special Item Number (SIN), which is a categorization method that groups similar products, services and solutions together to aid in the acquisition process.

With all those options, is a new or different cloud acquisition contract necessary? That's what the RFI will show, Kaczmarczyk said, and most likely the answer will be yes.

So far, 10 of the 12 original IaaS BPA vendors are in favor of a new option, and "we have heard very strongly from two very big agencies that we need something new," he said.

The two main reasons are because the current IaaS BPA doesn't include professional services, such as assistance with migration, integration and cloud management, and it doesn't take into account the speed at which cloud evolves. A new contract would include flexibility in onboarding new technologies and off-board obsolete ones, Kaczmarczyk said.

Contracting options make cloud acquisition easier, but they don't necessarily speed use.

"We put something in place and just raise awareness about it and wait for the orders to come in," Kaczmarczyk said. "But I think in terms of cloud technology … I'm starting to see an uptick in our business, and I'm thinking that the latter half of '15, certainly at '16, '17, we're going to see more business on our vehicles, and in-cloud movement in general, for two reasons: One, getting more comfortable with the technology and knowledgeable about it, but also, this is the way the IT services business is going. This is the business model that the vendors are adopting, and you're going to have to buy what's available to buy."

INTERVIEW

Setting Yourself Up for Success With the Cloud

An interview with Richard Campbell, Cloud Solutions Architect, ViON

Government agencies, more and more today, want and need the latest cloud technology. And though adoption of the cloud is becoming more of a priority, these same organizations are often challenged by tight budgets, complex procurement, and high security requirements.

Getting to the cloud doesn't have to be hard, though — especially if you have the right industry partner. GovLoop sat down with Richard Campbell, Cloud Solutions Architect at ViON, to discuss how you can set yourself up for success with the cloud — and what risks and bumps in the road you may have to watch out for.

Campbell said that the biggest challenges the public sector faces in successful cloud adoption have to with do the following three issues: security concerns; service level agreements; and legacy application considerations.

"What we see most with our customers, especially government, is they struggle with what data to put in the cloud – and what data to not put there," explained Campbell. "They have sensitivities and regulations they need to deal with. An example is health and patient data – how much of that can really be on a public cloud? How much needs to be on a private cloud? Is hybrid the right approach for data there? It can be a struggle to figure it out. It also can differ from agency to agency. What's appropriate for one may not be for another."

Service level agreements provide another obstacle for those looking to move to the cloud. Campbell explained that many of ViON's customers are trying to put better metrics around service level agreements that focus less on potential outage time and more about the cost of doing business right.

"It's all about what does an outage really do to a customer and how do they recoup it on the back side, not necessarily monetarily, but more in time purposes," Campbell said. "They need to be providing consistent connectivity to their end users and this needs to be discussed in carefully considered service level agreements."

Finally, Campbell said that legacy applications can be another significant issue for the government.

"As we see our customers start to be more open to moving to cloud, they're starting to really get hamstrung by these legacy applications that weren't originally able to be virtualized," said Campbell. "So now they're really putting a much bigger focus on virtualizing those top applications. That means we're seeing a lot of app modernization, which really falls into the rationalization piece.

Campbell recommended that agencies ask themselves the following questions: How do I look at my applications? What are they doing? How do I modernize them? And when I modernize them, are they going be web ready and cloud enabled?

In order to navigate these myriad challenges and become truly successful in moving to the cloud, Campbell said an important tactic is to make sure to partner with the right vendor who understands the potential risks and help you navigate the process, end-to-end.

As well as the right vendor, Campbell encouraged the public sector to look more closely at the hybrid cloud option.

"Many of our customers are really starting to see the hybrid cloud approach being the best of all worlds," Campbell noted. "It gives them much more granular control, while also preserving the capability that is easy to manage and easy to maintain and very cost effective. It helps those who are asking about the cloud, how do I look at it from just the cost perspective, and also how do I bridge in the access and availability of my applications and the data."

A final important note of advice? Making sure you retain some control of what you're doing with your cloud strategy with an agile and flexible cloud solution.

"ViON really wants to ensure that customers have multiple paths when it comes to cloud technology," Campbell explained. "It's important to be agile for a continuity of operations environment in more of a public setting, while, still putting some big security safeguards around it."

The right cloud solution delivers flexibility, options and value, Campbell added. The flexibility is especially important.

"It's really architecting solutions to give you multiple path resiliency," said Campbell. "But you also need to give your applications that multipath resiliency as well."

Added Campbell, "When you're looking at implementing cloud, putting all your eggs in one basket might not necessarily be the best strategy. Having the ability to move or add capability with new and emerging technologies is a big piece. It's really thinking about, how do you look at the bigger, broader architecture, versus just looking at what's right for you right now."

Considering the items above, said Campbell, are necessary – and helpful for anybody looking at cloud technology, no matter what stage of your implementation you are at.

Four Ways Cloud is Changing State and Local Government

TAKEAWAY:
A shared cloud marketplace creates more opportunities for small state and local governments to be able to take advantage of the technology easily.

OAKLAND COUNTY

OAKLAND COUNTY, MICH.

This large county northwest of Detroit is sharing services with smaller governments based on the belief that a rising tide lifts all boats.

Situated in the southeast portion of the state, Oakland County is home to 62 municipalities — and the **G2G Cloud Solutions Initiative**, which shares services with other small governments to eliminate obstacles to procurement.

The county has been delivering shared services since the late 1960s, so when cloud computing emerged, officials saw it as another platform and set of infrastructure tools to deliver services. Thus, the initiative was born.

"Now, the problem you have when you do that, is governments don't like other governments' names on their technology," said Phil Bertolini, county CIO since 2005. "So, we created the brand, **G2G Cloud Solutions** [about five years ago], and the **G2G Marketplace** [last September]. We created those brands, so it wasn't just stamped with 'Oakland County' all over it. And that's important because there's an identity issue. So when we do online payments and over-the-counter payments for people, we brand it with their look and feel and their logos and everything. The engine underneath is what we're using."

The county has nearly 40 partners so far. It provides technology through an inter-local government agreement, partners use it and everyone shares the revenue. In 2014, it transacted about $18 million, and Bertolini expects that number to hit $20 million this year.

"Some midsize to small governments struggle going through the procurement process because it's so cumbersome," he said. "Why do small governments not use big technologies? And that's because they can't afford the initial capital expense and then the ongoing operating expense. But what if they could simply consume the technology? Not have to own it, not have to operate it, but simply just consume it? And so what we did is created the marketplace."

People can work directly with the vendors in the marketplace and know that all the terms and conditions are set and the contract has been vetted. "We're actually using many of those solutions ourselves," Bertolini added.

Also available in the marketplace are documents on best practices in a number of categories, such as cybersecurity, geographic information systems (GIS) and IT governance — information that smaller governments might not have access to — and a free IT assessment tool to help smaller governments understand and prioritize IT issues.

To do all this, Bertolini and his team have worked with the Center for Digital Government and the National Association of Counties, which have helped him connect with CIOs nationwide and explore their challenges.

"I think it's incumbent upon larger government that has resources to help the smaller versions of government, because if we don't help them, then we're all going to have issues longer-term," he said. "I've always said, from the very beginning of this project, it has to be a win, win, win. And what I mean by that is, one, the small government or the midsized government is going to have the availability of technologies they wouldn't normally have the opportunity to use. Second, we win because as we get more people using these technologies, it drives our cost down. We can't make a profit because we're government, but what we can do is we can drive our costs for technology down, which is a savings to the taxpayer. So we're doing that. And then the third win is to the private sector. So the private sector is going to be able to get to a marketplace that was very difficult for them."

KING COUNTY

TAKEAWAY: ***Cost savings for cloud is great, but one real benefit is letting staff work from anywhere.***

KING COUNTY, WASH.

A centralized IT department's enterprise solutions are saving the county hundreds of thousands of dollars a year — and counting.

King County's Department of IT (KCIT) was formalized in 2011 to provide standardized IT services for the county. One big issue it tackled right away was infrastructure co-location. Previously, departments had data closets for multitudes of servers, which KCIT then consolidated into a state-of-the-art data center with a capacity for 1,400 physical servers.

The data center footprint was then further reduced by implementing an internal cloud known as a standard virtual environment (SVE) that can pack the workload of more than 30 virtual servers on one physical server, increasing the capacity of the data center to 40,000 servers. King County's SVE not only provides increased capacity, but utilization as well.

"If you look at a server and see how often it's used on a day, it might be used maybe 10 percent of the time throughout the day," said Bob Micielli, IT Enterprise Manager at KCIT. "Now we can leverage those resources and move them all together into one environment. Now we can achieve 50 [percent], 60 percent utilization, and that in turn helps us drag down the cost. So, our cost per unit goes down."

As a result, KCIT reduced its server service rates by about 20 percent in 2014, a trend Micielli expects to continue as the customer adoption rate increases.

In another money-saving move, KCIT recently set up a cloud-based customer relationship management tool for unified management of constituent correspondence. Nine agencies are using this tool specifically to track public records requests. If each had bought its own, the cost would have been about $360,000, said Terra Milles, KCIT's Communication Director. Instead, they implemented the enterprise version for about $100,000.

That kind of success has helped build momentum around cloud in the county, she said. "If we have these solid foundational tools, then help our customers understand how to leverage them, it's really a win for everybody," Milles said. "Our goal is to partner with our customers to provide the best IT solutions for their business needs. Some people don't yet understand the cloud, and we can break it down for them so they can see real benefits."

Next up for KCIT cloud offerings is backups, which Micielli expects will save $1 million this year.

"We're eliminating our backup solution that's on premise, and we can eliminate also the use of tapes," he said. "Instead of backing it up to tape and dealing with all the manual intensive labor that's involved with that, we're going to automate it, and actually back up our data to the cloud."

In addition to cloud's cost-saving opportunities, availability cloud is also a huge draw. When a tape drive failed on Thanksgiving Day 2014, workers had to go to the data center to fix the problem. "It took them pretty much all day before they could get a vendor in-house to actually replace the tape unit and put it back out," Micielli said.

Cloud will also automate the operation so that when customers need to restore data, KCIT no longer needs to call the off-site vendor storing the tapes, get the tape needed, drive it to the office and finally restore it. "Now the data will be available online 24/7," he said.

So far, his team has migrated about 240 of 400 environments that KCIT backs up. He hopes to have the remaining half done by mid-April. Meanwhile, last month, the office kicked off a couple proofs of concepts for applications in the cloud.

INTERVIEW

The Simplicity of the Software-Defined Network

An interview with Scott Ormiston, Director of Solutions Architecture, Business Development, Affigent, and Andy Ramsey, Account Manager, Juniper Networks

Today, the public sector is seeking solutions to its networking challenges. Organizations want their networks to adjust and respond dynamically, based on their policies, and they want those policies to be automated so that they can reduce the manual work and personnel cost of running these networks.

Public sector IT also needs to quickly deploy and run new applications within and on top of their networks so that they can deliver results to citizens. And they want to do this in a way that allows them to introduce these new capabilities without disrupting their mission.

The software-defined network (SDN) is a solution to these challenges. But as popular as it's been lately, it's still somewhat shrouded in misconception. To demystify the topic, GovLoop sat down with Scott Ormiston, Director of Solutions Architecture, Business Development at Affigent, and Andy Ramsey, Account Manager at Juniper Networks, to discuss SDN's benefits for the public sector – and how you can implement an SDN at your organization.

"The software defined network at a high level is the ability to enable automation of applications in the network," Ormiston explained. "It allows the applications to become mobile, and to be available where the user needs them by enabling integration between changes at the application level. So it's really about providing automation and simplifying the provision of new capabilities and new applications."

Ramsey added that one of the reasons the SDN is helpful to the public sector is that today the public sector needs to do more with less – and the SDN helps them do that with the automation of workflows.

"Today, many workflows are being done manually by various teams: the applications teams, the system administrator teams, the network teams, and the security teams," Ramsey said. "So, turning up new services or changing services requires a lot of manual complex interactions between different teams, which inhibits the ability for turning up and changing those new services. The SDN takes on many of these tasks and frees up your team to focus on other mission-critical projects."

Another benefit in using an SDN? It's all about the simplicity, said Ormiston.

According to Ormiston, SDN enables simplicity for both the end user and the network administrators in different ways.

"The SDN simplifies things for the end user by making locations irrelevant," he said. "They no longer have to worry about where's the datacenter or storage located, or where are servers that can handle my workload."

As for the network administrations, SDN simplifies their job significantly from the standpoint of what they're doing today where they have to constantly adjust the network to changes based on customer needs.

"Imagine someone running a network that covers 50 or one hundred sites, which would be a small agency in the U.S. government. If they make a change to the back of the network and the customer needs to make a certain server set in the datacenter available to all the remote offices, they may have to log into 50 or one hundred network devices, and make manual configuration changes," explained Ormiston. " Today you can simplify that workload significantly by automating with SDN."

If you're getting ready to make the switch to an SDN, Ramsey and Ormiston said there are three critical steps you need to first take.

A good logical first step, Ramsey explained, is to enable Ethernet VPNs at the Datacenter Interconnects.

"EVPN supports virtual machine mobility between datacenters and provides a great deal of automation by itself. It understands when a virtualized application is born or if it moves, and can provide that intelligence out to the entire network via standard protocols. It's also very helpful for stitching the existing environment to new environments based on SDN," Ramsey said.

Ormiston added on: "Step two is to assess what you have and what you want to accomplish, and then pick the solution that's the best fit for you.

The third step is to deploy it in a systematic fashion, making sure your people are trained and have the expertise so that they can take advantage of the new technology you're delivering."

Ramsey offered this final piece of advice: "You may not think you're ready for SDN today but you should be, at the very least, incorporating automation capability and the ability to integrate with orchestration tools into your technology selection process."

TAKEAWAY: Commoditization is something to consider when looking at cloud, because commercial opportunities may end up being your best bet.

MISSISSIPPI

THE STATE OF MISSISSIPPI

Commoditization is driving this Southern state to explore its options in the cloud.

The takeaway? Commoditization is something to consider when looking at cloud, because commercial opportunities may end up being your best bet.

Mississippi CIO Craig Orgeron says his state is in the same position as many others when it comes to cloud — trying to figure out how to make the technology another tool in their toolboxes.

"How do we take that next step? What would be something we could consider?" Orgeron said. "Those are the things that you start churning through: data proliferation; data storage; how can we aggregate as much volume as we possibly can to get the best possible unit price? Those kinds of things, I think, open the door."

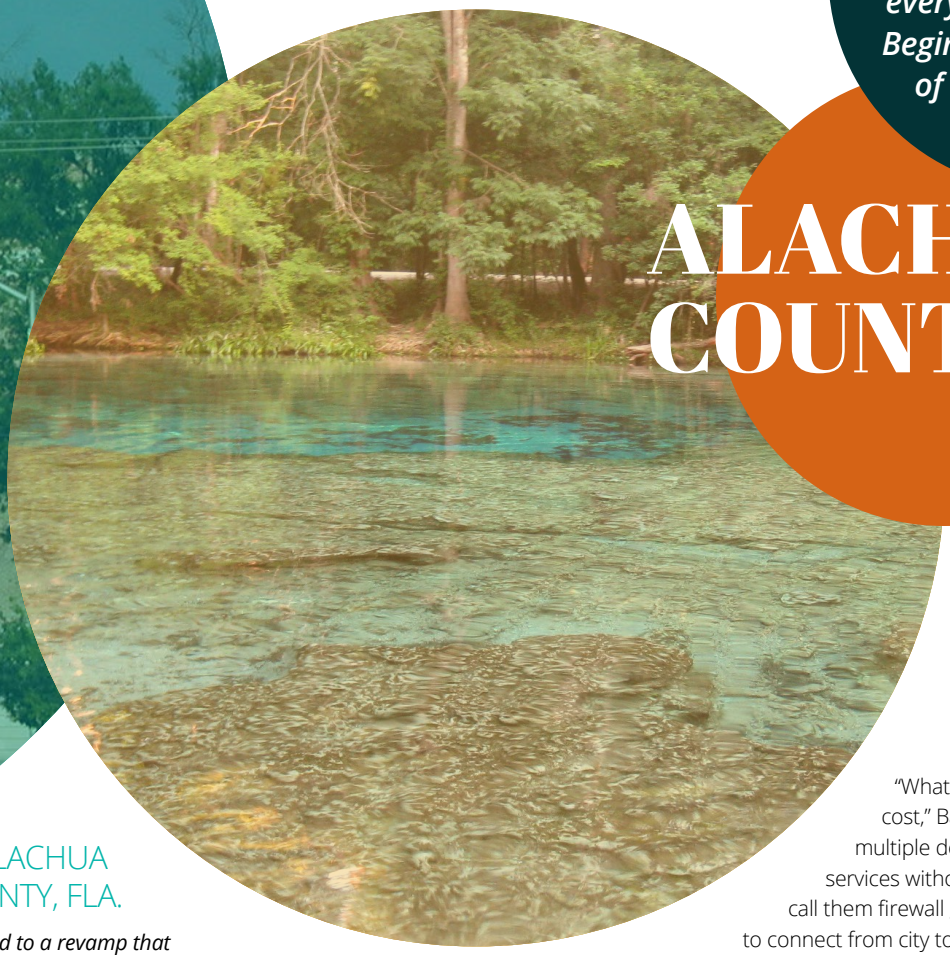
Topping his list for cloud are e-mail, Backup as a Service and disaster recovery.

What makes those optimal for the cloud? "Commoditization," Orgeron said. Particularly with e-mail, soon governments "may not have a choice in how some of that stuff is licensed and run ...This may not exactly be the same analogy, but if I have my iPhone, I don't really have a say where iCloud is. But if I want the service, I'm going to use it."

Mississippi has been using its state-owned cloud environment for years, but commoditization is pushing Orgeron and his team to look at commercial opportunities. As examples, they've studied California's CalCloud, a setup in which a company manages the pool of IT resources, and Texas' approach, which, as Orgeron describes it, "I call it a sushi menu of just 'here's a bunch of providers that can provide cloud; go and do it.'"

"Cloud presents just this ultimate commoditization of computer storage and network, and you're just going to buy all these things by the drink," Orgeron said. "We don't know of a lot of states that are doing that. A lot of the states and other companies seem to be very strategic in not moving forward with their primary mission-critical systems, but looking at what systems or what platforms are commoditizing."

That may change one day, however, he added, as companies stop offering on-premise products, a trend he already sees in niche lines of business. "It's: 'If you want this solution, it's a SaaS-oriented solution out of the box,'" Orgeron said. "And I think states are going be grappling with that."



TAKEAWAY:
If you're just starting out with cloud, don't feel the need to move everything all at once. Begin with a small test of data — then go from there.

ALACHUA COUNTY

ALACHUA COUNTY, FLA.

An IT snafu led to a revamp that made cloud the hero in this county of about 250,000 residents.

After an incident with an IT employee started an unfortunate chain of events — including sending servers down for a week and wiping out passwords — Bob Bates, Executive Director of GIS, Technology and Support Services for the Alachua County Property Appraiser's Office, started looking at alternative options. His requirements included reliability, scalability, cost effectiveness and security, and he found what he was looking for in a commercial cloud provider.

Bates tested the waters by moving backups of GIS data to the cloud. "It was working so well that we decided to move all the GIS data in the actual applications out to the cloud," he said.

That included hosting a commercial license manager to provide a license pool in the cloud, Bates said, because the office oversees a GIS service center that has almost 400 users from departments in the county and several cities.

"What it's enabled us to do is save on cost," Bates said of cloud. "Since we oversee multiple departments, it's allowed us to provide services without going to their IT people, and to — I call them firewall gods — that allow or will not allow you to connect from city to county agency. This way, when it's in the cloud, they can go directly to the cloud and get the data."

In the first year, the bill for server and associated costs dropped from $220,587 to $4,800. The costs have risen since then because he's added more servers and services to the cloud. For instance, Bates pushed all operations that involve the Internet to the cloud; the File Transfer Protocol site; large datasets, including 12 years of aerial photography; a disaster assessment application and many web applications. Next year, he plans to move e-mail and an appraisal system to the cloud, too.

It's the way of the future, he said in **a blog post on ControlCam** in February 2015. "In the future, cloud computing will be even more mainstream than it is today," he wrote. "It will be more of a default for many systems. Just as buying and collecting music, CDs are phasing out, books, movies (DVDs), and software will no longer be a disk in your hand but rather a link on the Internet."

INTERVIEW

Proactively Monitor, Manage, and Optimize

An interview with Bhaskar Sunkara, CTO & SVP of Product Management at AppDynamics

Today, government is more and more about user interactions. The citizen is no longer seen as just a citizen — the trend is now to view anybody engaging with government as a customer. More than ever, constituents are expecting the same level of digital interaction and application performance from the government that they are provided with by the private sector.

When a government application is performing well, what the user does not see is the back end of that application — the complex software environment, the millions of lines of code, and intra agency dependencies. The only thing they'll notice is if their interaction is slow or fails — and a poor interaction will lead them to expect poor performance in the future.

That's why it's important to invest in application performance management (APM). To learn more about this critical service, GovLoop sat down with Bhaskar Sunkara, CTO & SVP of Product Management at AppDynamics, a leader in application intelligence that provides operational insights into application performance, user experience, and mission outcomes of production software applications.

The AppDynamics Application Intelligence Platform uniquely delivers:

- Complete visibility into all user interactions and transaction flows across highly distributed, complex, and dynamic application environments, using the business transaction as the unit of management.
- A self-configuring, self-learning, and low-overhead platform that simplifies monitoring and improves decision-making, all in real time in the production environment.
- An integrated platform that scales in the most extreme production environments whether in the cloud or in private data centers.

"With the growth of cross-agency initiatives and cloud migration in the public sector today, application performance management is especially critical. In every public sector initiative, making sure that the key applications that are required to accomplish the mission are not impacted is what we do," said Sunkara.

Visibility into application performance becomes even more important when you have an application that's deployed on the cloud. Some agencies and departments are used to managing their own applications in their own datacenters, which gives them more control in terms of what those machines are doing and how they are performing. But once you go to the cloud, you are using hardware and software resources that someone else is essentially hosting for you and they're just being delivered as a service to you.

"There's always going to be some risk in cloud deployment or the data center transformation — but with any risk associated with those types of business initiatives, we eliminate or minimize that risk by keeping the application performance at a high level, and the availability at a high level, and the end user experience at a high level."

"So the dynamics of performance completely change, and visibility for you to be able to look at that cloud performance, and manage it, is hugely important," said Sunkara. "Another thing that you value when you're running on the cloud is capacity, because one of the great things the cloud brings to you is the ability to use only as much as you need. So that means visibility in terms of how much are you using, and is it optimal in terms of the resources you're consuming?"

The Application Intelligence Platform that AppDynamics provides let you monitor and manage your critical cloud-based applications, ensure application performance pre- and post-cloud migration, and visualize the performance of your cloud application in real-time. Additionally, it requires no hardware to access the network – and the company is currently in the process of becoming FedRAMP certified.

In the end, Sunkara said, good Application Performance Management comes down to people.

"The monitoring we do is not just about the cloud, it's also about culture," he said. "People, our customers, are involved in monitoring the application. It can be a very personal thing, and we want to help people to do that monitoring job well."

AppDynamics delivers a comprehensive solution — the Application Intelligence Platform — to help companies maximize business performance. The platform embraces three key principles:

- **See** everything with Unified Monitoring.
  - » Enabling an integrated view of real-time application performance, user experience, and infrastructure capacity.
- **Act** fast with DevOps Collaboration.
  - » Uniting teams through a shared, unified view of data for faster, more effective decision-making, rapid problem resolution, and automation workflows.
- **Know** the business impact with Application Analytics.
  - » Empowering deep, real-time analytics to help businesses make better decisions and create bigger impact — all with certainty and confidence.

It's all designed to give government agencies the certainty that their applications are running at their best; to give IT people the operational visibility and control they need; and to give constituents the great experiences they demand.

Cues From Abroad

Although the United States is a leader in technology, it's not alone in taking advantage of cloud's benefits. Here are some other countries that could serve as examples:

THE UNITED KINGDOM

The **Digital Marketplace**, previously CloudStore, lets public-sector organizations find and compare cloud-based services they can use via the **G-Cloud framework**, an agreement with vendors about the terms and conditions under which purchases can be made.

ZOTTEGEM, BELGIUM

This city of 25,000 residents needed a better way to deliver services via its messaging infrastructure and opted for a **commercial cloud-based messaging, productivity and collaboration service**. The result is six more hours a week that the tiny IT team can devote to other tasks.

AUSTRALIA

In recognition of cloud's potential, the government released the **Cloud Computing Regulatory Stock Take** on May 21, 2014, "to provide consumers with confidence and industry with certainty about the regulatory arrangements that apply to cloud computing." This follows the **National Cloud Computing Strategy** that came out in 2013.

TIPS FOR CLOUD MIGRATION

Feeling inspired after reading about these innovative initiatives? Here are some **tips for getting started with cloud**, according to the CIO Council:

1. First, learn about the benefits of cloud computing and the different ways agencies have used it.

2. Second, assess your current and future IT needs. Does your road map include capabilities your current IT portfolio can't meet or maintain? Are there any systems coming to the end of their life cycle?

3. Finally, evaluate the current cloud-computing environment. Are the agency, personnel, computing systems and cloud market-ready for you to make the move?

Once you decide to use cloud, you have to figure out what IT systems are good candidates for it. **Cio.cloud.gov recommends** the following:

- Social media
- Business applications
- Productivity applications
- E-mail
- Agile infrastructure
- Website hosting
- Storage

CONCLUSION

What's Next for Cloud?

Overall, cloud has come a long way, and all the experts we consulted agree that it's becoming easier and also more imperative to use.

"It's getting better understood, the agreements are getting better, the relationships between government and industry are getting better," said the Center for Digital Government's Sander. "There's probably some aspect of this that is appropriate for a jurisdiction of any size and complexity. So, I'm pretty bullish on the whole thing at this point."

"I think in 2015 you're going to continue to see agencies in the federal government and state government and in local government continue to move [to cloud] more and more," added Meridian Health Plan's Takai. "I think the other thing that we're going to see at the state government, at the federal government level, are what I call different kinds of clouds, because there's different ways to look at how you do cloud services."

One way is to buy them outright from a cloud services provider (CSP). The second kind of cloud is one that an entity stands up and runs internally and offers as a service within government. "The third thing I think we're going to see is the way that the CIA's done it, which is that basically they have contracted with an outside company, but that company comes in and runs the cloud on their premise," she said.

Last summer, the CIA announced that a commercial cloud provider will service all 17 agencies in the intelligence community. As a result, they "will be able to order a variety of on-demand computing and analytic services from the CIA and National Security Agency" for the first time, according to **an article** in The Atlantic.

To help this growth along, the sharing of best practices and case studies needs to increase among government agencies. As TechAmerica's Logsdon observed, "If there is a best practice from a particular agency, perhaps somebody that was on the federal agency team that helped implement that particular cloud product or service could do a short six-month stint at another agency to help bring on their cloud services, and vice versa." He added, "Also, there needs to be a way to capture these best practices and case studies. I don't know if something like this could exist, but perhaps [there could be] a federal agency cloud wiki that would have the requisite security control so that people couldn't hack into it, but so that the federal agencies could, in a secure atmosphere, share best practices and case studies."

The forecast is clear: Cloud is here to stay. It's not a one-size-fits-all solution, but its customizability is part of its charm. Governments recognize that there are still kinks to work out, but the effort to address them is worth it. Cloud may not be an IT silver bullet, but it has advantages that the public sector literally can't afford to ignore.

THE CASE FOR CLOUD

Looking to get cloud off the ground at your agency, but not sure what to say to managers about it? Try this summary from the Air Force's Rudolph: "We can't afford not to go, and we're going to go, and we need to transform, and we can transform willingly, proactively and help shape our destiny, or we'll just be caught without the required capability and doing a disservice to our customer."

INTERVIEW

Protecting Your Data in a Hybrid Cloud Environment

An interview with Alan Dare, District Manger, USPS Cloud, NetApp

Today's IT organizations are all under incredible pressure to respond to a variety of different business and citizen needs – and as a result there's hope that moving towards a hybrid delivery model for cloud will enable them to be more responsive. Ideally, this hybrid cloud solution can simultaneously help reduce costs and provide more flexibility to public sector IT.

But at the same time, there is a lot of concern around security and maintaining stewardship of the data that lives in a hybrid cloud. To discuss some best practices for maintaining visibility into what is going on with your data when operating in a hybrid environment, GovLoop sat down with Alan Dare, District Manger, USPS Cloud, NetApp.

"Organizations need to feel confident that they can integrate in the public cloud and not introduce additional risk," Dare said. "Many of the traditional datacenter environments enable these IT organizations to control every single aspect of their data, from the performance, security, the protection and all the governance associated with that."

But as public sector IT reaches out to use the public cloud to augment their portfolio of services, their data is becoming more mobile. Therefore, it's exceptionally critical for the IT industry to be able to control the data that you store in hybrid cloud setting, Dare explained.

"One of the things NetApp has created is a data fabric to help our customers try to utilize the promise that the hybrid cloud brings, while also maintaining stewardship of the data," Dare said. "We developed a NetApp private storage (NPS), which is a way for storage to be owned by the customer, yet have the data exposed through hyper scalers. And what it allows the customer to do is take advantage of the compute and software features of these hyper scalers. But the organization's data doesn't reside inside the public cloud. It actually is beside the public cloud, and only in the control of the parent organization. "

What this enables an organization to do, Dare said, is fully take advantage of the cost model that hyper scalers offer, as well as maintain the steward and control of the dataset.

For organizations that are looking to continue to improve best practices around data storage and control, Dare had one main piece of advice.

"The first step to the cloud is that all organizations need to enable a data stewardship policy around their data to correctly identify what data can and cannot reside inside the public cloud, and under what restrictions data can be accessed within the public cloud," Dare said.

Having a set policy before starting the journey to utilizing the hybrid cloud environment helps an organization's IT staff target candidate datasets and processes that can easily make the transition to cloud, and others that can't, or require higher levels of security or review.

"Many organizations fail to create data policies before jumping to the cloud, which causes delays in implementation or fractured cloud implementation," Dare said. "An organization's data policy should be the first step in contemplating utilizing a hybrid cloud solution."

Finally, Dare said that another movement gaining ground for utilizing cloud in many public sector IT departments is using cloud as disaster recovering and continuing operations.

"The cloud can really help both organizations that either have no disaster recovery backup plans, or are really advanced in their strategy," Dare said. "For organizations that have limited disaster recovery, the cloud offers the ability to provide offsite backup, without a substantial capex investment. Datasets can be mirrored offsite and tested in the cloud."

Dare went on to explain how NetApp can help with disaster recovery via use of their application called SteelStore.

"We can drop SteelStore into a customer's site, and without any significant changes, they can do a quick backup, and the device will transparently compress, deduce, encrypt the data, and push it off into the cloud for them," Dare said. "This means if you've got data that's on premise in its physical NetApp device, we can mirror it into the cloud. So if you have a disaster, you can sail over into the cloud and have the same protocols and services that you would on site."

In short, NetApp is building a data fabric around the hybrid cloud to enable customers to move the data back and forth in any situation. By focusing on data stewardship and control of data, the public sector can succeed in a hybrid cloud environment.

Resources

RESOURCES FROM GOVERNMENT

The CIO Council's **cloud advice**

The Commerce Department's **cloud computing policy**

The Defense Department's **Cloud Computing Strategy** and "**DoD Cloud Way Forward**"

The Defense Information Systems Agency's **cloud page**

The FBI's **CJIS Cloud Computing Report**

Federal Cloud Computing Strategy

FedRAMP

General Services Administration's **Cloud IT Services**

The National Institute of Standards and Technology's **cloud page**

NIST's **cloud definition document**

NIST's **U.S. Government Cloud Computing Technology Roadmap, Volumes I and II**

Recovery.gov's **On the Road to Accountability and Transparency**

OTHER RESOURCES

The Center for Digital Government's **Digital States Performance Institute**

GovLoop's "**Tips for Managing Your Hybrid Cloud Environment**"

Government Technology's "**Best Practice Guide for Cloud and As-A-Service Procurements**"

The IJIS Institute

NASCIO's **2014 State CIO Survey**

TechAmerica's "**The Cloud Imperative**" guide for best practices in cloud for state and local governments

TechAmerica's "**Cloud Buyer's Guide for Government"**

Acknowledgments

ABOUT GOVLOOP

GovLoop's mission is to "connect government to improve government." We aim to inspire public-sector professionals by serving as the knowledge network for government. GovLoop connects more than 150,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

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