EVERYTHING-AS-A-SERVICE

How the inevitable unbundling of technology will impact the future of state and local government.
When the state of Minnesota rolled out a cloud-based set of productivity tools several years ago, it included instant messaging and video to boost communication among state agencies. In just two years, growth among active users nearly quadrupled, while the number of cross-agency messages and videos rose from 25,000 in 2012 to 376,000 by 2014. This one set of tools slashed time and money spent on business travel and meetings.

In Ohio, the implementation of a private cloud infrastructure led to the migration of nearly 5,000 servers across an array of state agencies into the state’s primary data center. When the work is completed, Ohio expects to accrue more than $100 million in software, security and operational savings.

The list of cloud strategies goes on. From Hawaii to Maine, states and localities are finding that a service-driven IT plan with cloud computing as its business model is no longer a thing of the future. It’s happening now. A large-scale shift is underway in which hardware infrastructure, platforms and software are being unbundled and moved out of government’s traditional area of operation. This reduces the dependence on data centers and customized systems, and increases the reliance on innovative technologies, many from third-party service providers.

It’s happening for different reasons, and it’s not all happening at once. But the effects will be transformative in terms of costs, benefits and overall IT operations. The shift to everything-as-a-service also will be disruptive. CIOs and their staffs will need to take on new roles while learning different skills. Procurement processes must change, while federal rules around grants that support IT need to be rewritten. Most importantly, perhaps, the metrics traditionally used to measure the effectiveness of IT will have to reflect the new world of outcome-based performance taking hold in government programs.

“It’s important that government technology leaders realize these changes are not fads.”

Ted Ross, Los Angeles CIO

“It’s important that government technology leaders realize these changes are not fads and they will not fade,” said Ted Ross, general manager and CIO for the Los Angeles Information Technology Agency. “Since 2008, government IT shops just did what was necessary to keep the lights on, while lots of innovation was taking place in the private sector. This is a good opportunity to catch up for the benefit of businesses and citizens.”
THE RISE OF THE CLOUD

Cloud is common in states

PRIVATE OR HYBRID CLOUD ADOPTION

- **23 states** have implemented enterprise cloud services (49%)
- **16 states** have deployed cloud in multiple agencies (34%)
- **39 states** have done both (83%)

*Percentages are based on responses from 47 states.*

PUBLIC CLOUD

- **12 states** have implemented enterprise cloud services (26%)
- **21 states** have deployed cloud in multiple agencies (45%)
- **33 states** have done both (70%)

How states use the cloud

CONTENT AND DOCUMENT MANAGEMENT

- **49%** in use currently
- **20%** plan to implement private cloud within 18–24 months
- **15%** plan to implement commercial cloud within 18–24 months

HEALTH APPLICATIONS

- **49%** in use currently
- **17%** plan to implement private cloud within 18–24 months
- **9%** plan to implement commercial cloud within 18–24 months
# Cloud will grow in cities and counties

<table>
<thead>
<tr>
<th>CITY</th>
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<tr>
<td><strong>0-10% in cloud</strong></td>
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<td><strong>10-20% in cloud</strong></td>
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<tr>
<td><strong>More than 50% in cloud</strong></td>
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### Percent of current systems/applications in the cloud

- **City**: 35% in use currently, 11% plan to implement private cloud within 18–24 months, 19% plan to implement commercial cloud within 18–24 months.
- **County**: 53% in use currently, 13% plan to implement private cloud within 18–24 months, 15% plan to implement commercial cloud within 18–24 months.

### Percent of systems/applications that ultimately can migrate to cloud

- **City**: 1% in use currently, 6% plan to implement private cloud within 18–24 months, 6% plan to implement commercial cloud within 18–24 months.
- **County**: 8% in use currently, 2% plan to implement private cloud within 18–24 months, 3% plan to implement commercial cloud within 18–24 months.

### BUSINESS INTELLIGENCE

- **40%** in use currently
- **15%** plan to implement private cloud within 18–24 months
- **21%** plan to implement commercial cloud within 18–24 months

### GIS SYSTEMS

- **55%** in use currently
- **15%** plan to implement private cloud within 18–24 months
- **15%** plan to implement commercial cloud within 18–24 months

*Source: 2014 Digital States Survey, 2015 Digital Counties Survey*
WHAT’S DRIVING INTEREST IN SERVICES?
GOVERNMENTS NEED TO INNOVATE

For many CIOs, the last several years have been a period of technology stagnation as budget cutbacks forced governments to reduce investments. That has led to an innovation gap within many government IT organizations as advances in private sector technology have surged.

At the same time, elected officials and senior public executives have become empowered by the consumerization of technology, including smartphones, tablets, downloadable apps and smart appliances. “They bring those expectations to work, all of which are based on everything-as-a-service in the private sector, and those expectations become pressure on us to deliver quality service,” Ross said. “Whether we want to admit it or not, we are competing with Amazon and eBay.”

THE MARKET IS MOVING TO CLOUD

The software industry is moving toward as-a-service models, whether government likes it or not. “Sometimes there are no alternatives [to cloud services],” said Craig Orgeron, CIO for Mississippi. He sees many different segments of the market moving inevitably toward services because that’s where the best economies of scale now reside. In other words, more and more of the software that governments typically purchase on a disk only will be available via the cloud. This is happening rapidly in financial, inventory and asset management systems, Orgeron said, so that by the time new versions arrive in the public sector, there’s no real conversation about where it gets hosted.

THE OLD WAY IS TOO EXPENSIVE

Traditional IT ownership demands huge investments in data centers, networks and customized software. Spending tax money on more data storage and processing systems isn’t sustainable. Nor are the costs for customized software, which tends to be expensive both to build and maintain. Everything-as-a-service brings more consistent, predictable costs. It also allows governments to introduce new services and platforms quickly without having to invest a lot of money upfront.

THE WORKFORCE IS AGING

Everyone knows the IT workforce is aging and a growing percentage is ready for retirement. Attracting new workers has become a challenge at every level of government, but perhaps more so at the local level. Many cities and counties have a thin line of experienced IT personnel. When one of them retires, it becomes extremely difficult to find and train a replacement. “That’s something we always struggle with at the municipal level,” said Bryan Sastokas, CIO for Long Beach, Calif.

Having a service provider deliver infrastructure, platforms or software is an attractive option in a tight labor market. CIOs must tread carefully with unions when considering direct cuts to the labor force through a cloud strategy, but they can implement new technologies without adding staff. What matters, according to Sastokas and other local CIOs, is that staff be given the right tools and skills to manage existing infrastructure while brokering new cloud services.

CYBER SECURITY IS GETTING HARDER

Cyber security is a priority for CIOs, but investment in resources and tools often lags behind what’s needed. Everything-as-a-service presents an opportunity to embrace new cloud architectures to strengthen cyber defenses. These security solutions can be found in public cloud applications or as extensions of security platforms that reside in the cloud, yet protect onsite resources. Cloud-based cyber security has improved in recent years, providing continuous monitoring while meeting compliance requirements for key security frameworks.
INDIANA DELIVERS BIG DATA-AS-A-SERVICE
Can big data analytics truly help government make smarter decisions with taxpayer money? The answer is a resounding “yes” in Indiana, where Hoosier state officials are tapping the technology to deliver greater transparency and insightful data-driven decisions.

To date, the biggest successes involve crunching data from disparate state agencies to reveal a deeper understanding of social issues — and spending related dollars more effectively.

“At the highest level, analytics and predictive capability are giving Indiana state government the ability to make better decisions that aren’t necessarily intuitive,” said David Matusoff, executive director of the state’s Management and Performance Hub (MPH), which oversees the effort. “It’s informing policy in a way we were never able to do previously.”

MPH began in 2014, following Gov. Mike Pence’s directive for a more effective and open government that runs like a business. Indiana partnered with SAP for its analytics platform (HANA). For its special projects, MPH can now collect data in real time by adding an analytic function to relevant state agencies’ databases — providing those divisions with analytics-as-a-service on which they can act.

**GAINING VISIBILITY**

The state initially used data analytics to unravel the decades-long mystery of why Indiana suffers one of the nation’s highest infant mortality rates. It analyzed information from many sources, such as birth rates, demographics, public health records, maltreatment information and other data. The findings revealed that mothers on Medicaid who made few prenatal doctor visits suffered vastly disproportionate losses. Today, the state is developing a smartphone app to inform new moms and encourage proper care, and is working to support ridesharing to doctor appointments.

Likewise, Indiana also took a deep analytical dive into its growing opioid drug use problem. MPH crunched data feeds related to forensics, drug deaths, treatment centers, pharmacy thefts, police data and more. The resulting dashboard features geospatial maps that let decision-makers visualize the problem by county. The ability to “see” drug use and deaths geographically helped inform decisions on where to best place five new approved drug treatment centers, and strategically allot an anti-opioid overdose drug to local police officers.

And that’s just the beginning, Matusoff said. Indiana plans to focus big data analytics on tax and social services fraud, child abuse and other problems.

**PROVIDING TRANSPARENCY**

MPH translates data collected across many state agencies as easy-to-understand bar graphs, charts and geospatial maps posted on its website. The information allows constituents to visualize spending and efforts on the state’s public pension program or efforts to attract new business.

Over the next two years, look for MPH to expand to become a “true data hub” that makes available the vast majority of state agencies’ data sets, said Matusoff.

He also envisions partnerships with other states that experience similar problems, and eventually to provide data-as-a-service to universities, researchers and industry.
WHAT GETS UNBUNDLED?

Infrastructure-as-a-Service

Everything-as-a-service starts at the bottom layer of IT. Many governments migrate to infrastructure-as-a-service through a private or hybrid cloud model where hardware, storage, networks and commodity software can be shared. The result is a resource that is scalable and available on demand to meet peak needs when necessary.

**OHIO** » In fiscal years 2012-2014, the state shifted more than 40 percent of its infrastructure spending (hardware, networks and data centers) toward investments in the missions of state agencies and their delivery of services to citizens and businesses. It did this by constructing a private cloud for infrastructure, using virtualized servers that helped reduce its hardware needs significantly. The state also is consolidating its networks into a cloud to reduce costs.

**FAIRFAX COUNTY, VA** » The county first considered a private cloud infrastructure in 2010. Since then, Fairfax has gone from having a consolidated base infrastructure to adding other technologies, from enterprise data backup and recovery to mirroring, clustering and centralized management tools. As a result, the county has created a dynamic data center that delivers value to its agencies without the need for any independent infrastructure.

**OAKLAND, CA** » The city police department began piloting cloud-based storage last year for body-worn camera video. City officials told *Government Technology* that 600 officer-worn cameras were generating almost 7 terabytes a month of video, overwhelming onsite storage resources. The cloud-based storage platform — designed to comply with the FBI’s requirements for protecting public safety data — will give Oakland police almost unlimited capacity to store body camera video.

**MELROSE, MA** » Several towns in eastern Massachusetts have banded together to share infrastructure. Starting in 2011, the town of Melrose contracted with the nearby town of Essex to provide it with server capacity. Since then, other towns have joined the multi-tenant infrastructure service.
Platform- and Software-as-a-Service

After infrastructure-as-a-service, the next phase has been to look at platforms and software applications that can be used as a service rather than owned. For example, the use of cloud-based office productivity tools has taken off in recent years. Similarly, platforms for services — such as data management, security management, mobile management and web management — have emerged in state and local government. Using the cloud model, platform-as-a-service allows government organizations to support key IT services in dynamic ways, offering the same rapid launch and scalability that has made infrastructure-as-a-service popular.

MARYLAND PARKS » The Maryland-National Capital Park and Planning Commission adopted a hosted workforce management system a few years ago. The commission administers parks and planning in Maryland’s Montgomery and Prince George’s counties, managing more than 52,000 acres of parkland, trails and open space, and employing nearly 2,000 workers. The commission expects to cut the workforce management system’s operating costs 26 percent over 5 years by moving to the cloud.

IOWA » Iowa Workforce Development (IWD) uses a cloud-based data analytics service to spot fraudulent unemployment compensation claims. The solution uses publicly available data sets in conjunction with IWD data to generate leads for fraud investigators. “Because it’s a service, we’re not responsible for the hardware or the software — we simply provide the data … and they analyze it and send us back results in a dashboard fashion,” IWD CIO Gary Bateman told Government Technology. “It’s easy to use but didn’t require significant capital outlay to get it started or for maintenance.”

Business Process-as-a-Service

Just as important, but still in the early stages, is the idea of managing entire business processes as a shared service, such as budgeting, finance, procurement, Medicaid, public safety and transportation. As the cloud matures in the public sector, experts say entire business processes could benefit from the new computing model.

WYOMING » Wyoming has one of the smallest Medicaid enrollments among states, but still faced a price tag of $50 million to more than $150 million for a traditional on-site Medicaid management information system (MMIS). The state is now poised to become the first in the nation to switch to a services model for its MMIS. This cloud-based approach will allow the state to purchase the services it needs without paying for the assets and resources of an on-premises solution.
CLOUD STRATEGY PREPARES VIRGINIA FOR THE FUTURE
With a rich colonial history, and its reputation as a premiere sports and recreation destination, Henrico County, Va., has experienced significant growth in recent years.

But with that swell in population and tourism, the county’s aging IT systems could no longer support the 180 applications its divisions relied on to serve a growing constituency. Hardware outages, application downtime, always full email inboxes and other interruptions led to unhappy employees and external customers.

“Service reliability was not high, and when applications go offline, work grinds to a halt,” said Brian Viscuso, an IT project lead for the county. “We wanted to provide a steady quality of service across the enterprise.”

To manage those growing pains, the county modernized its infrastructure using next-generation clustered data storage, allowing flexible and scalable management and backup of ever increasing amounts of data — all within a private cloud.

**MODERNIZING WITHOUT DOWNTIME**

The new systems needed to handle twice the county’s normal peak load, shoulder potential spikes during special events, and extend its on-premises data and workloads to a private cloud. The county also desired a solution that would accelerate its longer-term cloud strategy to potentially use hybrid and public clouds.

Equally important, Viscuso’s team wanted to minimize application downtime during the migration.

NetApp’s clustered Data ONTAP next-generation solution solved the problem. Throughout the upgrade, the NetApp solution made it “very easy to move and balance workloads, and shift storage to a higher tier, so applications wouldn’t need to be brought down during upgrades,” said Viscuso, who managed the modernization effort.

Once completed in June 2015, the upgrade became a game changer for end users. Today, all departments enjoy superior performance and availability of the applications on which they rely.

**DELIVERING ON THE FLY**

Viscuso’s team can also now immediately “spin up” new servers, storage and other IT resources as needed. “Filling a server request previously took one to two weeks or longer,” he said. “Now, we can virtually deploy new systems in a matter of hours or less. So we’re now enabling business.”

When the county’s Recreation & Parks Department updated a computerized sprinkler controller, for example, Viscuso’s team delivered the required computing power within 45 minutes. “The only problem is that they now expect you to do it in a day,” he laughed.

**ENSURING UNDISRUPTED PUBLIC SAFETY**

During special county events, such as two annual NASCAR races that each attracts an additional 150,000 visitors, the IT department can ensure uninterrupted public safety services.

In summer 2015, Henrico County co-hosted a 9-day international cycling event that attracted more than 600,000 visitors. Public safety requests spiked to 100 times the usual levels. With the ability to quickly add capacity, the new system successfully shouldered the load on systems that, for example, monitor the location of every police officer or firefighter, their cars and equipment in real time.

Henrico County’s IT modernization using cluster data storage at its core should serve it well for years to come. “Everything talks to storage, so it’s very important that we have an agile, versatile platform as a core, and with NetApp clustered Data ONTAP, we can build upon that,” Viscuso said.
WHAT ARE THE RAMIFICATIONS?
Global spending on everything-as-a-service is growing fast — nearly 20 percent per year, according to research firm IDC. As spending increases, so does the innovation and diversity of services that will be available to government. The ability to access low-cost, innovative hosted software and platforms quickly is transforming IT in government. For small governments, the cloud provides a quick on ramp to new applications. For larger governments that are used to building their own applications, the cloud model can be a springboard for standardizing and streamlining development.

But everything-as-a-service will have ramifications beyond speed, diversity and innovation. It will impact the entire spectrum of IT operations in government, from the data center and governance to procurement and the workforce. Here’s what CIOs need to know.

**DATA CENTERS WILL SHRINK**

While it’s too soon to declare the data center dead, it’s clear that changes are underway in terms of its use and purpose. The capacity and role of the government data center is diminishing, thanks to the unbundling of infrastructure, platforms and software. As time goes on, a portion of non-critical (and some mission-critical) applications will migrate to the commercial cloud where they will be consumed directly by departments, agencies and constituents.

Servers will be unplugged as demand for hardware declines. This trend is reflected in NASCIO’s 2015 survey where only 2 percent of state CIOs said they planned to build new data centers. In addition, the percentage of states with multiple data centers dropped to 53 percent in 2015 from 58 percent in 2010.

So far, state and local governments are adopting a hybrid approach that mixes cloud services with on-site resources. “Hybrid allows for the most flexibility,” said Jennifer Grutzius, director of the state and local government council at CompTIA, a nonprofit trade association for the IT industry. “It allows government to have control over the cloud while sharing some of the workflow burden.”

But there’s also a cost factor to building a hybrid cloud. Some workloads are less expensive to run on premises than in the cloud, noted Los Angeles’ Ross. The key is having a flexible architecture that allows an IT organization to manage workloads, moving from on-site computing to a cloud vendor quickly, and vice versa, as needs, costs and requirements change. Ross believes Los Angeles will reach a 50-50 ratio between cloud and on-premises computing in the next 3 to 5 years.
CENTRALIZATION MIGHT FRACTURE

Will the move toward services lead to a more decentralized IT operation within state and local government? Perhaps.

TRADITIONAL IT
Trend toward centralization to reduce costs

VS.
EVERYTHING-AS-A-SERVICE
The services-driven unbuilding of technology may drive decentralization

Since the millennium, the focus for CIOs has been on centralization and consolidation. In 2015, 64 percent of states owned and operated a consolidated data center, up from 55 percent in 2010, according to NASCIO’s annual survey. But the unbundling of technology through a services-centric approach could undo that progress, with multiple agencies engaging with multiple service providers.

CIOs and their organizations will need thoughtful governance strategies around the cloud that balance innovation and enterprise vision.

“It’s definitely more of a distributed model because we’re looking at multiple providers that may not be on-prem,” said Long Beach’s Sastokas. But a different look and smaller data center doesn’t necessarily mean a diminished role for the IT organization. “We may change our complexion on how we look as a department,” said Sastokas, “but I think fundamentally the services we supply will still be perceived as coming from a centralized organization.”

THE CIO BECOMES A BROKER

Everything-as-a-service will change the job of CIOs and their organizations. As CIOs reduce their ownership and operation of data centers and IT assets, they will become brokers for IT services. In many cases, the job also will demand less raw technical knowledge and more leadership, communication and business savvy.

TRADITIONAL IT
CIOs build and run systems

VS.
EVERYTHING-AS-A-SERVICE
CIOs broker and manage services

If brokering is the future function of CIOs, the challenge will be figuring out what mix of services to provide from vendors and what proportion of assets are owned by government. “I don’t have an issue with who is providing the solution,” said Sastokas. “My goal is ensuring it’s meeting the needs of our customers and that I can point it to whichever provider or whatever solution, as long as it meets the necessary requirements.”

As CIOs hand off the operation of infrastructure and systems to cloud providers, they’ll need to shift their attention toward strengthening business processes and program outcomes. “CIOs should focus on improving government, having the big picture and serving citizens in the most cost-effective and helpful way possible,” Grutzius said. “It’s a different role that requires different skills.”

Indeed, expectations on IT aren’t just increasing on a yearly basis, they’re evolving. “It’s not just about delivering a service, it’s about delivering a service in a way that people can have a low barrier of entrance,” said Ross.

The good news is that with everything-as-a-service, CIOs don’t need to spend a lot of money to introduce a new service or reintroduce a better version of one that existed as a legacy desktop application. The CIO’s job is to make sure the service is flexible, integrated and scalable. That means the focus (and the related skills) has to be on application program interfaces (APIs), interconnectivity and integration between systems. “The services no longer have to be big,” added Ross. “They have to be effective, engaging and fast.”

YOUR DEPARTMENT’S REVENUE COULD DROP

The shift from systems to services will upset traditional IT funding models. Many IT departments have supported themselves through fees charged to agencies for data center computing. Almost a third of state CIOs surveyed by NASCIO in 2015 expected overall revenue to drop...
as a result of the swing toward everything-as-a-service. At the same time, they expected growth in broker-managed services to create additional administrative costs that will have to be captured through new fees. According to NASCIO, “To address these revenue challenges, some CIOs saw a potential need to increase other fees to cover fixed asset (e.g. data centers) costs that would be spread across fewer users. They also saw the potential for pressure to reduce the fixed asset footprint to match the adjusted level of revenue that would be coming into the organization.”

**TRADITIONAL IT**

IT departments supported by data center fees

**VS.**

**EVERYTHING AS A SERVICE**

Shrinking revenue from on-site computing

**PERFORMANCE WILL BE MEASURED DIFFERENTLY**

As everything-as-a-service grows, CIOs also expect to see a change in how their performance is measured. Instead of relying on traditional output metrics, the emphasis may shift toward outcomes to help justify expenditures, especially for new technologies. In order to do this, CIOs and their organizations will need to become more business-oriented, with a greater focus on what is required to help internal and external stakeholders meet their goals.

**TRADITIONAL IT**

System performance

**VS.**

**EVERYTHING AS A SERVICE**

Business value

**YOU’LL DO LESS CUSTOMIZATION**

The cost and complexity of customization has grown considerably over the years. It also has been cited as one reason why states and localities have struggled to adopt new technology. As one industry expert put it, “government has built itself into a corner with customization.”

Everything-as-a-service in the private sector marked a transition away from traditional development techniques and toward rapid software delivery in an incremental fashion using agile techniques. Now, that approach is showing up in government. The cloud model is especially conducive to agile development. Cloud can be a way to deploy new software quickly.

**TRADITIONAL IT**

Customized software and systems; long replacement cycles

**VS.**

**EVERYTHING AS A SERVICE**

Standardized services; frequent upgrades

The result is growing pressure to move away from government’s waterfall approach to software development, which has generated a lot of customized applications. Customized applications may have a high degree of functionality, but they are costly and difficult to sustain. These pressures are pushing CIOs toward off-the-shelf software for finished solutions and platform-as-a-service to deliver a standardized set of tools for building new applications. “We should only be looking in the world of custom when it’s a differentiator and there are not good off-the-shelf options,” said Ross. “We don’t want to keep reinventing the wheel when it comes to application development.”
COMMUNITY CLOUD DELIVERS EFFICIENT COMPUTING
Long before anyone ever heard the term “cloud computing,” Florida’s Northwest Regional Data Center (NWRDC) was pioneering something that looked pretty similar.

The organization began more than 40 years ago as a nonprofit consortium for shared mainframe services, providing local universities with the enormous computing power they required without shouldering the full costs of mainframe ownership.

Today, the unique nonprofit continues to evolve by offering software, infrastructure, storage and other data center capabilities as a service to 100-plus universities, K-12 school districts, and state and local government agencies — at significant cost savings.

“We view ourselves as a community cloud or data center co-op, because our goal is not to make money, per se,” said Matt Stolk, NWRDC associate director. “Our goal is to help smaller organizations, or those with technology challenges, by providing enterprise-level solutions that reduce costs by leveraging the buying power of a group.”

BARGAINING POWER THROUGH PUBLIC-PRIVATE PARTNERSHIPS

Signing up with NWRDC generally saves schools and agencies 15 to 20 percent compared with going directly to the vendors. The data center achieves those benefits by building strong public-private partnerships with providers such as EMC, SHI and ViON, and reselling those services to its customers.

“Our customers benefit by paying for just what they’re using — just incremental costs, not buying the whole thing,” Stolk said. And it’s a win for many vendors that embrace the opportunity to serve smaller customers they often don’t reach.

NWRDC succeeds, in part, by:

» Negotiating strong contracts that typically build in price-reduction clauses that lower everyone’s costs as usage increases. If the organization renegotiates a cheaper contract, or hits higher usage milestones, it passes those savings to customers.

» Eschewing more typical marketing approaches in favor of enlisting its own customers to help sell its services to neighboring schools, counties and cities — which increases usage and lowers costs for everyone.

“We say ‘Look, if you talk to another school district or another county, and they start using our services, your costs will go down,’” Stolk said. That strategy recently helped slice infrastructure-as-a-service costs by 45 percent. Storage-as-a-service customers saw an additional 10 percent cost reduction in 2015, and Stolk also expects savings on backup-as-a-service, provided by EMC, in 2016.

As a co-op, customers also receive a credit at year’s end if the NWRDC’s overall costs run less than what users have paid.

GROWTH THROUGH INNOVATION

NWRDC leaders definitely want to grow their customer base and the service catalog. “We grow by innovating. We listen to what our customers say and what they need,” Stolk said. “Our goal is to help our customers achieve their goals. As long as they have things they’re striving toward, there’s always going to be something else for us to do.”

The strategy continues to pay off. Over the past six years, its business has grown about 100 percent,” Stolk said. “And that tells you something, coming from a nonprofit service organization.”
WHERE WILL DISRUPTION HAPPEN?

With less emphasis on hardware, software development and networking infrastructure, and more attention on as-a-service solutions, government IT faces potential changes. The shift could disrupt internal work operations, impact procurement rules, change relationships with end-user agencies and require IT organizations to remove barriers to effective cloud computing policies.
PROCUREMENT

One key area of tension is procurement. Everyone is aware that everything-as-a-service is based on consumption, not ownership. But it’s not easy for government to change procurement rules to fit a new computing model. “It’s a struggle,” said CompTIA’s Grutzius. “States are looking to modify existing terms and conditions for a cloud procurement option, but it doesn’t always work that way.”

THE MARKET IS CHANGING THE WAY THINGS ARE BUILT AND DELIVERED.

Many CIOs and industry leaders recommend a new model for procurement that takes into consideration funding for incremental software development, as well as issues around auditing, breach notification and other security-related matters, data ownership and location, operational responsibilities and uptime guarantees.

FUNDING

Funding for IT operations could decrease as revenue from traditional tech services diminishes. As this happens, CIOs may have to reevaluate the fees they charge and look for new ones to replace lost revenue. While it sounds reasonable to start charging agencies some kind of broker fee for cloud solutions, CIOs will have to make a business case for these new charges. Still, it’s possible that as more IT services move to the cloud, costs will drop as well, easing the potential financial squeeze over time. Yet many CIOs see at least a short-term increase in costs as they maintain legacy systems while building out their cloud model for infrastructure, platforms and software.

Another big funding issue has to do with how the feds pay for state (and local) IT systems. Existing federal rules could hinder a move to the cloud where servers are not owned by states or cities, but by third-party providers, and data is hosted where the provider believes is the best location. Ultimately, the issue comes down to whether or not federal funds can be used to pay for IT services, not the purchase of IT assets. Fortunately, the feds recognize the dilemma and have been working with state and local government to come up with solutions.
Buying Cloud is Different

Many governments still try to buy everything-as-a-service through traditional procurement methods and standard contract terms and conditions, even though what they are buying is fundamentally different from traditional IT. This approach is not working.

Procurement processes that require strict conformance to prescribed specifications and unique terms and conditions are ineffective in the current technological environment. They were originally developed to acquire products, not services. Effective procurement achieves timely results and good outcomes, and protects the public’s interest. That is all still possible through a more flexible, services-centric approach.

The everything-as-a-service model relies on standardization and consistency in code, process, security and, ultimately, a business model supporting the delivery of service over the Internet. As-a-service delivers value and benefit for its users because services are not unique to each purchaser. This creates tremendous efficiency and economies of scale. It may, however, require significant changes in government business practices.

If state and local governments want to take advantage of this service model, policymakers — finance directors, auditors, procurement officers, attorneys and elected officials — must reconsider and modernize their controls and processes that create barriers to accessing these services. New ways to provide transparency and accountability must be identified and used to not only protect the public interest, but also enable the purchase of everything-as-a-service technology.

GOVERNANCE

On the organizational side of everything-as-a-service, states and localities face an array of challenges, but none more so than establishing a governance structure for a new model of computing. There are a lot of cloud-first policies and mandates in place in government, but without proper change management, project management and a viable migration plan, the policies are likely to be more a hindrance than path forward, say experts. “Government IT needs governance and the authority to put governance in place,” said Grutzius. But for many governments, especially at the state level, IT remains decentralized, with agencies still controlling their own IT operations. Without centralized authority (and the budget to go with it), it becomes difficult to call for cloud and as-a-service across government.

WORKFORCE

Lastly, everything-as-a-service will impact workforce training. New skills need to be learned, and new roles and responsibilities have to be adopted. IT departments from the CIO on down will have to master the art of brokering services. Mississippi CIO Orgeron believes the shift to everything-as-a-service requires CIOs and their staffs to become better problem solvers. It’s incumbent on the IT department to sit down with an agency, hear what their problem is and decide if IT has the best solution in house, or whether a cloud partner has a better solution. “Our IT [department] offers technical services, but we are not a technology company. There’s a difference there,” he said.
CLOUD-BASED GIS IMPROVES CUSTOMER SERVICE
In St. Charles Parish, a district of about 54,000 in the greater New Orleans metropolitan area, scarce resources and disjointed internal processes often meant residents waited three months for a burned-out street lamp or broken trash bin to be repaired. With just one overwhelmed employee managing the service requests, the parish considered hiring two new workers. But when its longtime technology partner Trimble suggested a new cloud-based solution, civic leaders saw the potential to provide better service at relatively little cost.

St. Charles Parish implemented Trimble’s TerraFlex solution to add mobile data collection and inspection capabilities to the parish’s existing GIS. The technology’s defined workflows help the parish more efficiently manage related repair and replacement efforts, track the process — and keep all parties in the loop. Another piece of the solution, Trimble Feedback, provides an e-services channel for citizens to communicate with the parish about repairs.

“Previously, those service requests got caught up in spreadsheets, emails, phone calls and voicemails. There was no way to track what was being replaced, or check the request status,” said Luis Martinez, the parish’s GIS director. “Now we can provide much better service to residents while increasing operations visibility and accountability.”

The parish laid the groundwork by creating a database containing location and other data about its 8,400-plus street lamps collected over several months. When integrated with the Trimble solution, which includes software, services and data hosted in the cloud, those assets appear as a layer of geospatial data on a parish map.

**REQUESTING SERVICE ONLINE**

Now residents simply visit the community’s website, input their address, then click a map dot representing the street light or trash bin in need of repair or replacement, and add a few details. The request is automatically dispatched to the employee managing those efforts, and copied to the resident, parish council member and electrician, or other workers involved. Residents can check the status online at any time.

“The installation and training happened in less than a day. It was very easy,” Martinez said. TerraFlex also seamlessly integrated with the parish’s existing software and hardware.

**REAPING IMMEDIATE BENEFITS**

The program went live in February 2016. Martinez expects noteworthy benefits immediately, including:

- Fewer phone calls, emails and walk-in requests
- Reduced repair or replacement time from three months to within two weeks
- A digital paper trail of accountability

Best of all, parish leaders expect to reap significant cost savings and productivity gains. The Trimble solution eliminated the need to deploy new hardware and reduced the need for additional employees, enabling St. Charles Parish to avoid 90 percent of those costs in the first year of deployment.

“The software will pay for itself in the first month,” Martinez said. Over time, the parish plans to add more TerraFlex services, for instance, allowing residents in hurricane and flood-prone regions to report broken water mains, power outages and downed electrical lines — and to visualize those events online for better planning around emergencies.
When Texas implemented a cloud-based procurement system, it cut maintenance costs from $11.5 million annually to under $3.3 million.

**BUT THE BENEFITS OF THE CLOUD GO BEYOND COST SAVINGS. EVERYTHING-AS-A-SERVICE CAN BE THE FOUNDATION AND CATALYST FOR GOVERNMENT INNOVATION.**
Everything-as-a-service can deliver tangible, direct benefits to state and local governments.

Alachua County, Fla., where the city of Gainesville is located, struggled for years with its on-premises GIS, which the county maintained for itself and other local jurisdictions. The costs and resources needed to run the system were always an issue. Finally, in 2014, the county decided to move to a cloud version of the software, paying only for what it needs. Its first monthly bill was only $230.

That same year, the state of Texas implemented a cloud-based procurement system, cutting maintenance costs from $11.5 million annually to under $3.3 million. The cost to upgrade to the cloud solution was $2.9 million for subscription service licenses and development time.

But the benefits of the cloud go beyond the cost savings that many like to tout. Everything-as-a-service can be the foundation and catalyst for government innovation. Alachua County may be saving money with its cloud-based GIS, but the experience also opened the door to other potential changes, such as the agility to start new IT projects without purchasing hardware assets or developing a business justification based on capacity planning.

As states and localities overhaul IT systems and services after years of neglect and waiting, an as-a-service model offers opportunities to jumpstart progress on key needs like cyber security, open data, mobile services, portals and shared services. And it can potentially transform Medicaid, financial management, public safety and other key business processes.

To get started, state and local CIOs need to map their environment and the challenges they face. CIOs also should educate themselves and understand market trends relating to everything-as-a-service and cloud. They should create a vision tied to business objectives and, most importantly, continually experiment and adapt.

“The market is changing the way things are built and delivered,” Orgeron said. “While it will take longer for the public sector to transform compared to the private sector, the transformation is coming,” he said.

What’s important is that CIOs set their strategies and plans now. “Everything-as-a-service is a broad statement that represents expectations in the new economy,” said the Los Angeles’ Ross.

One major area of potential innovation involves the Internet of Things. For government, the spread of Internet-connected devices, utilities, vehicles, and even street lights and parking meters marks a sea change in how infrastructure will be managed. Most experts say the vast amounts of data, along with the platforms and software programs that will run government IoT, will be provided as-a-service. That has enormous implications. CIOs will have to help agencies understand the business case for IoT; they will have to know the market trends so that they don’t use yesterday’s technology; and they will have to be willing to experiment and adapt when one solution doesn’t work.

The Internet of Things is just one example of how everything-as-a-service will enable transformation in government. But it captures the essence of what makes this trend so important: new technologies that are developed with agility and readily available. The solutions that rely on these technologies will be brokered to provide the best business case, and will be consumed rather than owned. The Internet of Things, like so much of what is happening in government today, is about the application of digital technologies that can change how the business of government works. It combines a rich array of innovative tools — cloud, mobile, data analytics, security — that is better, cheaper and more widely available to large and small governments. It’s disruptive and it’s transformative.

“EVERYTHING-AS-A-SERVICE IS A BROAD STATEMENT THAT REPRESENTS EXPECTATIONS IN THE NEW ECONOMY,”
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With more than 20 years of experience covering state and local government, Tod previously was the editor of Public CIO, e.Republic’s award-winning publication for information technology executives in the public sector. He is now a senior editor for Government Technology and writes the “Tech Talk” column for Governing. Tod is also the author of several books on information management.

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