



## Tech Trends 2015

### The fusion of business and IT

### A public sector perspective

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# A public sector perspective




Fusion – the merging of various elements into new compounds. Today and in the future, technology is that adhesive agent in bringing together various elements of the enterprise – people, process, data, the Internet of Things, you name it, – bringing about transformational change. As we look inside the business of IT, and into the new mission demands that IT must meet, there are many opportunities for change. And the current rate of change of the technology enabling transformation is breathtaking. Many technology leaders in the public sector suddenly find themselves operating not merely as enablers of broader strategies, but at the center of important decisions about strategy and the future of government.

How did we get here? Macro forces have combined in short order to help drive enormous transformation: digital, cloud, analytics, core renaissance, the business of IT, and cyber risk. These forces are not just fueling innovation and giving rise to new business models – they are enabling historic advances in the private and public sector alike. Meanwhile, they are also changing the ways in which people engage with the world – not only with public sector agencies, but with businesses and other organizations in their daily lives as consumers. As such, citizen expectations of how they engage with government at every level are quickly evolving and increasing as a result, driven in large part by technology.

This document provides a public sector perspective on Deloitte Consulting's *Tech Trends 2015: The fusion of business and IT*<sup>\*</sup>. The original report examines some of the most important current IT trends -- this report explores the implications of those trends on the public sector. Implications range from new approaches to application programming interfaces to the

dramatic impact that connectivity and analytics can have on the digital engagement with citizens. Effects inside government span from the evolving role of the public sector CIO to changing IT skill sets and delivery models, and beyond.

Over the next 18-24 months, each of these trends could disrupt the ways that public sector organizations engage with citizens, how work gets done, and how these agencies and IT organizations will interact and evolve. The public sector can harness these trends for positive disruption, or may ignore and risk negative disruption. We have included a quick-reference graphic (below) to shed light on the anticipated level of public sector relevance, timing, and readiness for each trend. The public sector is broad and complex, and a simple summary view is suspect. These gauges are provided throughout this document to present the opinion of Deloitte leaders in the fields of technology and government in order to spur the thought process of public sector leaders.

Public sector perspective		
 Relevance	 Timing	 Readiness to adopt
Low, medium, or high level of potential impact on the public sector	Relatively short, medium, or long runway to get started	Low, medium, or high level of preparedness in the sector to adopt the trend

As with each edition of our annual Tech Trends report, this is part of an ongoing discussion – in a quickly moving field, no less. As you make important decisions about where your IT organization is heading, and make increasing contributions to the overarching strategic goals for your organization, we hope that the ideas contained here help to inform and guide your thinking.

## Mark White

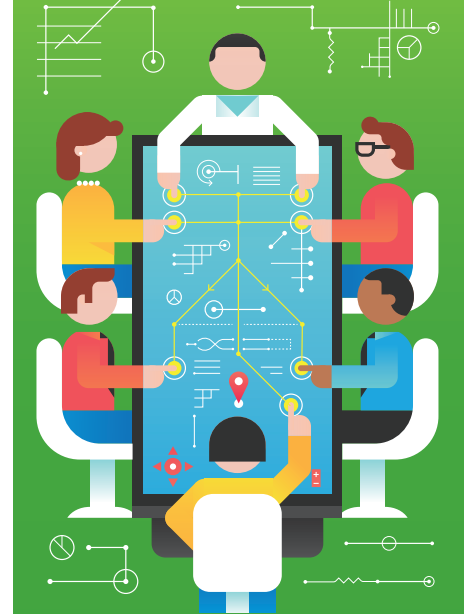
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<sup>\*</sup>Deloitte Tech Trends 2015: The fusion of business and IT, [www.deloitte.com/us/techtrends2015](http://www.deloitte.com/us/techtrends2015)

# CIO as chief integration officer



Technology is the glue that connects programs and people, and helps information flow in the public sector, making it an essential component of everyday public sector operations. That puts the CIO in a unique position to take on the important job of integrating decision-makers and stakeholders.

## Public sector perspective



Large public sector agencies often have dozens of technical assets in place to support a disparate range of business processes – everything from email platforms and data centers to grant systems. Meanwhile, rising expectations regarding citizen engagement and digital government have put integration architectures in the spotlight. In this environment, CIOs have a unique vantage point, able to lead integration from an enterprise-wide perspective. After all, technology touches every department and government function – as well as, arguably, every business and citizen.

CIOs not only have access to the technology and the organizational strategies, but also control many of the tools required to enable and activate those strategies. There are some challenges to stepping into this integration role. For some CIOs who “grew up” in the public sector, this may be unfamiliar territory, since this level of business integration and visibility was not traditionally part of the job. Today, CIOs face a growing maze of laws and regulations that have created the government structures in which they operate and established data and privacy practices that must be followed. The organizational and cultural shifts that should take place

to become a more integrated government present additional hurdles. Because of the independent nature of separate departments and agencies, many had carte blanche to procure any type of IT asset in the past. The concept of sharing is often a challenge for government, both organizationally and legally – and one that will likely require strong leadership and significant change management to recast.

Despite the hurdles, integration is happening now with various states and federal agencies making incremental progress. For example, the State of Minnesota is on the journey of bringing together the state’s IT assets, programs, and people under one umbrella so there can be one integrated “view” of citizens. While strong use cases can be a driver, new legislation is also helping to spur integration along. From a federal level, the Federal Information Technology Acquisition Reform Act (FITARA) gives CIOs more centralized accountability and more responsibility for the overall IT budget, regardless of size or number of components. Also, states such as Tennessee and Washington are passing legislation to consolidate departments, making it easier to integrate business processes, data, and technology.



To make progress along the lines of the examples above, CIOs should be masters of balance and collaboration, marrying the traditional day-to-day job of IT operations with the strategic goal of connecting technology, business, organizations, and data to meet future needs. They also have to balance strong executive leadership with diplomacy: CIOs need to partner with the business and human resources leaders while infusing IT across the enterprise. The organizational and modernization considerations loom large. What will new reporting structures look like? How will these new structures impact government functions? Who has final say in procurement issues?

Regardless of the obstacles, now is the time for the CIO to step into this new role and be the driving force for integration. Simply staying the course, or maintaining only an operational focus, would likely heighten the risks of increased technical debt, mistrust among key stakeholders, and an inability to make progress. Integration will be disruptive to business as usual in the short term, but its long-term positive benefits to citizens, stakeholders, and government itself are just too large to ignore.

### Moving forward

- **Find a champion.** Some agencies and even states are more interested than others in collaborating and integrating. Consider starting with agencies or departments that share a common constituent or line of business. Find them – and work together to create real momentum.
- **Determine infrastructure and organizational readiness.** Integration requires technology assets and management skills that are up to the job. Create measurable criteria for assessing readiness to make the case for keeping, merging, or discarding existing applications. Create new incentives and metrics to help the teams work together.
- **Align your IT efforts with the business.** Cabinet secretaries and others already have clear priorities in place. Make sure you understand those priorities and pursue initiatives that align with them—and work together to create real momentum.

# API economy



Application programming interfaces (APIs) are becoming increasingly important in both the commercial and public sectors. How they are harnessed holds big implications for service delivery, with the potential to lower friction between government and citizens, unleashing a torrent of information and capabilities. Full realization of this “API economy” will require government to assemble a community of partners, including those from the open source and commercial marketplace, to create a thriving ecosystem.

## Public sector perspective

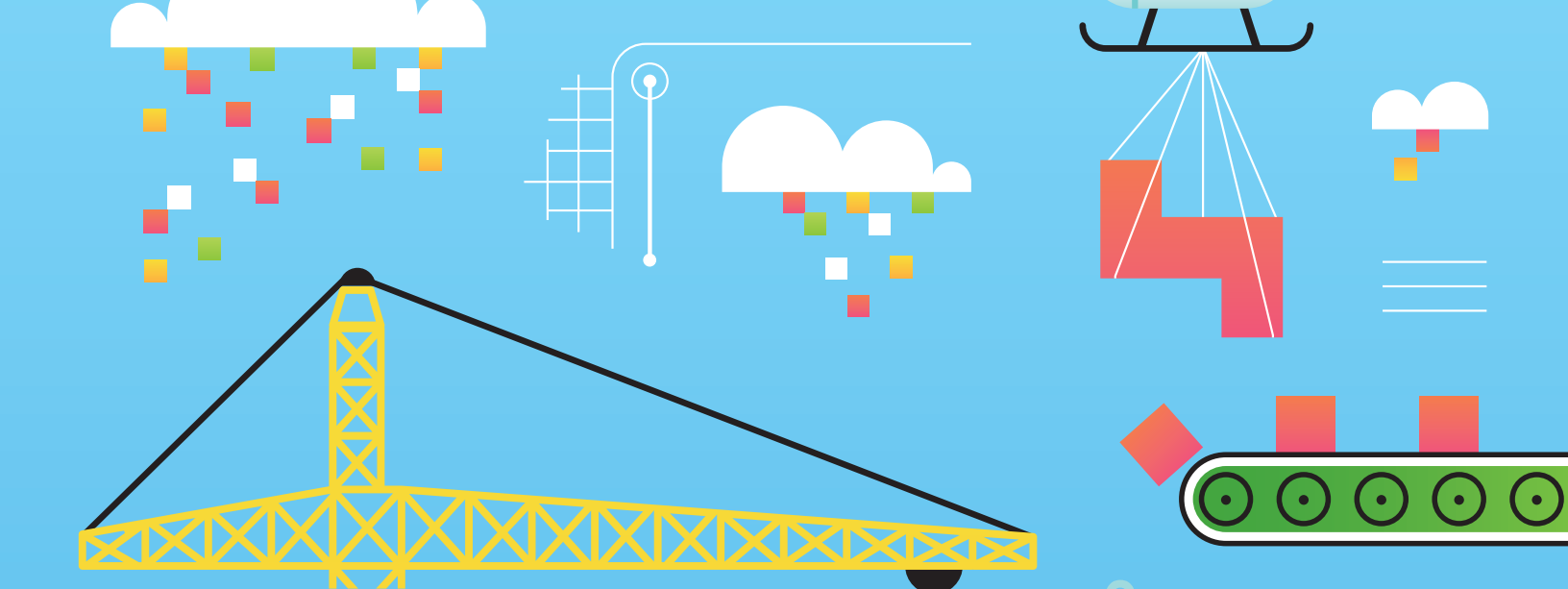


API adoption in the public sector is accelerating, where the many tools, rules, and interfaces for accessing data are now critical to enabling greater sharing and enhancing services. This push is being spurred along by initiatives such as the Federal government’s Digital Strategy and Federal Data Services Hub, both of which require sharing data through APIs. Other forces are also at work: citizens’ desire for more data, demands for improved customer service, and budget pressures to deliver more services with less funding.

Many states and federal agencies are already publishing a myriad of data sets for the public using APIs – from financial to transportation to community services and more. An evolution from standalone APIs to an integrated ecosystem approach could deliver government services more efficiently. Here’s an example: San Francisco has been able to offer new services to citizens that help them navigate the city’s busy streets by providing raw train route and schedule data to citizen developers, who have used the data to create ten different mobile apps.<sup>1</sup>

Some progress has been made, but there are still barriers that keep government from capitalizing on the API economy. For example, privacy and security concerns arise whenever public sector entities share data, especially citizen data. The API economy also requires establishing and nurturing the conditions for different systems to work together, communicate, and integrate easily. For agencies with legacy data and systems, this is a serious challenge. Finally, having your data and technology houses in order may not mean much without participation. By making APIs more discoverable and usable, government could help grow the public sector API community.

Those leading the way in APIs often start by identifying high-value use cases that facilitate smoother interactions between citizens, businesses, and government agencies. These are likely to be especially attractive as a path to efficiency and cost-savings. For example, APIs that could streamline the processes for renewing a driver’s license or registering a new business might have immediate appeal to citizens and government agencies alike. Equally important, API efficiency can allow government employees to shift from transaction processing and other clerical tasks to bigger issues.



Looking ahead, CIOs and data owners will need courage to place a few big bets, while waiting for other standards to be championed and emerge. Leadership may be needed in some areas to allow the level of collaboration that comes with an API economy. In many cases, developing the right API isn't the problem – it's having the license to use data in new ways to deliver new capabilities.

### Moving forward

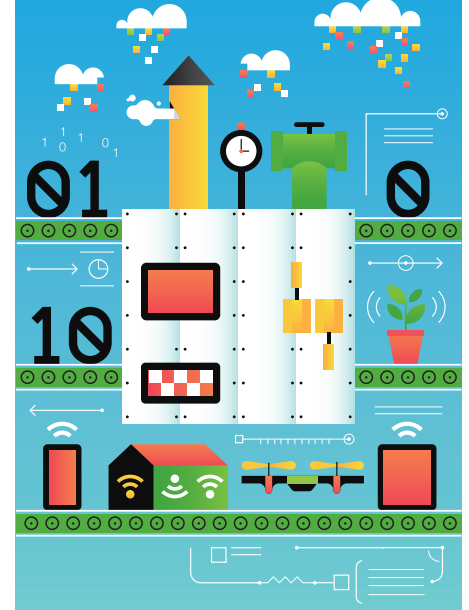
- **Actively seek partnerships.** Government alone can't create the API economy. Look for opportunities to create communities around APIs that can eventually become self-sustaining.
- **Pilot and prune.** Which APIs are really adding value and which are barely making an impact? Focus on pilots to quickly determine which APIs are having the biggest impact. Move to quickly abandon those that aren't.
- **Evangelize.** Creating the API economy in the public sector will require executive-level leadership and governance. CIOs and digital officers will need to champion API initiatives in order to overcome natural organizational resistance. When you discover a winning solution, spread the word to others in your ecosystem to help build interest and momentum.

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#### Endnote

<sup>1</sup> Office of Management and Budget, *Digital Government: Building a 21st Century Platform to Better Serve the American People*, May 23, 2012, <https://www.whitehouse.gov/sites/default/files/omb/egov/digital-government/digital-government.html>, accessed April 8, 2015.

# Ambient computing



When sensors are woven together with analytics, data integration platforms, and strong security, significantly greater business value can be achieved. This combination – ambient computing – creates a fabric that provides contextual intelligence with business purpose. It is a trend that many businesses are exploiting for competitive advantage. In the public sector, early adopters are already experiencing greater improvement in performance and efficiency.

## Public sector perspective



The business purpose of government, in the view of many, is to protect the homeland, detect fraud, waste and abuse, and improve the lives of citizens. Ambient computing can help accelerate performance in each of these areas. Here's what's happening:

Intelligence-driven agencies, such as the Department of Homeland Security, have been on the bleeding edge of ambient computing for years, adding more computing power to sensors in the field to send back intelligence for processing later. The “connected border agent” is one example, but there are many more.

In other domains, ambient computing contributes to the quality of life in ways large and small. The city of Boston, for example, has implemented sensor networks to help manage traffic. In addition, Boston has deployed solar-powered benches that not only give citizens a place to rest but also measure air quality.<sup>1</sup> Washington, D.C., is cutting down on violence by using remote monitors that detect gunshots.<sup>2</sup> The city of Seattle has modernized its existing electric meters with sensors that help customers understand their energy consumption patterns and also allow utility companies to provide better service when outages occur.<sup>3</sup>

For some agencies, this may sound more like science fiction than a capability that is central to the agency mission. Some may not see the immediate value and may be hesitant to adopt it. Technology standards and reference architectures are still evolving. Nonetheless, there is enormous potential in the number of sensor and data collection channels already in place in government, such as traffic signals, telecommunications towers, or even citizen-owned devices like smartphones. Adding computing capability and advanced analytics to existing infrastructure could make adoption of this trend much more manageable.

Yet while the infrastructure might be ready to use, the reason for adopting such technology may not be obvious for some government entities. Mission areas that require constant monitoring or the need to extend capabilities of assets “in the field” may conjure up a number of use cases. When operational efficiency or public safety is the focus, ambient computing can play a game-changing role.



Agencies can approach ambient computing in collaboration with the industries they monitor or regulate. For example, the Department of Transportation could create incentives for stakeholders (states, contractors, civil engineers) to embed sensors into infrastructure and public works. In doing so, government could help enable new industry standards around security, reference architectures, and data models

critical to growth and more unified adoption. Agencies also have the opportunity to embrace “open government” by sharing nonsensitive monitoring data with peers and the public at large, allowing creative public use ideas to flourish. Organizational barriers to sharing data can be resolved when the reward exists.

### Moving forward

- **Pilot high-value use cases.** Start by identifying a labor-intensive effort where ambient computing could drive major value. Identify a few use cases and nudge them into proof of concept with a handful of sensors.
- **Learn from public sector peers.** Technology leaders at every level of government have already taken the first steps toward ambient computing capabilities. One good conversation with those leaders could help you jump-start your own ambient computing initiative – and avoid big pitfalls along the way.
- **Don’t reinvent the wheel.** Take advantage of existing infrastructure, data streams, and communication channels before building anything new.

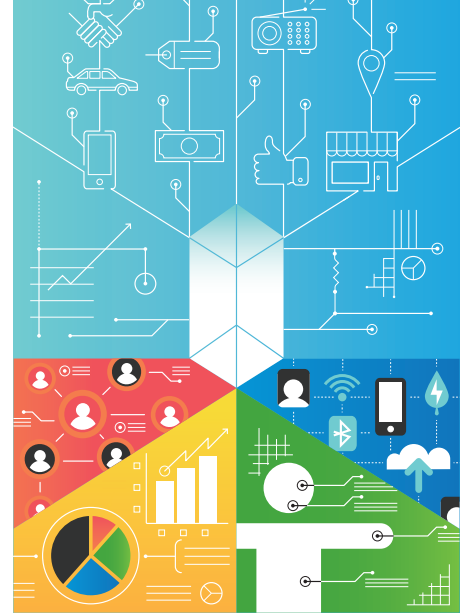
### Endnotes

<sup>1</sup> Michelle Reis, “5 U.S. Cities Using Technology To Become Smart And Connected”, *Forbes*, August 15, 2014, <http://www.forbes.com/sites/ptc/2014/08/15/5-u-s-cities-using-technology-to-become-smart-and-connected/>, accessed April 2, 2015.

<sup>2</sup> Andras Petho, David S. Fallis, and Dan Keating, “ShotSpotter detection system documents 39,000 shooting incidents in the District”, *Washington Post*, November 2, 2013, [http://www.washingtonpost.com/investigations/shotspotter-detection-system-documents-39000-shooting-incidents-in-the-district/2013/11/02/055f8e9c-2ab1-11e3-8ade-a1f23cda135e\\_story.html](http://www.washingtonpost.com/investigations/shotspotter-detection-system-documents-39000-shooting-incidents-in-the-district/2013/11/02/055f8e9c-2ab1-11e3-8ade-a1f23cda135e_story.html), accessed April 2, 2015.

<sup>3</sup> Reis, “5 U.S. Cities Using Technology To Become Smart and Connected.”

# Dimensional marketing



Driven by their experiences in the private sector, many citizens are letting their expectations for service in the public arena soar. The principles of the 2015 Tech Trend Dimensional Marketing provide a compelling roadmap for citizen engagement. Engage with citizens as customers – give them the integrated, informed, and customized user experiences they expect, and everybody should win.

## Public sector perspective



With multiple channels available and new tools helping make sense of consumer data, public sector IT leaders are in a strong position to improve citizen outcomes while also driving important performance improvements. Likewise, the technology services marketplace is burgeoning with new vendors, breakthrough solutions, and flexible platforms. This further presents opportunities for increased engagement in the public sector, as well as the chance to explore new revenue streams. Dimensional marketing tactics used in commercial sectors like retail and healthcare can be used by government today. Social networks and analytics are of special interest, but the broader possibilities are upending traditional views of citizen engagement across all levels of government.

Many consumers have learned they can connect their experiences and preferences across multiple business engagement platforms, and they want that same relationship with government. That means creating a smoother and more intuitive government experience – at a lower cost, without friction. In practical terms, agencies should consider focusing on reducing unnecessary touch points and improving transactions.

Though it's not often recognized, most government agencies face direct competition from the private sector. Think of the U.S. Postal Service, Amtrak, or even regulated taxi services, where many private businesses have already triggered massive shifts in consumer behavior. Generally, agencies at every level of government are deeply influenced by activities in the commercial sector – and vice versa. For tax preparation, healthcare exchange and mortgage lending transactions, or state park reservations, the interdependence of public sector services and the private sector is real and growing. All of which means many public sector IT leaders have significant opportunities to more deeply engage with citizens to improve effectiveness and efficiency in delivering government services.

An improved understanding of citizen needs, preferences, and individual journeys is typically at the heart of multichannel, digital engagement. As we learned from states participating in the federal health exchange, understanding citizens is where we should start. Initially, the exchange was conceived of as a web-only property. But when the states conducted deeper research into the demographics and preferences of those who would actually be participating in the exchange, it became



clear that the web was only one of several platforms on which the target audience relied. As a result, states modified their strategies to focus on additional omnichannel methods of engagement.

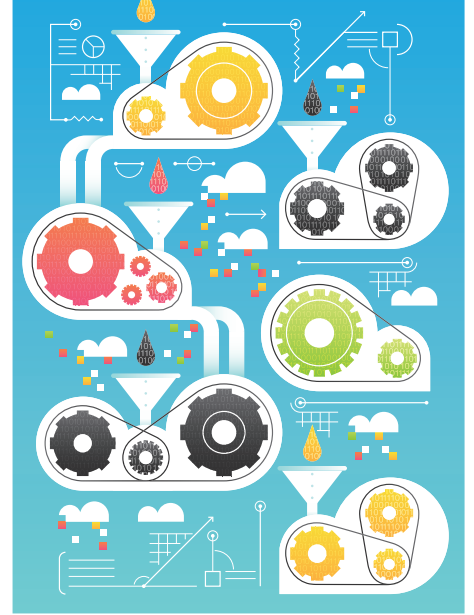
Regardless of the channel being developed, technology leaders should insist that their teams stay focused on the user

experience throughout each service. This means architecting systems from the “outside in” based on what people need and want to do. As we’ve seen through many examples in the commercial world, seamless, rich transactions often lead to better adoption, reduced cost, and more satisfied consumers. That same philosophy can be applied to government services as well.

### Moving forward

- **Zero in on the customer.** Who will be using your solutions? What are their demographic profiles? How do they engage with technology? The better you understand your target users, the more effective your efforts can be across multiple channels.
- **Design for an elegant user experience.** Focus on delivering rich customer engagement offerings that aim for a true “win-win” situation between the constituent and government.
- **Measure what matters.** There are multiple opportunities for metrics, so focus on those that can help you understand what people are actually doing. Whether tracking the number of transactions driven from one touch point or the uptake of crowdsourcing for certain applications, listen to how, why, and when – and by whom your services are being used.

# Software-defined everything



As the Everything-as-a-Service trend pushes beyond software and into infrastructure and operations, the virtualization of the entire IT stack – compute, network, storage, and security layers – becomes a possibility. Not only could this help lower costs, but it also could help improve speed; reduce the complexity of deploying and maintaining technology footprints; boost mission effectiveness in data sharing; and enhance cyber-incident response.

## Public sector perspective

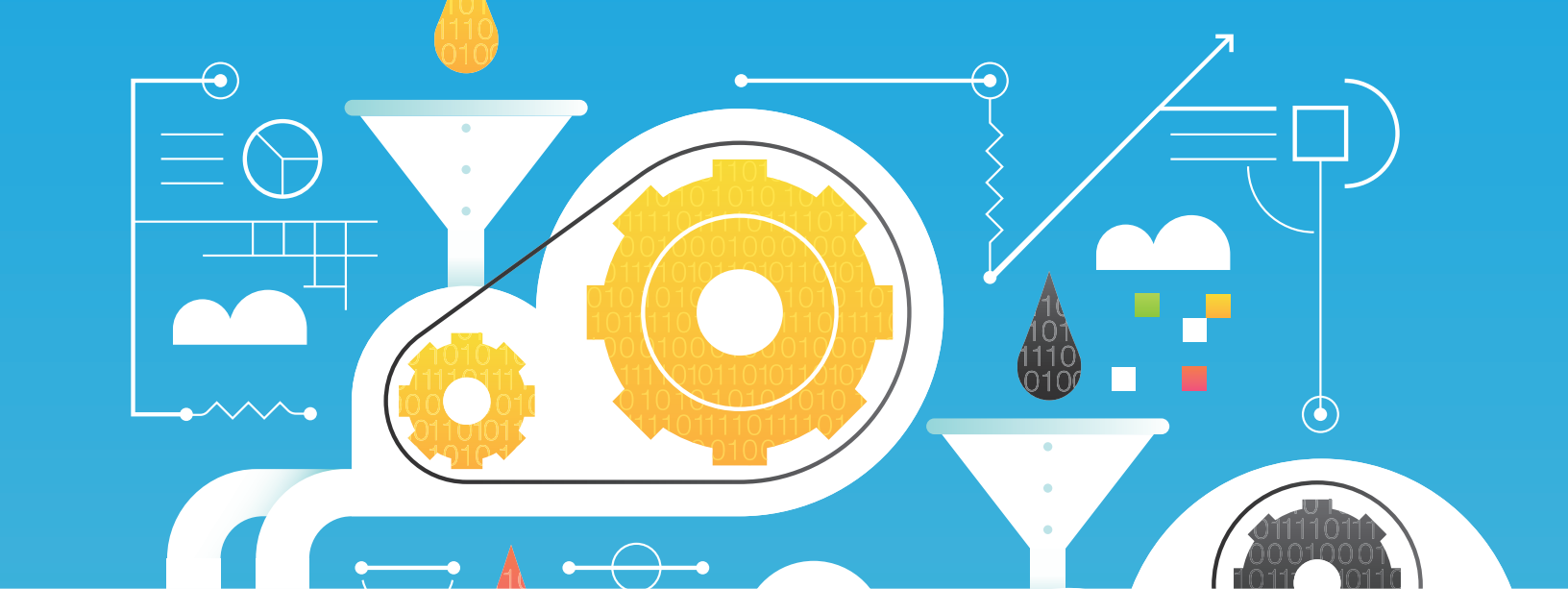


Software-defined everything? Yes. Everything. Of course, achieving that vision tends to be easier said than done – and progress in the public sector has been mixed. At the forefront, public sector adoption of software-defined compute has been underway for years. Driven by efforts such as the 2010 Federal Data Center Consolidation Initiative,<sup>1</sup> various agencies have invested heavily in virtualization and are adopting cloud computing. For example, according to a September 2014 GAO report, the Department of State achieved an estimated \$9 million savings related to virtualizing IT resources.<sup>2</sup>

Adoption has generally been slower for other data center components such as storage and networking, although there are some early adopters leading the way. For example, the Department of Defense is implementing an enterprise-wide view of its information networks through software-based controllers.<sup>3</sup> At the top of the pyramid, the complete software-defined data center – one which includes the full set of data center capabilities – is still a ways off.

Several barriers might be preventing public sector entities from adopting software-defined everything as quickly as the private sector. From a technical perspective, public sector entities tend to struggle in deciding what to do with old, legacy systems which cannot take advantage of new automation-based technologies. From a non-technical perspective, greater automation and standardization, typically requires tighter integration and governance between disparate organizations, which can be difficult in the public sector.

Software-defined everything appears to have the greatest impact in large-scale environments. The Googles and Facebooks of the world, which rely on tens of thousands of servers, have a lot to gain from comprehensive virtualization and automation – where even slight increases in efficiency can have a significant impact on the bottom line. The same is often true in government. However, to pull off a major shift toward software-defined everything, most public sector technology leaders would need to achieve a higher level of alignment with its requirements, including (1) trained and experienced talent accustomed to working in a software-defined environment, and (2) new levels of coordination to centrally manage larger pools of resources, and administer and secure shared networks.



Government shared service center modernization might be the nexus for early adoption; however, making true progress through this path will likely involve significant coordination and collaboration with the private sector and vendor communities.

At some point, tightening budgets could be the catalyst for adoption. But for now, the most effective approach might be to test the software-defined concept's merits, experiment where possible, and start laying the groundwork for a larger-scale transition in the future.

### Moving forward

- **Establish a baseline.** Success tends to be the best motivator for continued improvement. Establishing solid metrics (such as virtualization adoption percentage and time required to provision specific elements of the IT stack) can help you measure progress and tell a more compelling story.
- **Focus on key aspects within the broader picture.** Early progress can provide a launchpad for your overall strategy and helps drive change within the organization. Identify focused metrics and ask, 'Is my team making a concentrated effort to identify tangible benefits and celebrate small wins?' Some commonly overlooked benefits include reduced human error and increased standardization, both of which can lead to early cost savings and efficiency.
- **Take a phased approach.** Trying to implement software-defined concepts in one big step, across all infrastructure components can be daunting. It will likely involve more capital investment than most organizations can afford. A more effective approach may be to evaluate automation capabilities as part of the standard IT refresh cycle or through cloud services adoption. Use the baseline metrics noted above to benchmark software-defined deployments against existing practices to focus scarce resources on areas with the greatest potential impact. Use the same baseline metrics to validate improvement, then repeat. Over time, adoption of software-defined layers should evolve.
- **Collaborate for success.** Learn from the achievements and mistakes of others – especially when it comes to managing change and driving adoption. If you are facing a problem, there's a good chance someone else has already found a way to address it. No need to reinvent the wheel.

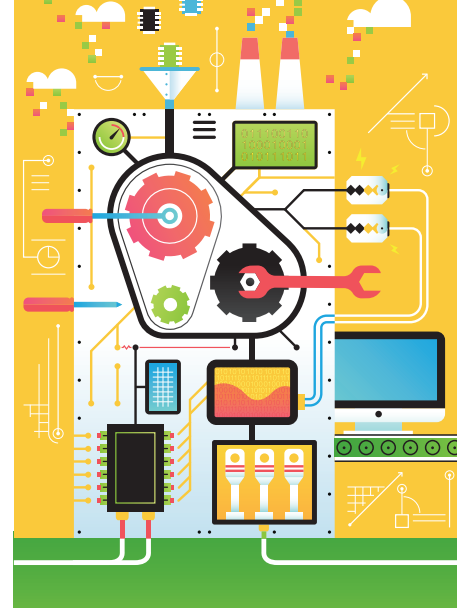
### Endnotes

<sup>1</sup> Ted Girard, "Virtualization's value in data center consolidation", *Federal Times*, March 3, 2015, <http://www.federaltimes.com/story/government/solutions-ideas/2015/02/24/virtualization-data-center-consolidation/23945955/>, accessed April 14, 2015.

<sup>2</sup> U.S. Government Accountability Office, *DATA CENTER CONSOLIDATION: Reporting Can Be Improved to Reflect Substantial Planned Savings*, September 25, 2014, p. 19, <http://www.gao.gov/assets/670/666123.pdf>, accessed April 14, 2015.

<sup>3</sup> Sean Lyngaas, "Software-defined networking key to Lockheed's DISA deal", *FCW*, February 27, 2015, <http://fcw.com/articles/2015/02/27/lockheed-disa-contract.aspx>, accessed April 14, 2015.

# Core renaissance



Many public sector CIOs today stand at a crossroads of large systems that have powered their agencies for decades and the latest wave of cloud, social, and mobile technologies. With a sharp focus on modernizing their legacy transactional systems, these CIOs are now thinking about ways that they can use lessons learned over time to inspire new services and growth at the core. This “core renaissance” involves plenty of coordination, integration, and alignment by public sector IT leaders.

## Public sector perspective



Relevance



Timing

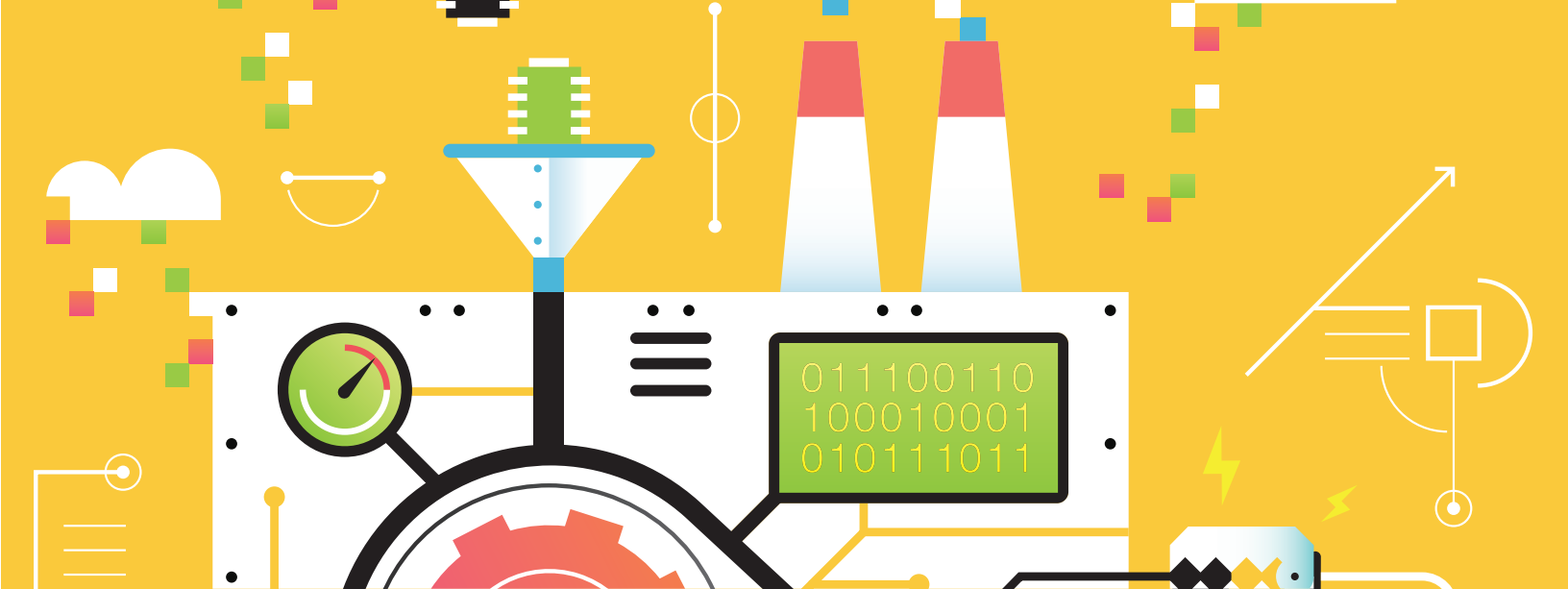


Readiness to adopt

Many government agencies have spent the past 30 years building out core transactional, reporting, and management systems. These systems have typically been the lifeblood of public organizations, powering both the back office and the mission. Over time, however, many of these systems have developed significant technical debt,<sup>1</sup> as well as redundancies with more recent technology. In some cases, agencies no longer have an adequate workforce to support them.

The environment is ripe for a renaissance. Modernization is leading towards a convergence, with shared services receiving a resurgence with support from Shared First and Cloud First mandates. Shared Service centers are rethinking their core capabilities, some being combined or outsourced to help reduce costs and improve performance.<sup>2</sup> In 2014, for example, the Department of Housing and Urban Development (HUD) began to outsource all of its core financial management and other administrative functions to the Department of the Treasury.<sup>3</sup> This consolidation enabled the paying down of technical debt, helping to remove barriers to scale and performance and freeing up resources for other activities.

In some cases, renaissance goes beyond technology consolidation to focus on revitalizing or augmenting legacy systems to fuel new capabilities. This area is often more difficult for many government agencies, given the sheer size of their IT systems and the traditionally risk-averse mindset of many in the public sector. Any significant shift in an agency's IT infrastructure can affect far more than the technology itself. It can also create change management challenges in terms of training, communications, talent management, and governance. For example, the Food and Drug Administration (FDA) is using advanced analytics to identify drugs in the pipeline that pose a potential risk to delivery of health services. Their approach involves modernization using a mix of new capabilities that sit on top of a massive core infrastructure foundation.



Within government IT, there tends to be no avoiding the issue of modernization. Virtually every agency will grapple with it in the future – if they haven’t already – and there is a strong case for pressing ahead. With modernization often comes increased

agility, as well as the opportunity to layer on new services to the core. These new services can fuel innovation, while enabling scalability, improved security, better customer service, and reduced costs.

### Moving forward

- **Know which technology assets you already have.** Before making any decisions, consider an asset assessment. After years of slow, steady growth, many public sector IT organizations have a hodgepodge of technologies, tools, and solutions – many of which may have been forgotten or are even unknown. The first step is to take inventory and make decisions about which technologies are candidates for consolidation, elimination, outsourcing, or endorsement.
- **Have a clear vision for the short and long term.** Public sector IT leaders should think about and plan along both their short-term goals as well as long-term enterprise-level vision and core architecture investments. Otherwise, modernization could result in disconnected technologies and more technical debt down the line.
- **Start with your advocates.** Leading change, especially in government, can be challenging. Start with internal stakeholders who understand the vision and need to revitalize the heart of the IT and business footprint. Stakeholders behind the plan can help to promote the potential benefits with you.

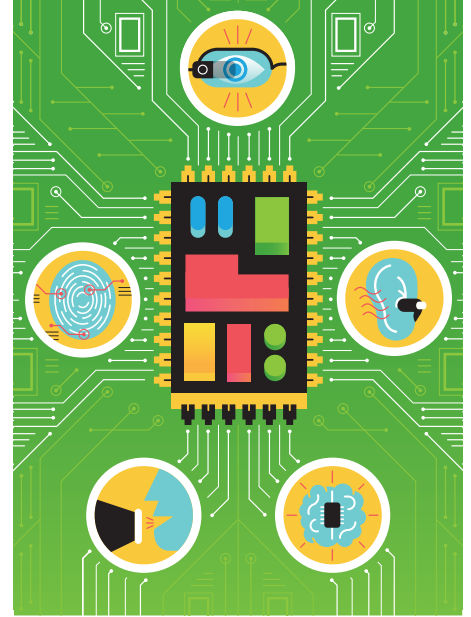
#### Endnotes

<sup>1</sup> Deloitte Consulting, *Tech Trends 2014: Inspiring Disruption*, 2014, pp. 67 - 75.

<sup>2</sup> Office of Management and Budget, *Federal Information Technology Shared Services Strategy*, 2012, p. 6 <https://www.whitehouse.gov/blog/2012/05/02/introducing-it-shared-services-strategy>, accessed April 13, 2015.

<sup>3</sup> Office of Management and Budget, *The President’s Fiscal Year 2016 Budget*, February 7, 2014, <https://medium.com/budget-document/efficiency-increasing-quality-and-value-in-core-operations-e185fda92ce2>, accessed April 13, 2015.

# Amplified intelligence



Some of the most promising and valuable uses for analytics will come not from the field of artificial intelligence alone, but from “amplified intelligence.” That’s where the effort and intelligence of public sector employees can be augmented with machine-generated data-driven insights that can help improve people’s decision-making and efficiency.

## Public sector perspective



The public sector has historically led the way on adopting artificial intelligence (AI) in critical areas such as defense and national intelligence. For example, the military’s F-35 fighter jet has specialized equipment designed to provide valuable intelligence to human pilots while reducing their workload.<sup>1</sup> Troops on the ground are increasingly supported and informed by a wealth of live data based on their combat surroundings.<sup>2</sup> Also, not surprisingly, the intelligence community is an early adopter to process large volumes of calls and digital data in an effort to identify potential terrorists, while the rocket scientists at NASA are looking for ways to use technologies such as machine learning, natural language processing, and human-computer interaction to help astronauts detect potentially life-threatening errors when performing routine tasks in space.<sup>3</sup> However, despite these examples of AI adoption, public sector organizations tend to lag behind their commercial counterparts, many of which have started using artificial intelligence and natural language processing to improve their operational and analytical capabilities in a wide variety of ways – both large and small.

It is one thing to augment warfighters and astronauts with eye-catching AI technologies, but how can similar technologies be used to create value in the everyday operations of government?

Amplified intelligence will be enabled by analytics, which itself is enabled by data and human intelligence. Today, machines still struggle to make sophisticated connections and find higher-order patterns within data; yet those are precisely the kinds of sophisticated and creative analyses where human experts excel.

Consider this notional public health scenario: If a certain state were to find that infections are rising dramatically, but the data does not reveal much more than the velocity and scale of the trend –this would not be enough for them to pinpoint what is actually causing infections to rise. Unfortunately, that’s where today’s common machine-generated insights stop. In this scenario, the breakthrough would occur when a person thinks to compare infection data with NOAA’s weather-related data,



such as recent sandstorms in the region. In cases like this, the underlying analytical algorithms are simple, and the machine can then perform the heavy lifting calculations; it's the human decision to correlate weather data with infection data that is the real breakthrough. Combining machine intelligence with human brainpower provides opportunities to create and test various hypotheses such as "could weather irregularities be the cause of a rise in infections?"

The public sector faces a number of significant challenges to adopting this trend – starting with data. Siloed data and data ownership can make it difficult for public sector organizations to harness amplified intelligence. For example, creating a single, comprehensive data source to use as the basis for analysis might be almost impossible. However, such challenges should not necessarily be viewed as deal-breakers. In the case of data, there are proven and effective workarounds that make it possible to connect and link data across legacy systems without moving it to a centralized repository.

### Moving forward

- **Identify clear questions.** Start with a hypothesis, and don't just look at data with the vague notion that "we have so much data, there must be something we can do with it." Begin with a specific problem or, better yet, a specific question. Amplified intelligence can help accelerate you toward an answer.
- **Formulate your path.** In the public sector, it might take a few steps before agencies fully embrace amplified intelligence. Implement visualization, and then move on to cross-system insights; from there, amplified intelligence can play a bigger role.
- **Tackle tedium.** Speak to analysts, and find out where they spend their time. Identify areas that are repetitive or tedious, and then determine where a machine could help augment or accelerate tasks – freeing up humans to focus on higher-value analysis and insights.
- **Widen your circle.** Look at your data and data governance models, and see where you can leverage data sharing or crowdsourcing to tap into other internal or external skills that might uncover new insights in your data.

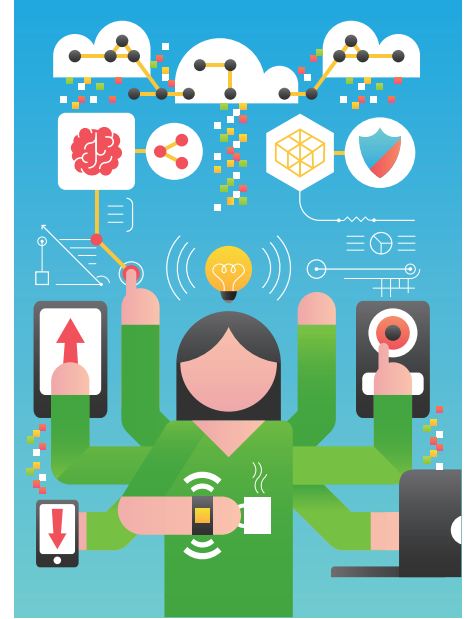
#### Endnotes

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# IT worker of the future



Senior public sector technology workers are leaving agencies en masse, and younger employees with new skills are taking their places. This changing landscape is forcing technology leaders to rethink their approach to talent management today and for the future. Everything is on the table – from the types of skills new workers must have to new service delivery and staffing models.

## Public sector perspective



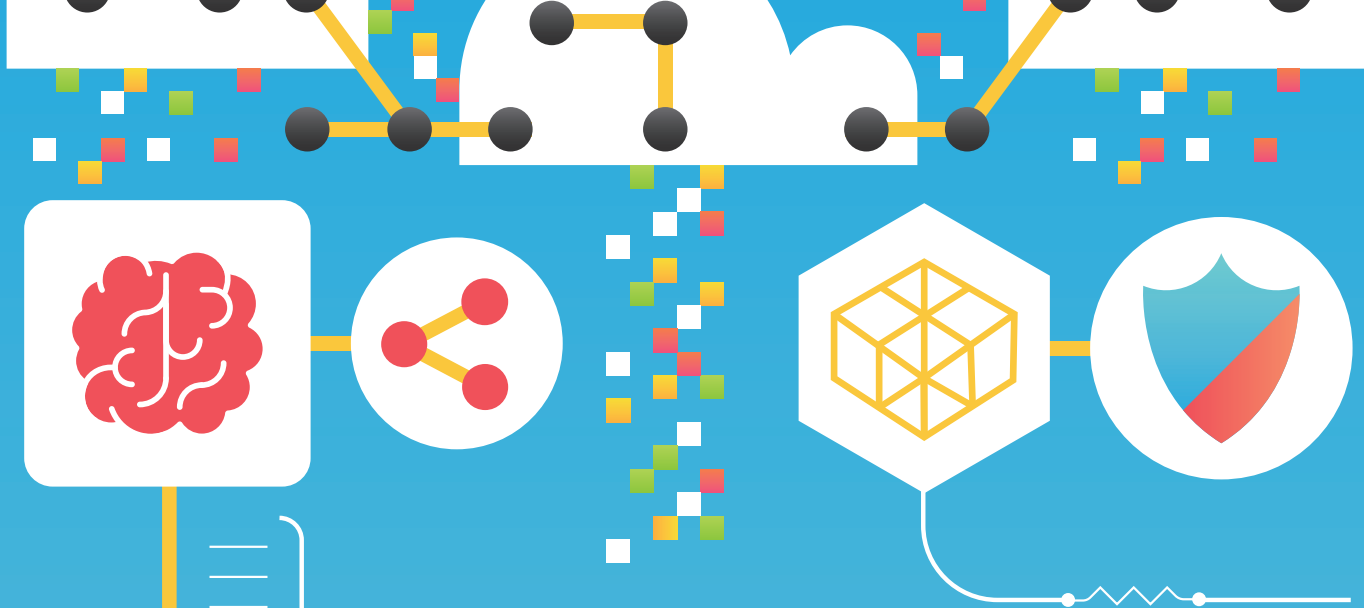
Public sector leaders who are moving forward with transformative technologies are also turning their attention to the workforce that will be expected to deliver value from these investments. Hiring the right talent with the right skill sets presents a mix of big opportunities and long-simmering challenges.

Some CIOs continue to worry about the large number of retirement-eligible employees who may leave public service and take their skills and institutional knowledge with them. The Government Accountability Office forecasts that more than a third of federal workers will be eligible for retirement by September 2017.<sup>1</sup> While agencies may be trying to hire new, younger talent to fill gaps left by retirees, many are not having success. A 2014 report said the percentage of federal employees under age 30 hit an eight-year low of 7 percent in 2013.<sup>2</sup> It may be that agency hiring practices, compensation, and staffing models are seen as out of step with what younger workers are looking for. Many of those workers may be interested in government work but are not ready to commit to lifelong public service.

Other CIOs are thinking about the issue differently, asking a new kind of question: What if success depends less on replacing all that retiring talent and more on rethinking what kind of talent is actually required and how to get that talent exactly when it's needed?

Given today's advancements in automation, for example, it may be that IT workers require fewer hard technical skills and more soft skills from disciplines like anthropology or sociology. The real work may involve bringing training, vendor management, and change management capabilities together to achieve an objective, not simply grinding out the work. Think vendor management officers, service delivery managers, and solution architects versus system administrators, operators, and developers.

Technology leaders at every level of government are already adapting their technology portfolios and service delivery models to meet new demands, from shared services to cloud-based services, taking advantage of new capabilities as they emerge. They'll have to spark the same level of innovation when it comes to talent management. If their IT organizations can spend less time on user support, for example, their workers can be used for more sophisticated technology collaborations.



CIOs need to continue to be creative to compete with private sector compensation packages and job flexibility. Some are offering externships and reverse mentoring. Others are creating more opportunities for virtual work. Still others are changing their hiring practices and associated policies to be more agile. For example, some states have enacted game-changing reforms in terms of who can apply for and secure various IT jobs. Tennessee has increased its focus on hiring for skills needed rather basing the position on experience or seniority.<sup>3</sup>

New technologies also provide a path for exploring innovative, flexible workforce models, even as the overall IT personnel model in the public sector may struggle to catch up. Just as cloud services introduced a model for renting processing capacity, so too are agencies looking at ways to access on-demand IT talent. For example, the federal General Services Administration's 18F coding squad is an example of an entirely new approach to government technology staffing. This is just one early example (hackathons are another) of new talent models that could be replicated across many public sector technology arenas.

### Moving forward

- **Experiment in new territory.** Choose an area that is not currently mission critical – or where you cannot find good people – and experiment with new workforce practices.
- **Mix it up.** Examine how you have people deployed. Can the jobs become more diverse? Can you cross-train? Can you rotate people into different positions for short periods of time? Look for ways to mix up responsibilities that may open the door to new capabilities and levels of creativity.
- **Take a portfolio approach.** Start managing your IT workforce like your IT portfolio. Just as you would invest in new technologies, invest in your people by offering development and career advancement opportunities. Align the workforce to technology investments now as well into the future.
- **Engage in the policy discussion.** In the public sector, many hiring processes are dictated by outdated laws and policies – which aren't going to change until policymakers are educated on widening gulf between what public sector IT leaders need from their workforce and what they're allowed to do today.

#### Endnotes

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