



MOBILIZING TECH TALENT

Hiring Technologists to Power Better Government

SEPTEMBER 2018



PARTNERSHIP FOR PUBLIC SERVICE

The Partnership for Public Service is a nonpartisan, nonprofit organization that works to revitalize the federal government by inspiring a new generation to serve and by transforming the way government works. The Partnership teams up with federal agencies and other stakeholders to make our government more effective and efficient. We pursue this goal by:

- Providing assistance to federal agencies to improve their management and operations, and to strengthen their leadership capacity.
- Conducting outreach to college campuses and job seekers to promote public service.
- Identifying and celebrating government's successes so they can be replicated across government.
- Advocating for needed legislative and regulatory reforms to strengthen the civil service.
- Generating research on, and effective responses to, the workforce challenges facing our federal government.
- Enhancing public understanding of the valuable work civil servants perform.

For more information about the Partnership for Public Service, visit ourpublicservice.org.

Jennifer Anastasoff and Jennifer Smith, the authors of this report, are the former heads of People Operations for the United States Digital Service.

PREFACE

The federal government lags behind the private sector in how it uses digital technology to engage citizens and deliver services. When the average American can sign up for a mortgage using a smartphone app, but has to visit a Department of Veterans Affairs medical center in person—sometimes repeatedly—to make an appointment, there is a problem.

One of the main reasons for this state of affairs is that the government simply does not have enough staff or leadership with the modern technical expertise needed to fix critical services and build for the future.

In order to address this problem, the government must prioritize recruiting and hiring senior leaders and employees with modern technical experience and know-how—experts who can prevent systemic failures, fix broken services, launch new digital initiatives and capitalize on emerging technologies. At the same time, it must invest in building the skills of current technical workers.

This report by the Partnership for Public Service and the first two leaders of People Operations for the United States Digital Service shares the lessons learned from recruiting and hiring technology experts at USDS, one of three digital service entities established by the federal government between 2012 and 2014.

To date, these organizations have hired more than 600 highly qualified software engineers, designers, product managers, innovation experts, entrepreneurs and other leaders with modern technical expertise. They have left an indelible mark on the services our government delivers to the American people.

This report highlights the strategies used by the USDS and its counterparts—18F and the Presidential Innovation Fellows—to hire, engage and support top technology talent, and examines how technical experts can and have improved government effectiveness.

Many examples provided are from projects that used technology to make government work better and cost less. However, the lessons from hiring and deploying individuals with technical expertise are broadly applicable to all types of government activities, including finance, performance management and scientific advancement.

We hope that some of the ideas and strategies outlined in this report will assist agency leaders in bringing creative technical talent into the federal workforce to improve the operations of government and better meet the needs of the American people.

Sincerely,

Jennifer Anastasoff

Former Head of People Operations
Founding Executive Team
United States Digital Service

Jennifer Smith

Former Acting Head of People Operations
United States Digital Service

Max Stier

President and CEO
Partnership for Public Service

INTRODUCTION

In October 2013, President Barack Obama watched as his landmark national healthcare program failed because a website did not work. On the first day Healthcare.gov was rolled out to the American public, only six people signed up. A day later, just over 240 had enrolled.¹ The problem wasn't that millions of Americans didn't want the life-saving health insurance the president had promised them, it was that they could not create accounts due to technical difficulties despite the project's \$300 million price tag.²

Healthcare.gov was hardly an isolated incident, but its high-profile failure shed light on the magnitude of the technology problems that have plagued the government for years, from the Air Force scrapping a \$1 billion combat support software system to the loss of tens of millions of dollars by the FBI and the Census Bureau on problematic IT projects.³

This problem will only get worse in the coming years. The federal government faces technology challenges on three fronts: the collapse of pre-existing, critical systems, such as those supporting Social Security payments and those at the IRS used for processing income tax returns; the failure of new systems built to support key policy initiatives, like Healthcare.gov; and the need to promote the benefits and manage the risks of new technologies, including autonomous vehicles, artificial intelligence and synthetic biology.

Without an influx of modern technical talent, a transformation in how the government thinks about and executes technology projects, investments in existing staff and the inclusion of technologists in policymaking, the government will not be prepared to face any of these challenges. As a result, the American people will suffer the consequences.

MODERN GOVERNMENT REQUIRES MODERN TECH EXPERTISE

Currently, the government is not doing enough to recruit and hire technical talent with broad experience in the private sector, to cultivate technical talent in the government or to bring a new generation of technologists on board.⁴

At the end of fiscal 2017, for example, data supplied by the Office of Personnel Management show that less than three percent of full-time information technology professionals were under the age of 30, while 51 percent were 50 years of age or older. Unless the government has provided significant training in modern tech, which evidence does not support, this suggests that the training and skills of the federal IT workforce are several generations out of date. If this does not change, leaders at all levels will not be able to implement programs and policies that people in America rely on.

Once the Healthcare.gov website failed, the Obama administration recruited more than 40 private-sector designers and software engineers to help. These experts were given one job: use their specialized knowledge to make the site work effectively for as many people as possible within an urgent time frame of four months.

1 Avik Roy, "The Truth Comes Out: Obamacare's Website Enrolled a Grand Total of Six People On Oct. 1," *Forbes*, November 1, 2013. Retrieved from <https://bit.ly/2LBTKOH>

2 Government Accountability Office, "Healthcare.gov: Ineffective Planning and Oversight Practices Underscore the Need for Improved

Contract Management," GAO-14-694, July 2014. Retrieved from <https://bit.ly/2LQLfT>

3 Patrick Thibodeau, "Healthcare.gov website 'didn't have a chance in hell,'" *Computer World*, October 21, 2013. Retrieved from <https://bit.ly/2NIVO4V>

4 *Government's lack of IT expertise is due to a variety of factors, including the perception that it is not on the cutting edge of technology. Where government has been ahead of industry in technical leadership, it has attracted strong specialized talent, such as at NASA and the Defense Advanced Research Projects Agency.*

They were remarkably successful. Working with the existing team, they were able to understand and fix the problems and relaunch Healthcare.gov, eventually allowing millions of people to sign up for health insurance. This was only possible because the team of technologists brought in new skills the project previously lacked, such as experience rolling out modern technology products on a large scale. They also succeeded because they were given a clear mandate and broad authority to make the program work.

The Healthcare.gov experience led to the creation of the United States Digital Service in 2014, an organization that deploys teams of technologists to agencies, and to increased support for 18F, a new digital services shop launched the same year within the General Services Administration. These organizations joined the Presidential Innovation Fellows program, which was launched in 2012 to bring talent from the private sector on 12-month tours of duty to work with agencies on technology initiatives.

These programs, which are referred to in this report as “the Digital Services,” focus specifically on addressing the gap in technology skills and best practices between government and industry by bringing in engineers, product managers, designers and other technology leaders to work directly in or with agencies to solve specific problems.⁵

Since their creation, the Digital Services organizations have been remarkably effective in addressing high-impact technical challenges.⁶ They have helped strengthen the struggling State Department visa processing system; built a system for NATO allies in Afghanistan to communicate with one another; launched an online tool to help students and their families choose a college based on access, affordability and outcomes; and much more.

The Digital Services teams working with career civil servants also have made progress on projects that have been stalled for years, such as moving the immigration processing system online—a testament to how vital technology can be to breaking deadlocks and driving change. Their work shows what can be accomplished with the right talent and support. In 2017, Office of Management and Budget Director Shaun Donovan summarized many of the lessons from these and other Obama administration modernization efforts in a comprehensive exit memo.⁷

This effort has continued under the current administration. USDS teams today are working with the Center for Medicare & Medicaid Services to change the way Medicare pays doctors and clinicians, rewarding them for the quality—and not the quantity—of care they provide. They also are working with the Small Business Administration to reduce the burden on small businesses applying for assistance; building out Vets.gov, a single website to unite all resources available to veterans at the Department of Veterans Affairs; and running a training program for government staff on how to buy digital services more effectively. This work is highlighted in the Trump administration’s management agenda released in March 2018.

“USDS continues to produce significant value across the government, using design and technology to deliver quality services to the American public,” the administration said in outlining its management agenda. “The United States Digital Service and GSA will support modernization efforts by leveraging top technical talent to help agencies solve the technical challenges posed by upgrading legacy systems and technologies.”⁸

The work of the Digital Services teams provides a template for how government can improve technical programs and implementation. The experience of these teams, including both their successes and failures, can serve as a foundation for building specialized expertise across the federal government and serve as a model at the state and local levels. By leveraging the lessons of the Digital Services, government executives can proactively tackle the technology challenges that face us now and going forward.

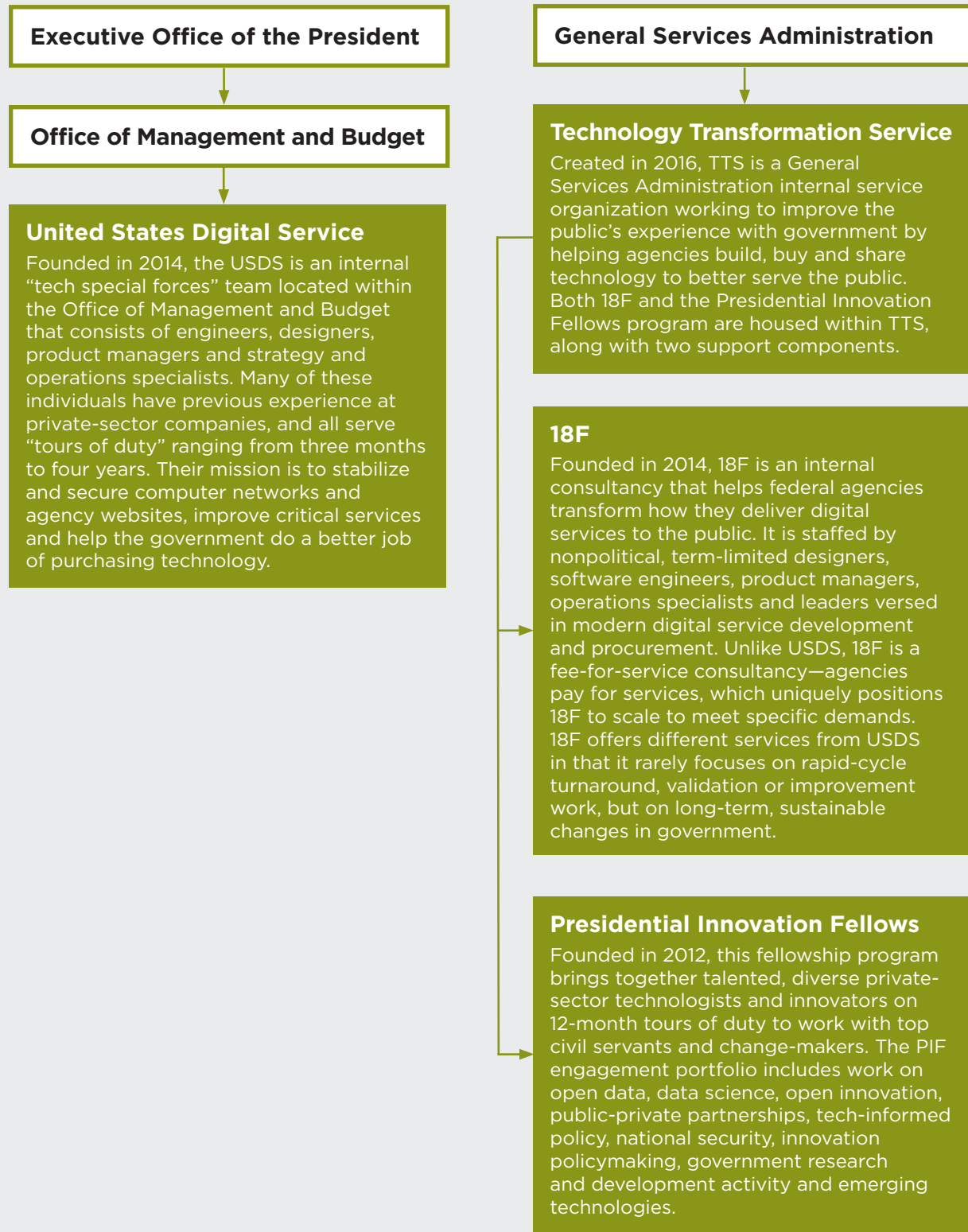
5 The White House Office of Science and Technology Policy, while not one of the Digital Services, was also a key part of this movement and provides the government with vital technological and scientific expertise.

6 The U.S. Digital Service, “Fall 2017 Report to Congress,” 2017. Retrieved from <https://bit.ly/2LBeciY>

7 Shaun Donovan, “Office of Management and Budget Cabinet Exit Memorandum,” January 5, 2017. Retrieved from <https://bit.ly/2NGOCgw>

8 The White House, “President’s Management Agenda,” March 2018. Retrieved from <https://bit.ly/2q4CQfZ>

THE DIGITAL SERVICES: TECHNICAL TOURS OF DUTY IN THE FEDERAL GOVERNMENT



THE ROLE OF EMERGING TECH IN FEDERAL FOCUS AREAS

There are enormous opportunities to improve government services through technology. Some of these opportunities arise from new, innovative technologies that are just being developed. Others have existed in the private sector for a long time, but are only now emerging into the public sector.

| Focus Area | Opportunity |
|----------------------------------|---|
| National/homeland security | Defend against threats such as cyberattacks and engineered pathogens and strengthen U.S. leadership in technologies that are critical for national security, such as AI and quantum computing. |
| Economic growth and job creation | Foster economic growth and job creation by creating the right environment for the industries of the 21st century. Partner with regions to create dozens of innovation hotspots in America's heartland. |
| Education | Encourage the development of advanced learning technologies, such as software that is as effective as a personal tutor. Make computer science a "new basic" for K-12 education, and move the U.S. from the middle to the top of the pack in STEM education. |
| Energy and environment | Accelerate the transition to a low-carbon economy. Develop a "circular" economy so that the waste of one industry is the raw material of another. |
| Health care | Allow Americans to lead longer, healthier lives by improving our ability to diagnose, treat, cure and prevent diseases such as cancer, diabetes and Alzheimer's. |
| Workforce development | Reduce the time and cost for workers in low-wage jobs to master a skill that is a ticket to the middle class. |
| Transportation | Reduce fatalities, injuries and traffic congestion with self-driving cars and intelligent transportation systems. |

In order to take advantage of these opportunities, it is critical to employ best practices for building and maintaining technology that have been followed for years, even decades, outside of the government. Adopting best practices around databases; streamlined, user-driven online services and websites; systems with more than 99.9 percent reliability; and a relentless focus on user experience will make government services more accessible, convenient and useful for all Americans who depend on them.

How technology experts can help improve government outcomes

The goal of digital service organizations is to bring technology experts into government to make a positive, outsized impact on program and agency outcomes. In addition, these organizations seek to serve as force multipliers by increasing the effectiveness of the federal workforce.

The Digital Services have succeeded by introducing new tools and technologies, often at lower cost. The technologists have employed new techniques, processes and methodologies; informed policy development, making policies more realistic to implement and maintain; and created bright spots that have demonstrated how problems can be solved and have ripple effects across government.

USING NEW TOOLS AND TECHNOLOGIES

Experts working for the Digital Services come from a variety of companies, universities and government agencies. They bring a range of experiences and perspectives, including new tools and technologies, to the federal government. One prominent example is the use of cloud-based services. Prior to 2014, most government agencies hosted online services on local servers housed in government or contractor-owned data warehouses. Using local servers led to services that could not easily grow. They functioned with only a few thousand users, but not with the millions they needed to reach. The government was also responsible for the maintenance of these servers, an expensive and time-consuming task.

When several USDS teams encountered this situation at multiple agencies, they recommended using cloud-based service providers such as Amazon Web Services or Microsoft Azure. They worked closely with the agencies to make sure these tools met government standards of security and privacy, and helped implement them once approved. Most importantly, because the Digital Services teams were connected across agencies, they were able to share what worked and what didn't in securing approvals and implementing the services. As a result, many agencies have been able to adopt these resources more quickly than in the past.

Experts from technical industries also have brought knowledge of how common problems have been solved elsewhere, such as building cross-platform login systems to make accessing services simpler. Nearly every online service has some kind of login or identity management system that authenticates users. The government is no different. However, since the government offers hundreds of online services, all built and operated independently, it has hundreds of identity management systems. For instance, citizens cannot use the same username and password to file their taxes as they do to apply for TSA PreCheck, the system that allows travelers to speed through airport security. To tackle this problem, teams from 18F and USDS built Login.gov, a single account people can use to sign into government services. The service was launched in April 2017 and is in various stages of implementation at agencies across the government. More than five million Americans have already signed up for an account.⁹

By adopting tools that are standard in the private sector, government can rapidly improve services for users, break down silos that lead to overspending and repeated reinvention of the same solutions, and increase security in the process. Recruiting and supporting technical experts with current experience hastens the flow of these tools into government and their widespread implementation.

APPLYING NEW METHODOLOGIES

The private sector and government handle software development very differently. Most software companies now use an agile approach, where products are developed, tested and improved in short, iterative sprints (often as short as one or two weeks). A basic version of the product is delivered very early in the process and then improved over time based heavily on user observation and feedback.

The government, on the other hand, builds and buys software the way it builds and buys battleships. It grants large, multi-year contracts where all the requirements and timelines are laid out on the first day and the product is built following those specifications without input from users. This is how Healthcare.gov was built and is one of the reasons it failed.

By operating in an agile manner, and delivering functional software much more quickly and cheaply than the traditional government methods, the Digital Services have been able to create and test higher-quality products. At the same time, new, more flexible procurement and hiring procedures have emerged to support the agile approach.

9 Sara Friedman, "Login.gov hits 5 million users," *GCN*, May 15, 2018. Retrieved from <https://bit.ly/2uNRScj>

Another technique used sporadically in government prior to the introduction of the Digital Services is human-centered design. This is an approach to devising services and solving problems that focus on end users through constant and iterative user research and usability testing. Essentially, it means talking to users, designing for their needs and then testing those designs with them to determine if they accomplish the intended goals. This technique allows product teams to deeply understand their users, and this research forms the foundation on which they build services and experiences.

The USDS team at the Department of Veterans Affairs, working closely with career staff, used this approach to ask veterans what frustrated them during their experiences with the VA. They learned that veterans going online to obtain information, benefits and services often ended up discouraged by a complicated tangle of websites, forms, logins and outdated digital tools.

As a result, the USDS team worked to consolidate the hundreds of online portals into one easy-to-use platform known as Vets.gov, which enables veterans to more easily discover, apply for, track and manage many of the benefits and services they have earned. Since its launch, more than 1.6 million veterans have logged into a Vets.gov account. That number is expected to grow substantially as the team merges the platform with the department's main information resource—VA.gov—which serves some five million visitors a month.

One part of this effort involved use of the human-centered design approach to build a new online application for veterans to apply for health care benefits. The USDS team and VA staff interviewed veterans trying to navigate the existing online application, which was used by less than 10 percent of applicants. One veteran described the existing application as “a back door that’s blocked with spikes and IEDs.”¹⁰ The USDS team and VA staff tested prototypes in interviews with veterans, leading to a version of the form that was launched in the spring of 2016. Today, more than 50 percent of all applications are submitted online.¹¹

These new approaches and methodologies make building software easier, faster, cheaper and, most importantly, provide better outcomes for citizens.

INFORMING POLICY DEVELOPMENT

Policies, regulations and laws are usually written by some combination of politicians, policy experts, lawyers and economists. The deliberations and negotiations rarely involve technologists even when the policies in question are about technology or reliant on technology for implementation. This often leads to situations where outdated tools, inflexible data structures or inefficient architectures are required even if this prevents the policies in question from actually working.

Technologists should have a seat at the table to avoid unnecessary and burdensome requirements and anticipate future impacts. Agencies that run sizable citizen-facing programs or that deal with emerging technologies like self-driving cars, artificial intelligence or synthetic biology cannot afford to make decisions without advice from experts deeply familiar with the potential and pitfalls of modern technology. And in order for technologists to make the best possible recommendations for how policies can be shaped and executed, they must be immersed in government and working within agencies. Government needs technologists in policy development conversations to effectively serve people today and anticipate needs for tomorrow.

10 The U.S. Digital Service, “Introducing a new digital application for health care at VA,” *Medium*, July 1, 2016. Retrieved from <https://bit.ly/2OdcF0K>

11 The U.S. Digital Service, “Simplifying Veteran-facing Services with Vets.gov,” December 2016. Retrieved from <https://bit.ly/2JQ3Pmp>

BUILDING BRIGHT SPOTS

All of the above—tools, techniques and technology-informed policy—have yielded a number of wins, or bright spots, for the federal government. The American people have seen how government can solve problems and provide quality experiences and outcomes for veterans, students, immigrants and patients. These types of success stories can improve morale and confidence in the government’s ability to serve people. They also can inspire more technical experts to work in government.

The experts the Digital Services recruit for short tours of duty are not doing this work alone. The work is only made possible with the partnership of senior executives, civil servants and contractors who bring vital expertise and wisdom to the table. This close collaboration energizes all who are involved to raise their expectations of what is possible and how they can make a difference in the lives of citizens. The ripple effect is powerful.

As an example, the USDS team at the Department of Defense helped revolutionize the way government organizations find and fix security vulnerabilities in their digital systems. They suggested the use of a bug bounty, a common private-sector method that encourages citizens to identify and report security flaws in exchange for monetary rewards.

The DOD and USDS teams launched the first federal bug bounty program in spring 2016, which led to the resolution of 138 vulnerabilities for only \$150,000—far less than the estimated \$1 million that it would have cost by hiring an outside firm to do a security audit and vulnerability assessment.¹²

The success of this program inspired the Pentagon to allow all military components to launch their own bug bounties. Since then, the department has run eight more challenges, identifying more than 3,000 security issues and making DOD systems more secure.¹³ Following the Pentagon’s lead, the General Services Administration launched the first civilian agency bug bounty in August 2017.¹⁴ More agencies are taking notice and hoping to follow in their footsteps.

The question now becomes how to source and recruit more people with these skills and perspectives. There is a narrative in the technology industry that great engineers can change the world by creating great products. So far, the Digital Services have given several hundred engineers—and a host of specialists—the opportunity to do exactly this through tours of duty within the federal government. In this work, they have discovered the ability to make a difference on a previously unimaginable scale and depth by strengthening the public-sector services we all depend on.

The tech industry is watching and taking note. But it is imperative that the government rethink how it hires and empowers these experts so that it can bring more of them into the civil service. When agencies are ready to do so, they will have an audience eager to serve.

12 Department of Defense, “Carter Announces ‘Hack the Pentagon’ Program Results,” June 17, 2016. Retrieved from <https://bit.ly/2Loxitd>

13 The U.S. Digital Service, “Hacking the Pentagon,” 2017. Retrieved from <https://bit.ly/2v5gWuz>

14 “TTS Bug Bounty: The First Civilian Agency Public Bug Bounty Program,” August 2017. Retrieved from <https://bit.ly/2wk7ySy>

Seven Strategies to Strengthen the Federal Government's Technical Workforce

Based on research and conversations with agency leaders and those who worked for and with the Digital Services, we offer seven recommendations to enhance the technical expertise in government and provide a foundation for success.

1. Hire, appoint and empower leaders with knowledge of modern technology
2. Use private-sector best practices to recruit and hire tech talent
3. Create the conditions for success
4. Upgrade the technical skills and competencies of the existing workforce
5. Build the brand and tell more stories
6. Remove structural barriers and make operational excellence possible
7. Consider ideas for future exploration

1. HIRE, APPOINT AND EMPOWER LEADERS WITH KNOWLEDGE OF MODERN TECHNOLOGY

It is difficult to think of any major government mission or agency responsibility, whether it's responding to an Ebola outbreak, delivering services to veterans or formulating transportation policy, that doesn't rely on and benefit from technology expertise. Having senior leaders who understand technology and its importance to the mission is fundamental for ensuring a high level of government effectiveness.

Therefore, to roll out programs and policies, it is necessary to have a combination of political appointees and career leaders with successful track records using technology to accomplish goals on a large scale. It also is vital to hire technical experts into roles where they are integrally involved with both program execution and the core senior leadership team, and where they participate in policy discussions from day one. This ensures that those leading the development of critical policies understand the constraints and opportunities presented by existing and emerging technologies. Familiarity with and appreciation for modern technology in top leadership positions is so critical for success that such expertise should be no more than one step removed from an agency's leader.

This is true whether a program is being executed by government employees or contractors. Even when buying private-sector services, the government needs a critical mass of top in-house technical talent. Without these skills, agencies will not have the expertise to fully understand the solutions they need or evaluate which contractors are best to deliver those solutions. Agencies also need employees with the technical knowledge and skills to manage contractors efficiently and drive continuous improvement in agency operations.

The level of knowledge necessary, of course, depends on the person's leadership role. A Cabinet secretary or agency director, for instance, does not need to know how to write code, but should understand the importance of cloud storage. However, program directors and others responsible for moving the immigration system online, for example, will be most effective if they understand in great detail how to use the cloud and are fluent in security protocols and website reliability requirements.

Similarly, agency chief information officers should be highly skilled technological managers who can successfully handle existing technical operations, infrastructure and services. They should be able to work effectively with leaders across the organization to modernize service delivery and the approach to buying and implementing technology infrastructure. Crucially, they also should be able to alter the expectations of government digital services. These services should be useful, intuitive and available 24/7. Optimal candidates will have led organizational migrations from old systems to modern ones and have a track record of collaborating successfully with operations, product and engineering leaders to support the delivery of digital services.

While agency leaders must drive their own technology transformations, government-wide leadership also is critical. As former Office of Management and Budget Director Shaun Donovan noted in his 2017 exit memo, "Agency and government-wide leadership [must] build, empower, and support these teams by knocking down roadblocks rather than by 'gatekeeping.' This includes leadership establishing rapid escalation procedures for teams to get help with roadblocks as they are encountered—to avoid wasting time."¹⁵

Agencies also have a support system that can be of assistance, including the federal chief information officer and federal chief information security officer within OMB, the General Services Administration which offers a variety of shared technology services, and the Office of Personnel Management, which can assist agencies in the hiring of technical experts.

To tackle the complex problems facing our country, it is critical that the government hire and empower technical leaders. While progress has been made, the federal government is in the very early stages of developing its digital capacity and leadership. Ultimately, the goal is to raise the bar for what is expected of senior executives, and this starts by hiring people who know what is possible. According to the Donovan exit memo, "the probability of an agency being able to successfully modernize without such leaders is zero."¹⁶

¹⁵ Shaun Donovan, "Office of Management and Budget Cabinet Exit Memorandum," January 5, 2017. Retrieved from <https://bit.ly/2NGOCgw>

¹⁶ Ibid.

AGENCY LEADERS REQUIRING MODERN TECHNICAL EXPERTISE

Deputy Secretaries should possess modern technological expertise. Barring that option, an assistant secretary for management or a senior technology advisor to the secretary should have significant technical knowledge.

Chief Information Officers should have the ability to elevate expectations of what is possible through technology and align agency policy and programs in support of better user outcomes.

Chief Innovation Officers and **Chief Technology Officers** should be capable of innovating across agency silos. Optimal candidates should have agency-specific knowledge and a track record of successfully engaging across organizations.

General Counsels should be able to work effectively with technology leaders focused on modernizing infrastructure and service delivery. These individuals should have experience collaborating successfully with operations, product and engineering leaders in organizations to support the delivery of modern digital services and products.

Chief Human Capital Officers should be familiar with current private-sector hiring and recruiting practices, have an entrepreneurial mindset and be ready to find creative ways to compete for high-tech talent. Critically, they must prioritize the quality of the people they hire rather than simply the number of hires.



MANAGEMENT IMPERATIVES FOR IMPROVING AGENCY DIGITAL SERVICES

Former OMB Director Shaun Donovan, in his exit memo at the end of the Obama administration, said agencies must be the primary drivers of transforming government technology delivery in their own domains. And key to agency success, Donovan said, is having the right leaders and management teams in place to drive change. Here are his ingredients for success:

- The agency's senior leadership, including the secretary, deputy secretary and CIO, should understand the need for, strongly support and personally sponsor ongoing transformation.
- The management team driving ongoing transformation work should include and empower senior managers as well as product and engineering leaders. These leaders should have deep expertise and experience in modern, agile, customer-centered service; software design and development; digital service product management and mission-driven information technology delivery.
- Small, semi-autonomous teams that are experienced in technology and working in modern ways should be created and empowered to make decisions and be held accountable for results. These teams require strong, ongoing support from management to advance transformation as they run into the inevitable barriers and issues that arise when changing how organizations work.
- Reforming procurement policies, processes, practices and capabilities is necessary to enable agencies to access best-in-class private-sector contractors and commercial product and service offerings in an efficient way.
- Transformation efforts must be aided by acquisition professionals who are deeply versed in digital service contracting best practices, and by recruiting and hiring professionals who understand how optimally to bring technical talent into the government.

CRITICAL GOVERNMENT-WIDE TECHNOLOGY ROLES IN THE WHITE HOUSE

U.S. Chief Information Officer: This individual, who oversees federal technology spending, information technology policy and strategic planning of all federal IT investments, should have experience transitioning large, complex organizations from legacy to modern technical systems. The federal CIO also should have a track record of using influence rather than authority to make critical changes.

U.S. Chief Information Security Officer: The CISO guides federal cybersecurity policy, planning and implementation. The optimal candidate will have deep knowledge of the current field of information security, including areas such as cloud-based systems and identity management, and have a track record of successfully using influence and policy to build strong security practices across complex organizations.

U.S. Digital Service Administrator: The leader of USDS must recruit and manage teams of top IT personnel who can work with agencies to improve the usability and reliability of our government's most important digital services. Candidates should have a track record building and leading small, semi-autonomous teams of experts in design, product management and software engineering, and in using industry best practices.

Director of the Office of Science and Technology Policy: The director of OSTP should have broad experience in science and technology policy to ensure that the president understands issues associated with everything from cybersecurity to building a foundation for precision medicine to addressing disease epidemics. Other critical roles within OSTP include the chief technology officer and IT policy experts with experience in areas such as net neutrality, broadband, spectrum policy, encryption and cybersecurity. OSTP also has information policy experts with experience in areas such as open data, privacy and data ethics; innovation policy experts with experience in the use of innovation policy tools such as incentive prizes; and experts in emerging technologies.

KEY TECHNOLOGY SUPPORT AGENCIES

In order for agencies to make fundamental changes in how they deliver services driven by technical experts, they often must seek assistance from organizations within the government that offer enterprise-wide support services.

Office of Management and Budget: OMB has extensive influence on how the federal government operates through its mission to administer the federal budget and oversee the performance of federal agencies. With its wide-reaching oversight authority, OMB has the opportunity to guide agencies in spending their technology money and managing technology projects more effectively. But in order to achieve this objective, OMB must have the necessary technology expertise on its staff.

General Services Administration: GSA provides shared services to all of the federal government and is a natural home for the growing collection of shared technology services available within the government. Login.gov, the single account people can use to sign into a variety of government services, is being built under the auspices of GSA. In addition, GSA procures and provides a wide variety of tools and services for the entire federal government, including IT. For GSA to be effective, it must have the necessary technical expertise on staff to lead these innovative initiatives and ensure that quality technology decisions are being made at all levels of federal IT.

Office of Personnel Management: OPM sets federal personnel and HR policies and manages the federal workforce. It is vital that OPM leaders understand the value of increasing the government's technology expertise. The recruiting and hiring changes necessary to make government an attractive and competitive employer for tech experts require the support of OPM.

Office of Presidential Personnel: The PPO is responsible for identifying and hiring political appointees throughout the government, including Cabinet-level positions. Many of the leadership positions in technology are political appointees. It is essential, therefore, that the PPO leadership recognizes the value of technical expertise, and that it has highly qualified staff dedicated to the recruitment, selection and hiring of technology experts.

2. USE PRIVATE-SECTOR BEST PRACTICES TO RECRUIT AND HIRE TECH TALENT

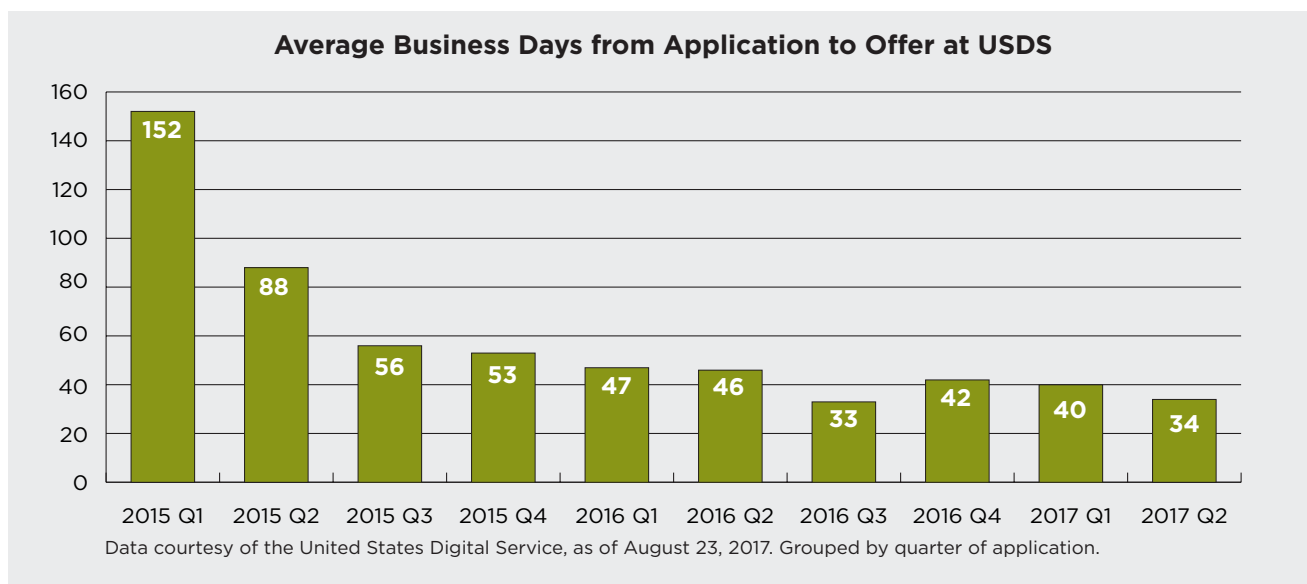
Government hiring is often slow and painful for applicants, and jarringly different from the private sector. In the technology industry, the current best practice is that it should take no longer than 30 days from the time a candidate expresses interest in a role to making an offer.¹⁷ In some cases, this can happen within a week. In the federal government, the Office of Personnel Management estimates that the average time to hire is now about 106 days, and it often can take much longer.¹⁸

From the perspective of a candidate, the length of the hiring process puts the government at an immediate disadvantage. This disadvantage is compounded by other factors, including the need to submit an extensive government-style resume and minimal communication from HR during the decision-making process. Those hired also have to fill out lengthy background investigation forms.

In addition, public-sector work has a poor reputation among potential technology candidates who have heard that government is intractable and that real impact is impossible. This makes potential candidates less inclined to apply or to stick around through setbacks in the hiring process. And even when highly qualified technical candidates apply, agencies often struggle to successfully identify those individuals because they do not have the adequate expertise to evaluate these skill sets. Thus, any agency that wants to compete with the private sector for top technology talent must exert considerable effort to counteract these disadvantages.

The Digital Services found that the best way to do this was to create their own talent teams to manage the recruiting and hiring process in-house, meet all compliance requirements including veterans' preference and coordinate with agency HR teams when necessary, rather than rely on HR to manage the whole process. The teams are intimately familiar with effective industry practices, prioritize active recruiting, provide an excellent candidate experience and lead a rigorous selection process based on technical evaluation by subject matter experts.

Ultimately, through building an internal team to run recruiting and hiring, USDS hired nearly 300 high-caliber staff members in its first three years, about half of whom were actively recruited. USDS reduced time from application to offer from about 152 days to 34 days over that period of time—in line with the tech industry—and maintained a high candidate satisfaction rating even during the change of presidential administration and a government-wide hiring freeze.



¹⁷ It takes 30–60 days to process a strong candidate from first contact to formal offer, according to Dan Portillo, talent partner at Greylock Partners. Outside of 60 days, hiring a competitive candidate becomes difficult.

¹⁸ Nicole Ogrysko, “It took agencies an average of 106 days to hire new employees in 2017,” *Federal News Radio*, March 1, 2018. Retrieved from <https://bit.ly/2F6uXQp>

Techniques used by USDS to find and hire technical talent can be adopted by federal agencies

Agencies wishing to compete with the private sector for technical hires can learn a great deal from the recruitment and hiring methods used by USDS. Ideally, large agencies that have a high demand for technical employees should create specialized talent teams that work closely with HR offices. For agencies where this is not possible, hiring managers and HR staff should take a page from the USDS playbook and seek to adopt many of the best practices outlined below.

Active recruiting

The standard practice at many government agencies for filling a job opening is to “post and pray”—post a position online and wait for people to apply. However, most of the ideal candidates for technical positions have never considered working for the government, so they never see the job posting and never apply.

The solution to this problem in the government is the same as at most private companies: actively recruit a diverse group of candidates with critical technical skills. The Digital Services employ an active recruiting strategy based on best practices from private-sector technology companies that are recruiting from the same talent pool. They hire technical recruiters with deep technology experience who build relationships with potential recruits, getting to know them and educating them about the work, rather than selling them on the idea of a specific role. They work to expand their networks of potential candidates, generate referrals and reach outside of who they already know to find candidates with diverse skill sets and backgrounds.

Just as many private-sector technologists today believe they have no place in the government, many people within the government assume that private-sector employees are not interested in this type of work. The Digital Services found that both of these assumptions were wrong.

When USDS invested the time to build credibility in the tech industry through connecting with leaders across the field, pursued leads and talked to people about the opportunities available, it discovered a great deal of interest in the work. But without that effort to actively recruit staff, most of the Digital Services’ current employees would never have taken the leap.

Rigorous technical evaluation

Recruiting talented technical specialists to work for the government is a difficult task. And when individuals apply, determining whether they are qualified for the role and should be hired is equally challenging and important. It’s also a step where government HR teams can struggle.

The goal of the selection process seems straightforward: identify the qualified candidates from among the pool of applicants. But government HR teams have to make decisions under multiple constraints. This includes balancing compliance with the numerous, overlapping and sometimes contradictory laws, regulations and policies, and relying only on the available resources and tools.

This places agency human resources staff in a very difficult position. The resources available are a relatively fixed constraint. Their tools are limited and the price of not meeting compliance requirements is higher than the price of not hiring the best people. This pushes HR to focus first on compliance and second on making sure they are hiring the most qualified people. This is quite different from the tech industry, where compliance is assumed and hiring top candidates is expected.

The standard government selection process is set up to select qualified candidates based largely on their resumes. This doesn’t work well when recruiting for technology roles because most government HR specialists are not familiar with the skills and competencies needed. Moreover, qualifications are determined based on a candidate’s self-reported competencies, data that has little or no correlation with on-the-job performance. Research in this field shows that the best tools for determining whether someone will be effective in their job are work sample tests and structured interviews.¹⁹

¹⁹ Laszlo Bock, “Work Rules!: Insights from Inside Google That Will Transform How You Live and Lead,” Hachette Book Group, April 2015.

USING TECH INDUSTRY TALENT RECRUITMENT AND SELECTION BEST PRACTICES

At USDS, leaders forged trust between the talent team and HR personnel in an effort to experiment with new tactics and solutions to meet three primary challenges:

| Government Challenge | USDS Solution |
|--|---|
| The government does not receive enough qualified applicants for technical roles because they do not recruit them. | Actively identify and recruit top professionals using specialized recruiters, staff and a diverse group of technical leaders. |
| The government selection process does not always produce the most qualified hires, particularly in technical fields. | Devise a selection process where every candidate is evaluated by subject matter experts based on validated research and criteria. |
| The government often provides a poor candidate experience because its process is slow, confusing and opaque, and requires candidates to jump through numerous hoops. | Prioritize the candidate experience. Proactively communicate, walk candidates through complex steps and improve consistently based on candidate feedback. |

Based on a regulation allowing for different methods to hire specialized talent available to all agencies, USDS, 18F and Presidential Innovation Fellows created and ran their own structured selection processes. Over time, they built tools and methods for receiving, processing and evaluating applications that were reviewed and approved by the Office of Personnel Management. USDS ended up with a selection process where subject matter experts performed structured interviews with candidates to determine whether they were qualified.

This is fairly standard practice in specialized industries, and specifically in the technology industry, which is where USDS looked for inspiration (with tweaks to mitigate the risks of interviewer and selector bias). USDS applicants were reviewed by individuals doing the same job they were under consideration for. The reviewers and interviewers evaluated candidates against a set list of competencies tailored to the candidates' skills, and used questions from a list developed by their peers. These questions included work sample tests such as coding exercises and hypothetical scenarios. The ultimate decision of whether a candidate was qualified was made by leaders in such disciplines as design and engineering based on interview feedback.

The questions and competencies were developed by the subject matter experts, rather than the talent team, and the entire evaluation process was driven by the people doing the actual work. This created very useful feedback loops throughout the organization. The people who created the interview questions also used them; the people doing the work at USDS were determining the skill sets for evaluating candidates; and the people who decided whether candidates were qualified were responsible for their performance once hired.

The result was a selection process that was far more effective at identifying qualified technical candidates than the standard government approach.

Providing the best possible candidate experience

The USDS talent team was defined by a relentless emphasis on candidate experience and mission. Not only was this the right thing to do, but offering a stellar candidate experience was also one of the only things USDS could do to improve its ability to compete with tech companies. They knew their hiring process would be slower than the private sector and that their pay and other compensation would be lower. To recruit, USDS officials emphasized its social mission and scale of impact, techniques that were successful in attracting candidates to apply. But they knew they would lose most of the candidates if the selection process was too long or painful. To improve this segment of

the candidate experience, the talent team focused on drivers of success that are already best practices in industry: increasing the speed of the process, staying in constant communication with candidates and gathering feedback from candidates to iteratively improve the process.

USDS was more successful in some parts of the interview and hiring process than others. Since USDS managed the interview process, it was able to reduce time from application to offer from 152 days in the beginning of 2015 to 34 days by mid-2017 while maintaining the same rigorous selection process. However, USDS candidates still were subject to traditional federal human resources rules regarding making offers, setting salaries and running background and suitability reviews. This process was considerably slower, generally taking 40 to 60 additional days. Even when HR made heroic efforts to assist candidates, they were often constrained.

Ultimately, USDS lost very few candidates during the interview process, but of those it wanted to hire, more than half dropped out after receiving an offer. Some of these candidates would have chosen not to join anyway, but most dropped out because the process was confusing and uncertain as well as too slow relative to other options.

Fortunately, current and future administrations have the chance to prioritize improvements in this area in order to bring in high-demand professionals at scale.

Using tools that already exist

When USDS was founded, the leaders hoped they could run their own expedited selection process that would permit them to quickly hire specialized or high-need career staff with no term limits. However, no such process existed, and creating one would likely have required new legislation, something that would have taken months or years to push through Congress if it was even possible. USDS chose to use Schedule A hiring authority, a provision in federal hiring regulations that allows agencies to more quickly hire high-need, specialized talent for limited terms.

Another example of an existing hiring tool used across the government is the Intergovernmental Personnel Act, which allows government agencies to recruit employees from academia, state and local governments and nonprofits for temporary tours of duty.

Significant resource investment

All of this work, from active recruiting to having subject matter experts make qualification determinations to staying in constant contact with candidates, was essential to the success of the USDS talent team—and enormously time-consuming.

By its third birthday in August 2017, the USDS talent team was composed of 15 people serving an organization of 150. USDS made the decision early on to invest in the talent pipeline by having a large talent team and by dedicating agency-wide resources to recruiting and hiring. This is because the organization's tour-of-duty model meant that there would be 30–40 percent staff turnover annually, requiring a steady flow of qualified candidates to make continuous progress.

This was not always an easy decision. However, finding the best people is the lifeblood of any organization, and cutting critical resources from the hiring team would have had amplified negative downstream effects on the organization's outcomes.

USDS, with the help of agency partners, has proven the value of investing heavily and consistently in talent. It's easy for this priority to get lost in the daily negotiation between the urgent and the important. Long-term success requires constant reminders to everyone that a steady influx of talent is paramount. The bottom line is that hiring technical talent into government is an uphill battle, but a battle worth fighting to create enormous value.

Fortunately, improving the government's ability to recruit and hire the people it needs doesn't require large-scale, revolutionary change, but instead can be done by a small, determined team with the right goals and tactics. As USDS found, a state-of-the-art talent team with partners in civil service and executive support can close the gap between modern technical hiring in the government and the private sector. This approach, or at least adoption of many of the practices employed by USDS, can give government agencies a fighting chance to enlist the country's top technical talent and help them become change-makers.

3. CREATE THE CONDITIONS FOR SUCCESS

Bringing in the right people with the right technical expertise will have little impact if they aren't working on the right problems and empowered to be successful. To make this possible, the Digital Services worked not only to hire great people to partner with dedicated civil servants, but also created conditions that allowed them to make a difference.

Upon arrival at USDS, new employees are told that success is not guaranteed and failure is expected at least some of the time. At the same time, USDS leaders work with staff to do everything they can to set them up for success, such as securing top-level executive support and not sending anyone into a project alone. There are a set of baseline conditions without which any project is almost certainly doomed to fail. It is critical that government leaders ensure that all technical projects meet these baseline conditions to give all employees, including technical experts, the best possible chance of having an impact.

Through experience, USDS developed a few core principles:

- **Ensure executive air cover.** Approval and endorsement from senior agency leaders, particularly secretaries and deputy secretaries, is essential to institute technology changes that will affect services and internal operations. This includes a direct line to those who can make decisions and clear obstacles.
- **Never send anyone into agencies alone.** Always send in teams with the skills necessary to do the job.
- **Listen to the civil servants.** No problem can be solved without a partnership with civil servants. Many federal employees have been working on ambitious projects for years and bring vital expertise.
- **Create a sense of belonging, shared identity, culture and community.** The close-knit and collaborative ideals of the USDS culture generated interest from talent within the technology industry as well as passion for the work and loyalty to the cause. The focus by USDS on values helped retain people longer than they intended to work in government, increasing impact.

Based on their experiences, USDS officials developed a set of values for leading successful projects across government. These tenets are core to how USDS teams approach their work and make decisions and have become vital conditions for success:

- **Hire and empower great people.** Both elements are prerequisites of success—hiring people with the technical ability needed to get the job done, and empowering both the new hires and the people already on the job to make informed changes. Skipping either of these steps will ultimately lead to failure.
- **Find the truth, tell the truth.** Understanding the actual status of a project, whether it is good, bad or ugly, is vital. USDS team members are committed to presenting the realities of a given situation in full transparency and holding each other accountable.
- **Optimize for results, not optics.** If how things look is more important than achieving positive outcomes, a project will probably fail. This also means accepting and even applauding failures that lead to future successes.
- **Go where the work is.** By working directly in and with agencies, the Digital Services can impact citizens who most need government services. This starts with working directly with civil servants.
- **Design with users, not for them.** Every project should start and end with the needs of the users, not the needs of the agency or the developer.
- **Create momentum.** Work toward incremental, achievable goals on tightly scoped, outcome-oriented projects. Any project that looks like it is trying to boil the ocean will probably fail, but you can achieve great things by starting small.

The work of transforming how the government handles technology projects is incredibly hard. There are those who are resistant to change, the tools available trail behind the private sector and success requires relentless persistence. But with the right conditions in place and the right team on the ground, these challenges become exciting opportunities to improve the lives of millions of Americans. In order to truly have an impact on the government's ability to implement its priorities, creating these conditions is essential.

4. UPGRADE THE TECHNICAL SKILLS AND COMPETENCIES OF THE EXISTING WORKFORCE

The Digital Services model of recruiting a small number of people with technical skills is necessary but not sufficient to improve the federal government's capacity to design and execute technology projects. To make sustainable improvements, the government also needs to invest in and upgrade the skills of the existing technical workforce. This will require raising the expectations of political and career executives as to what can be achieved through technology as well as a concerted effort to improve the capabilities of the current IT workforce.

Raise expectations for senior political and career executives

Senior executives should embrace the best practices of the technology industry when it comes to serving the needs of people, whether it involves obtaining health benefits, receiving Social Security checks, applying for student aid or getting a small business loan. Yet the people-facing technology standards in government lag far behind the private sector. It is up to senior executives to push for the higher standards. For example, major websites such as Google, Amazon and Microsoft Azure commit to at least 99.9 percent uptime for their websites – meaning the website would go down no more than 8.75 hours a year. When healthcare.gov launched, it had a 91 percent uptime rate. At the time, The Atlantic magazine described the situation this way: “Imagine if Google.com randomly stopped returning search requests for two hours, every day, and you would be imagining a more reliable website than the one that [was] introduced.”²⁰ According to a site that monitors uptime of 1,000 websites across industries, many government websites are unavailable for four days a year, an uptime rate of 98.9 percent. As long as this is seen as acceptable performance, it will not improve.

Invest in IT employees

Tens of thousands of people work in federal government IT, many of whom do not yet have the modern technical experience to bring government technology into the 21st century. And with technology constantly changing, bringing existing technical workers up to date on what is possible in 2018 will be critical, but it won't be enough. Therefore, the government must build out the most important skills and competencies of the existing IT workforce, invest in training that works and create a culture of continuous learning.

Unfortunately, chief human capital officers across government do not believe they have “reliable information on how much they spend on training and for what purposes,” according to a 2012 General Accountability Office report.²¹ This makes it difficult to even begin comparing a professional development return on investment between the federal government and the private sector. Furthermore, GAO said some CHCOs reported they did not prioritize training so that the most important needs are met first and they did not evaluate the benefits of training.

In addition, in order to be promoted to more senior levels of project or program management, federal employees may have to receive certifications that teach and reinforce waterfall methodologies—a sequential, linear process of project management. This approach works for specific types of large projects such as buildings, bridges and battleships, but has been shown to be inefficient for building quality software and leading other types of rapidly evolving projects.²²

The federal government can learn from large companies that are facing similar challenges and are investing heavily in reskilling. As Scott Smith, AT&T's senior vice president of human resources operations, said, “You can go out to the street and hire for the skills, but we all know that the supply of technical talent is limited and everybody is going after it. Or you can do your best to step up and reskill your existing workforce to fill the gap.”²³

20 Robinson Meyer, “The Secret Startup That Saved the Worst Website in America,” The Atlantic, July 9, 2015. Retrieved from <https://bit.ly/2o1650K>

21 Government Accountability Office, “Federal Training Investments: Office of Personnel Management and Agencies Can Do More to Ensure Cost-Effective Decisions,” GAO-12-878, September 2012, 45. Retrieved from <https://bit.ly/2Nb7jXe>

22 18F, “Modern Software Product Development.” Retrieved from <https://bit.ly/2OiU8zX>

23 John Donovan and Cathy Benko, “AT&T's Talent Overhaul,” Harvard Business Review, October 2016. Retrieved from <https://bit.ly/2cECYuJ>

LEADING TRAINING INVESTMENT PRACTICES THAT MANY CHCOS REPORTED NOT IMPLEMENTING ROUTINELY

| Leading training investment practices | CHCO responses | | |
|--|----------------|----|-----------|
| | Yes | No | Sometimes |
| Practice (1a): Identify the appropriate level of investment to provide for training and development efforts | 11 | 16 | - |
| Practice (1b): Prioritize funding so that the most important training needs are addressed first | 12 | 15 | - |
| Practice 5: Compare different training delivery mechanisms and determine what mix to use to ensure efficient and cost-effective delivery | 11 | 16 | - |
| Practice 7(c): Have a formal process for evaluating the impact of training on the agency's performance goals and mission* | 8 | 8 | 11 |

Source: GAO analysis of CHCO responses to a GAO questionnaire.

*One agency that reported "I don't know" was included in the category "No".

AT&T has pursued several broad strategies to ensure that it has the workforce it needs to be competitive. AT&T created incentives for skill development by having managers clarify future roles and goals for teams and by aligning the people processes around those goals.²⁴ AT&T managers documented gaps between the current profile of their teams and future role profiles for themselves and their teams. They focused performance metrics on how a role more directly meets business goals; raised performance expectations; and changed compensation plans to lower the impact of seniority and increase the impact of high demand skills to motivate high performers. AT&T is offering their employees tools such as tuition assistance; online courses, nano-certificates and master's degrees in high-demand technical specialties such as software engineering and web development; career profile tools that allow workers to identify the skills they need for new jobs, and the ability to connect with nearby employees with similar skills; and career intelligence tools that allow workers to analyze hiring trends within the company.

The federal government should make similar investments to ensure wide employee understanding of the utility and tradeoffs of cloud computing, agile methodologies, human-centered design and the methods associated with building effective software over time.²⁵ Given the rapid pace of technological change, the federal government will need to make a commitment to support lifelong learning.

Lazlo Bock, former head of People for Google, identified three key areas of effective professional development.²⁶ The federal government would be a much more attractive employer for technologists if it invested in all three.

- **Build a culture of deliberate practice** in which the goal is continuous improvement over time with direct feedback.
- **Have your best people teach.** For example, have those who have effectively built cloud platforms and products in government or utilized agile methodologies to develop useful software, share their experience and bring their colleagues up to speed. The Digital Services has engaged civil servants in learning how to build effective software, first in the development of the Digital Service Playbook and then in the development of the Automated Testing Playbook.
- **Only invest in courses that change behavior.** Bock identifies four levels of testing to determine if a behavior has changed, with the ideal test being whether the behavior change has improved outcomes.

24 Susan Camaniti, "AT&T's \$1 billion gambit: Retraining nearly half its workforce for jobs of the future," CNBC, March 13, 2018. Retrieved from <https://cnb.cx/2FBr9ah>

25 Partnership for Public Service and Accenture, "Customer Experience." Retrieved from <https://bit.ly/2x8qk2m>

26 Laszlo Bock, "Work Rules!: Insights from Inside Google That Will Transform How You Live and Lead," Hachette Book Group, April 2015.

5. BUILD THE BRAND AND TELL MORE STORIES

When people think of top technical talent in government, they often think of organizations like NASA and the Defense Advanced Research Projects Agency because those are agencies with successful technology stories that have been chronicled in books and movies. But the federal government has many other compelling stories about technology it could and should tell if it hopes to recruit a critical mass of talented technologists. These stories fall into a number of categories:

1. **How technology has changed the way government delivers services. These stories inspire readers to see how their work could change the lives of millions of Americans:**
 - Redesigning the application process for Americans living in poverty to receive critical benefits.²⁷
 - Releasing FBI crime information through an interactive website that includes trend data, datasets for download and an open API so the public can build tools using the data.²⁸
 - Digitizing the application for veterans to apply for health care from the Department of Veterans Affairs.²⁹
 - Building tools to improve communication and coordination among NATO allies in Afghanistan.³⁰
2. **Technology industry leaders who brought best practices to government, demonstrating the impact of these individuals:**
 - DJ Patil, who became the first chief data scientist of the United States after executive roles at LinkedIn, Greylock Partners, Skype and eBay.
 - Matt Cutts, former head of the web spam team at Google, who became acting administrator of the USDS.
 - Megan Smith, who served two years as chief technology officer of the United States after working as a vice president at Google X.
3. **Federal leaders who found success partnering with the Digital Services experts, showing the value technologists can add for career civil servants and agencies:**
 - Former IRS Deputy Chief of Staff Elaine Ho, who helped the USDS team at IRS pull together various stakeholders and led the reorganization of the agency's research and data analytics office before becoming the USDS chief of staff.
 - Renata Maziarz, the director for data transparency at the Department of the Treasury, who was responsible for implementing the DATA Act with assistance from 18F.
 - Numerous VA civil servants partnering with USDS who have been vital to reaching and serving veterans through the Vets.gov platform.³¹
 - The many alumni of the digital IT acquisition professional training program who are bringing best practices in procuring digital services to agencies around the government.³²
4. **Stories of the successes that government will only be able to achieve with qualified technical expertise. Future technology professionals will have the opportunity to:**
 - Protect the United States from critical threats such as cyber warfare and engineered pathogens.
 - Allow Americans to live longer, healthier lives by improving our ability to diagnose, treat, prevent and cure diseases such as Alzheimer's and cancer. Initiatives like those furthering precision medicine have begun to explore ways to use data to tailor medicine to individuals and groups.³³
 - Provide veterans and their doctors with easily searchable and readable medical records during and after their service.
 - Make paying for federal education loans as intuitive as paying a phone bill.

The Digital Services discovered a few keys to telling successful stories for recruiting highly qualified technologists:

27 The U.S. Digital Service, "Redesigning the journey to critical benefits for Americans in poverty," Medium, January 5, 2017. Retrieved from <https://bit.ly/2LlC8aP>

28 18F, "Federal Bureau of Investigation: Opening up crime data," 2017. Retrieved from <https://bit.ly/2Of16Yk>

29 The U.S. Digital Service, "Introducing a new digital application for health care at VA," Medium, July 1, 2016. Retrieved from <https://bit.ly/2OdcF0K>

30 Issie Lapowsky, "Meet the nerds coding their way through the Afghanistan War," Wired, May 27, 2017. Retrieved from <https://bit.ly/2sjiBcV>

31 The U.S. Digital Service, "Meet the Digital Service at VA Champions: May 2018," Medium, May 10, 2018. Retrieved from <https://bit.ly/2LPlHzI>

32 TechFAR Hub, "Digital IT Acquisition Professional Training (DITAP) Alumni." Retrieved from <https://bit.ly/2OhCjBI>

33 Centers for Disease Control and Prevention, "Precision Medicine: What Does it Mean for Your Health?" 2018. Retrieved

- **Talk about results after they are completed, not before.** Audiences are used to governments making promises they can't deliver. By not talking about projects until they've actually finished, USDS gained credibility and set itself apart from other organizations. 18F took a different tack to share the lessons it learned and gain credibility by embracing full transparency through blogging about the process during and after projects.
- **Be honest and authentic.** As captured in the USDS values, all stories should focus on finding and telling the truth, and optimizing for results, not optics.
- **Tell stories of failure, not just success.** To prospective candidates, failures are as interesting as successes. These stories show why certain skill sets are needed and underscore the impact of modern technical expertise.
- **Tell human- and user-centered stories.** Keep the focus on the end user of a service as much as possible and make sure to share the impact of the project.
- **Talk to the right audience.** Know what you're trying to achieve and make sure you're putting the story in the right place. In the summer of 2015, President Obama mentioned government service in an interview on the Daily Show with Jon Stewart. Around the same time, Sam Altman, an influential tech entrepreneur, wrote a blog post supporting USDS.³⁴ While Obama's interview was good for visibility, Altman's blog led to more and higher-quality applications from technical experts.
- **Keep storytellers close to the work.** Anyone speaking or writing on behalf of project teams should spend considerable time with those teams. The Digital Services also found great success allowing project team members to write about their own work on a regular basis.

Working for the government offers technologists the opportunity to solve complex, high-stakes problems on a national scale. It can be a powerful draw when these challenges and successes are clearly articulated. In addition, technologists in government are at the forefront of exciting and emerging technologies. Making the public aware of the opportunities that exist to radically improve government services through technology energizes prospective candidates and gets them excited about what can be achieved.

The people who see the opportunities for impact, the incredible colleagues they will work with and the invaluable role technology plays in government, are more likely to be motivated to join the government. In order to recruit top quality technology experts, the government should tell individual stories of the opportunities, important challenges and successes in a way that engages the technology and innovation community. Stories are the critical brush strokes that paint the full opportunity to build a government powered by modern technical expertise.

6. REMOVE STRUCTURAL BARRIERS AND MAKE OPERATIONAL EXCELLENCE POSSIBLE

The best technologists in the world will not be effective without the tools and an environment that allows them to be successful. The tools can be as simple as having an email, login and computer on the first day at work or as industry specific as having modern developer tools and an up-to-date tech stack—a combination of software products and programming languages used to create web or mobile applications.

An environment that allows a technologist to be successful also is one that allows professionals to purchase necessary goods or services, or launch and iterate on a product quickly in order to meet the needs of citizens. Yet in government, structural barriers in procurement and compliance requirements can undermine the productivity of technologists.

Former Office of Management and Budget Director Shaun Donovan noted that there should be a shift in approach that “requires government to embrace secure and reliable cloud services, customer-centered design, agile development, shared services, a ‘continuous upgrade’ model of technology refresh and replacement, and enhanced cybersecurity while retaining the ability of agencies to focus on their mission goals and objectives.” Government should not only embrace these concepts, but remove the barriers to realizing these goals. Below are a few examples where processes created to improve critical areas such as security and accountability have in practice led to a government that is less secure, accountable and effective.

from <https://bit.ly/2QsrihN>

³⁴ Sam Altman, “The U.S. Digital Service,” August 14, 2015. Retrieved from <https://bit.ly/1KlUCLw>

Procurement

Government procurement processes are unable to keep up with changing technical and user needs. Existing processes call for documenting all facets of a project in detail before a user ever engages with the product. This approach makes it exceedingly difficult to build easy-to-use, secure and effective digital products.³⁵ In 2014, Dugan Petty, the former CIO and procurement director in the Oregon state government, noted that “the alignment of technology and procurement has always had a lot of tension to it. Often, it’s about whether the jurisdiction has met the procurement laws first, and perhaps secondly whether or not they actually achieved the outcomes they were looking for.”³⁶ Moreover, federal vendor approval processes are often based on a written proposal, not the demonstrated ability of the company to deliver results or create the needed product for citizens.

One solution is to adopt procurement vehicles that support iterative development like the agile blanket purchase agreement vendor pool piloted by 18F.³⁷ The blanket purchase agreement helps agencies fill a repeated need for services or products with trusted suppliers. 18F created a pool of trusted agile vendors by requiring the companies to demonstrate their knowledge, create a technical product within a matter of weeks and show the code associated with that product rather than requiring hundreds of pages of written submissions. 18F’s assessment team had the opportunity to see if a product worked and used that knowledge to choose vendors who had demonstrated their abilities.

Creating new procurement vehicles won’t be enough without hiring in-house technical talent to buy and effectively manage technical products. Donovan made the case for reforming technology procurement. In an exit memo, he said the “government needs a critical mass of top-flight in-house technical talent in order to be a good buyer of private sector services—otherwise, government will do a poor job of specifying the solutions it truly needs, won’t be able to evaluate accurately which contractors are the best ones to deliver those solutions, will manage contractors badly, and won’t be able to drive continuous iteration of how agencies work to support execution of the latest best practices (e.g., today, moving agencies from “waterfall” to agile development, from monolithic systems to modular systems, from repetitive rebuilding of services to reuse of services, including extant, commercially available, cloud-based services).”

Authority to Operate

A new product or service in government requires a designated authority to formally accept responsibility and the risk to agency operations. This is done via a process known as Authority to Operate. Within government, it is not unusual for this authorization process to take six to eighteen months, along with hundreds of pages of documentation. This means, for example, that there are often lengthy delays in securing approval to launch a website. The burdensome requirements of this system end up discouraging the creation of new systems and delaying the launch of those that are built. This also creates an environment which reinforces and locks projects into a relatively linear sequential design approach.³⁸

The Authority to Operate process requires an executive to sign off on a product, declaring that security and operational risks have been mitigated before the product can be launched. In practice, this makes executives very wary of signing an authorization unless all current and perceived future risks are mitigated, at times leading teams to spend months brainstorming and attempting to mitigate theoretical risks.

In the private sector, understanding and addressing potential risks is usually an iterative process that involves testing products with a small number of users to identify weaknesses, fixing those weaknesses and then testing the product again. This is a much more efficient and effective way of identifying actual risks.

18F initially found that this process took an average of six months for every system that needed to be approved within its division of the General Services Administration. To shorten the time, 18F invested significant energy to reduce the time required to secure authorization from six months to one month.³⁹ According to former 18F innovation specialist Aidan Feldman, the organization accomplished this goal by using several methods that also support more agile development. These included:

35 The U.S. Digital Service, “Transforming Federal IT Procurement,” 2016. Retrieved from <https://bit.ly/2pbPeKh>

36 Justine Brown, “Bringing Innovation to Procurement,” Government Technology, March 4, 2014. Retrieved from <https://bit.ly/1e5ZF3t>

37 18F, “Agile Blanket Purchase Agreement.” Retrieved from <https://bit.ly/2CRPUhf>

38 The U.S. Digital Service, “Transforming Federal IT Procurement,” 2016. Retrieved from <https://bit.ly/2pbPeKh>

39 18F, “Taking the ATO process from 6 months to 30 days,” July 19, 2018. Retrieved from <https://bit.ly/2QrRLfq>

- **Reducing the complexity of the projects** for which they were seeking authority. Feldman maintains that “smaller systems, timeframes, and packages are easier for everyone.” For example, agencies can take advantage of limited authorization for new projects that reach fewer than 100,000 people at the point of launch. This provides an opportunity for new projects to gain user feedback and improve the product while developing an audience, thereby creating a better product with far less risk.
- **Having the team spend focused time on securing the authority to operate** rather than attempting to secure authorization at the same time as building the product. This represents a tradeoff because it means that work on the product will be put on hold to secure the authority to operate.
- **Using consistent frameworks and standards** to increase ease and reduce review time for assessors. This approach has helped the National Geospatial Intelligence Agency get closer to its goal of authority to operate in one day and even gaining the go-ahead within a week.⁴⁰
- **Using and publishing consistent tools and processes** so that those assigned to assess the security of a project (called assessors) can easily understand the basic security and risk frameworks of each project. If the assessor has to work to understand a new set of tools and processes each time, it will add significant time.
- **Reusing proven software products and programming languages** to reduce the number of security requirements that have to be reviewed during the process.
- **Integrating the project and assessment team.** The more the assessor knows about a given project on a day-to-day basis, the more likely it is that the assessor will be able to address questions and issues early. Software development projects change often based on user feedback and other improvements, making an embedded assessor the easiest way to quickly identify and address compliance issues.

For people with technical expertise in government to effectively build, deploy and maintain technologies, strategies like those used by 18F to streamline authorities to operate are critical. Departments within government also need to explore more efficient and effective ways of identifying and addressing actual risks.

Lack of access to modern developer tools and technology stacks

A modern tech stack—the software products and programming languages used to create web and mobile applications—was identified in the Digital Service Playbook as one of the critical prerequisites to enabling a technology team to be efficient and bring services to scale. Modern tech stacks are often unavailable in government. When a developer arrives in the federal government without access to current tools for coding effectively, the end result is that the developer will inevitably waste valuable time using inefficient workarounds.

Modern developer tools often include flexible hosting environments that allow resources to be allocated when they are needed and that don’t require the costs and constraints of having government maintain and manage hardware directly. This becomes important in critical periods, for example, when the number of users on a website spikes.

Using modern developer tools and technology stacks enables teams to scale quickly, more easily and cost-effectively. The playbook identifies a checklist for those seeking a modern tech stack. It recommends choosing software frameworks that are commonly used by private-sector companies creating similar services; ensuring that software can be deployed on a variety of commodity hardware types; ensuring that each project has clear, understandable instructions for setting up a local development environment and that team members can be quickly added or removed from projects; and considering open source software solutions at every layer of the stack.

The Digital Services Playbook has a similar checklist for deployment in a flexible hosting environment. This means that resources should be provisional and based on real-time user demand through an API. Resources also should be available in multiple regions, and paid for only when used. In addition, static assets should be served through a content delivery network, and applications should be hosted on commodity hardware.

Paperwork Reduction Act

The Paperwork Reduction Act was enacted in 1995 to prevent the government from burdening citizens with unnecessary questionnaires. One provision of the PRA limits agencies from asking 10 or more citizens structured questions without first obtaining approval from the Office of Management and Budget.⁴¹ Unfortunately, it often takes OMB six months or longer to approve requests. This makes launching technical projects, collecting user feedback and doing user research difficult.

40 Nick Sinai, “ATO in a Day,” Medium, July 25, 2017. Retrieved from <https://bit.ly/2uTxace>

41 “Information Collection and Paperwork Reduction Act (PRA) Overview,” Usability.gov. Retrieved from <https://bit.ly/2Ni2b4>

For example, in 2003, a carve-out was made in PRA that allows agencies request a login name and email without getting formal OMB approval, a provision that helped in the use of early stage login technology. Today, however, login technology often asks users to answer other questions not covered by the law, such as “In what city were you born?” or “What is the name of your favorite pet?” As a result, there have been delays in creating Login.gov, the system that provides the public with secure and private online access to multiple participating government programs.

The PRA serves a useful purpose, but needs to be updated to avoid the current unnecessary hurdles that restrict agencies from asking for voluntary feedback and citizens from voicing concerns and providing suggestions.

7. CONSIDER IDEAS FOR FUTURE EXPLORATION

Although implementation of the recommendations described above would significantly increase the capacity of the federal government to work better and cost less in the 21st century, the government and the private sector also need to experiment with new approaches to recruit and harness technical talent, and increase the adoption of policies, programs and practices that work. Here are some areas where additional experimentation would be worth pursuing:

1. Make it easier and more attractive for young people with technical skills to join government.

- Create and support digital fellowships for college students to expose them to the power of working for government early in their careers. Coding it Forward, a student led nonprofit focused on empowering computer science, data science and design students to make a difference in the social sector, created a Civic Digital Fellowship that brought 14 college students into federal agencies in 2017 and 36 in 2018. Organizations like Teach for America, AmeriCorps and National Science Foundation have shown that these types of fellowships paired with scholarships can make service opportunities attractive to top talent.
- Increase the opportunities for people with technical skills to engage in a continuum of service, everything from participating in bug bounties like those at the Department of Defense to short term engagements such as two week discovery sprints to assess the strengths and weaknesses of a particular IT system.⁴² By creating new ways to enter government for the short term, the government can engage more people, some of whom will then go on to consider longer periods of service.

2. Expand the presence of deeply knowledgeable tech teams to talent hubs across the country.

- One key barrier to bringing top tech talent from around the country into the federal government is the requirement to move from a major technology hub to Washington, D.C. for many positions. The Pentagon tested this concept with the creation of Defense Innovation Unit Experimental, a partnership with tech companies in Silicon Valley. This initiative was led for two years by Raj Shah, a veteran and founder of a successful tech security startup. 18F has had a group of around 30 team members in San Francisco for several years working on federal and state technical needs and through that work bringing federal and state tech efforts closer together.⁴³ Agencies should continue to explore opportunities to build strong technical teams based outside of the Washington, D.C. area, including technology hubs like Austin, Texas, the San Francisco Bay Area and Atlanta.

3. Challenge companies to adopt better civic leave policies.

- Many companies have sabbatical policies and legally required military leave policies, but few have defined civic service leave policies. For decades, larger companies have included sabbaticals as part of their benefit packages, leading to experimentation with social service leave policies in the technology industry after a major downturn in the 2000s. Cisco is one of the companies that pioneered social service leave as a development tool for leaders a few years later.⁴⁴ Now is the time to challenge companies to develop strong civic leave policies that would allow top talent to have a short-term role in government. Specifically, companies should consider signing commitments to create strong civic service leave policies, allowing employees to serve up to a year in government.

⁴² The U.S. Digital Service, “Identifying Security Vulnerabilities in Department of Defense Websites – Hack the Pentagon,” 2016. Retrieved from <https://bit.ly/2QsSoWk>

⁴³ 18F, “Tackling challenges facing cities in collaboration with all levels of government,” May 11, 2016. Retrieved from <https://bit.ly/10lBFkv>

⁴⁴ Terry Timm Moos, “Matching Skills with Need: Cisco Leadership Fellows Take on Impactful Roles with Nonprofit Partners,” Cisco, May 17, 2007. Retrieved from <https://bit.ly/2OgnkHD>

CONCLUSION

Technology plays a central role in most people's lives even if they never touch a smartphone or a computer. Unfortunately, federal employees often lack the technical skills found in the private sector, missing important opportunities to improve operations and the delivery of vital services by using current and emerging technologies.

The single most important recommendation of this report is this: Leaders across the federal government must prioritize finding, hiring and supporting people with deep knowledge and experience in modern technology, and put them to work to meet the needs of the people. And while this report specifically addresses the federal government, stellar technical leadership is no less imperative at the state and local levels.

This will be difficult and at times overwhelmingly. There will be conflict, frustration, setbacks and failures as attempts are made to bring the government into the world of 21st-century technology.

But there also will be successes from this employee expertise and from the use of modern technology. These successes will save lives, help veterans obtain health care, enable parents to feed their children and businesses to earn new and better contracts. And as these successes multiply, other challenges will become easier.

We live in a world both dominated and shaped by technology. Whether the government succeeds in shaping technological advances to improve the common welfare of the nation depends on leaders who have the know-how and a laser-like focus on building a sophisticated technology workforce.

PROJECT TEAM

Lead Writers

Jennifer Anastasoff, Former Head of People Operations, Founding Executive Team, U.S. Digital Service

Jennifer Smith, Former Acting Head of People Operations, U.S. Digital Service

Partnership for Public Service

Mary Ann Badavi, Web and Design Manager

Mallory Barg Bulman, Vice President, Research and Evaluation

Bob Cohen, Editor

Samantha Donaldson, Director, Communications

Max Stier, President and CEO

CONTRIBUTORS

Thank you to the many contributors to this report and the founders, alumni and supporters of the Digital Services as well as all those continuing this vital work today.

APPENDIX

OMB MEMO ON BUILDING AND IMPLEMENTING MODERN TECHNOLOGY

At the beginning of 2017, outgoing Office of Management and Budget Director Shaun Donovan captured several years of hard-won experience about how to build and implement modern technology in government. In an exit memo, Donovan crystallized some of the key lessons and principles that have been standard operating practice in the private technology sector for years. These include focusing on outcomes for the user, using shared tools and services, taking advantages of cloud-based services, continually pushing to reform both hiring and procurement and hiring people who can build and operationalize modern tools. Below is a summary of Donovan's findings. The full document can be found [here](#) on page 19-36.

THE OPPORTUNITY

The digitization of the federal government requires a fundamental shift in how leaders and employees think about and use technology. This requires the government to adopt a continuously evolving, iterative approach to technology that focuses on delivering effective, continually improving services rather than completing “projects.” In addition, all the tools, structures and processes used by the federal government must evolve to support this new way of doing things. This will require strong sponsorship from senior leadership. Ultimately, the transformation of government is a never-ending journey, not a destination.

Specifically, this approach has the following characteristics:

1. The government should use appropriate cloud-based services, including commercial products whenever possible. This will allow services to scale easily and remain secure. Use of commercial products, where appropriate, will allow the government to benefit from the specialized expertise and resource investment of the private sector.
2. There should be increased use of shared government tools and services, such as an identity management system, APIs, source code, infrastructure and more. Building these tools once and then using them across the government—customized when necessary—will produce economies of scale and allow agencies to work faster and cheaper while keeping the focus on service delivery.
3. This work should be done by small, highly qualified, cross-functional teams. These teams should be composed of subject matter experts in disciplines critical to the project and held responsible and accountable for setting and meeting expectations in the delivery of the mission. They should have access to the tools necessary to complete the job, including procuring private-sector contractors and services. Bigger missions should not be handled by bigger teams, but rather by more small teams working in a coordinated fashion.
4. The teams doing the work must be empowered to make the necessary changes in how agencies operate in order to achieve their mission. Leadership at the agency and government-wide levels must support these changes by quickly knocking down roadblocks and keeping the focus on service delivery.
5. Teams and systems need to constantly collect data and other sources of feedback, including from users. The data should be used to monitor performance and drive future decisions.
6. Government should never stop iterating and innovating on all of the above, because technology and its optimal use will continue to change.

KEY INITIATIVES

1. Continue aggressive technology procurement reform to improve the government's ability to build and support top-notch digital services.
 - a. Enable more expert modern software vendors to be part of the government market by lowering non-productive barriers to entry, simplifying ongoing reporting requirements, creating new methods of allowing vendors into the market, and allowing new and easier ways for agencies to procure their services.
 - b. Build the capacity across the government to procure and manage vendors to produce great digital services. This includes digital service contracting officers who can be trained through the Digital IT Acquisition Professional Training program, and project/program/product management teams.
2. Accelerate hiring and workforce reforms to build capacity for managing digital service delivery.
 - a. The Digital Services have made great strides in bringing digital service experts into the federal government. Their approach should be expanded to more agencies, including a new focus on actively recruiting technical experts for noncareer, nonpolitical tours of duty.
 - b. Identify areas for increased training for current government employees to build their capacity to support, manage and execute on digital services. This includes scaling up the existing digital acquisition training program and expanding training into areas such as product management and agile development.
 - c. Allow the procurement and use of collaboration and productivity tools that reduce communication and collaboration barriers across teams and agencies.
3. Through the Office of the Federal Chief Information Officer, continue to drive change in governance, budgeting, financing, monitoring and policymaking practices to most effectively support continuous modernization.
 - a. Use the statutory authority of the Office of the Federal Chief Information Officer to continue to drive broad changes in the business processes and operations of federal agencies to align efforts and incentives in support of modernization, digitization and, ultimately, service delivery. Critical areas include IT policy, agency performance oversight, cybersecurity and data policies.
 - b. Coordinate modernization and digital service delivery efforts across the components of the Executive Office of the President and federal agencies to maximize efficiency and the sharing of best practices.
4. Advance shared services to improve the usability, security and efficiency of the government.
 - a. For services that cannot be procured from a commercial source, the federal government should build internal shared services to increase efficiency and reduce duplication across agencies. Examples include cloud services, APIs, identity management, verification and payment services.



**PARTNERSHIP
FOR PUBLIC SERVICE**

1100 New York Avenue NW
Suite 200 East
Washington DC 20005

(202) 775-9111
ourpublicservice.org
CFC# 12110