

The government we need

**How proven
technology
solutions can
save taxpayers
more than
\$1 trillion
over a decade
while enabling
more effective
government**

TECHNOLOGY CEO

COUNCIL

January 2017

ABOUT THE COUNCIL

The Technology CEO Council (TCC) is the information technology industry's leading public policy advocacy organization comprised exclusively of chief executive officers from America's top information technology companies.

For 25 years, the Technology CEO Council, formerly known as the Computer Systems Policy Project, has focused on advancing policies that promote innovation and U.S. competitiveness through technology leadership. Our CEOs meet with policy makers on issues of importance to the high-tech industry and offer insights and recommendations on ways technology can help solve global challenges.

Currently, the Technology CEO Council is driving public policy initiatives related to competitiveness (including a level playing field on tax and trade, as well as 21st century infrastructure that enables innovation) and policies that empower entrepreneurs with the technology they need to change the world.

The Technology CEO Council includes some of the nation's most well-known brands and globally integrated enterprises, generating more than \$300 billion in annual revenues and employing more than 900,000 workers.

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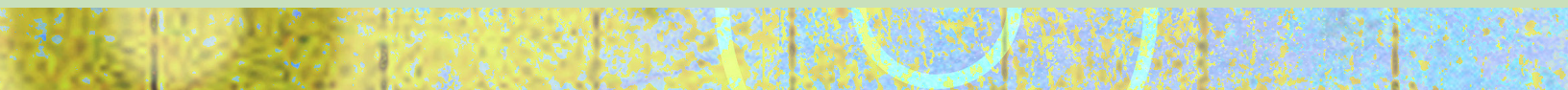
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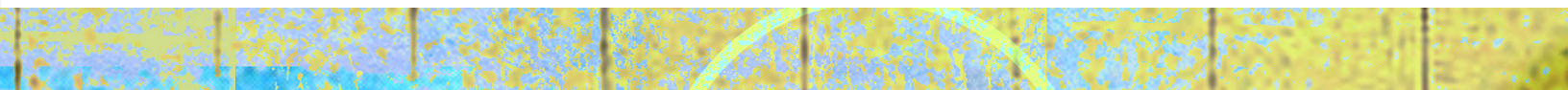
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1 EXECUTIVE SUMMARY

For most of the past 70 years, federal policy makers faced a stark, binary choice: spend more, or cut the deficit? Better government generally required more dollars, necessitating higher taxes or larger deficits. Fiscally prudent government usually accomplished less, with fewer services and lesser impact. **There is a better way.**

Leveraging existing, proven-effective strategies, the federal government can reduce costs by over \$1 trillion on operations over the next decade, while improving the reach and quality of government services.

Right now, the federal government spends roughly 30% on operations that support mission delivery, according to studies over many years. Efficient private-sector organizations spend roughly 15% for similar overhead.¹ While government will always have unique demands and obligations that prevent its reaching the level of private-sector efficiencies, it can significantly improve operations. Government must raise its performance and become more cost-efficient at all levels over the next decade.

Agencies can meet their missions more quickly, at a lower cost, and with less risk by implementing modern and interconnected processes and systems. Current technologies enable faster, more informed and efficient decision-making, more productive coordination among agencies, improved physical and digital security, and more responsive services for citizens.

Around our country and around the world, we have seen meaningful reforms successfully

implemented by government agencies to save money and improve outcomes. There are likewise similar exemplars in the U.S. federal government, but these efforts tend to be episodic in nature. It is time for government-wide embrace of these modern improvements.

This report highlights opportunities and pathways for innovation in federal use and deployment of information technologies (IT), supported by clear implementation plans that focus on proven systems and methodologies. We offer estimates for the scope and scale of potential cost reductions that could be realized, summarized in the table on the next page.

The new administration can and should make government efficiency a top priority from day one. This goal has bipartisan support, with many across industry eager to contribute know-how, lessons and recommendations. Change is never easy, but improving government efficiency is critical to our future success as a nation.

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¹ Gore, A. (1993). From red tape to results: Creating a government that works better & costs less: Report. Washington, D.C.: National Performance Review.

Estimates on overhead costs for the U.S. Department of Defense range from 23% in a 2015 report prepared for the Defense Business Board (DBB) to approximately 40% in a 2013 DBB report. <http://apps.washingtonpost.com/g/documents/investigations/defense-business-board-study-from-jan-2015-identifying-125-billion-in-waste/2236/?ref> and <http://dbb.defense.gov/Portals/35/Documents/Reports/2013/FY13-03%20Applying%20Best%20Business%20Practices%20from%20Corporate%20Performance%20Management%20to%20DoD.pdf>

Cost reduction estimates, highlighted in the table below, were derived through analysis of specific examples featured throughout this report. The cost reduction estimates shown by the examples have been extrapolated to reflect the size and scope of the federal government, assuming effective implementation; cost reduction figures reflect the total estimated opportunity over a 10-year period, and may

necessitate additional investments in people, process and technology. Based on previous analysis of similar initiatives, we estimate that up to 40% of the cost reduction opportunities identified in this report may be “scoreable” by Congressional Budget Office (CBO) standards. To produce a more refined estimate of scoreable cost savings, further review with CBO officials would be required.

10-YEAR COST REDUCTION OPPORTUNITIES²

COST REDUCTION AREA	Estimated 10-Year Cost Reduction
Supply Chain and Acquisition	 \$500 Billion
Fraud and Improper Payments Prevention 	\$270 Billion
Big Data and Analytics/Cognitive Computing	 \$205 Billion
IT Modernization 	\$110 Billion
Shared Services 	\$47 Billion
Energy Use	 \$3 Billion
Mobile 	Improved Efficiencies
Cybersecurity 	Cost Avoidance

TOTAL 10-YEAR COST REDUCTION POTENTIAL

\$1.1+ Trillion

² A review of these opportunities should assess the degree to which any figures already have been incorporated into the CBO baseline. A portion of the cost reductions included in this table and further described throughout this report may be underway already through current investments and initiatives or may be subject to overlap across initiatives, which could reduce the new opportunities in some areas. In addition, any review of opportunities should include a detailed estimation of any additional investments required to achieve these savings.

2 INTRODUCTION

The United States operated at a \$587 billion budget deficit in Fiscal Year (FY) 2016,³ representing approximately 3% of gross domestic product (GDP) and adding to the over \$19 trillion in existing federal debt.⁴ Over the long term, this debt will have ever greater impacts on the economic health of our nation—it is projected to continue to grow unless actions are taken to change how the federal government operates. The new president thus inherits a challenging fiscal position. The new administration has a critical opportunity to rethink how to reduce costs across the government, while maintaining or improving the quality of services for the American public.

Meaningful spending reduction will require an aggressive, disciplined and multifaceted approach that is government-wide and integrated into early budget proposals and strategic plans. Simply looking for a cheaper way to continue operating in the current manner is no longer a viable option. Instead, the new administration needs to empower the government with new technology-enabled capabilities that fundamentally improve the way it does the business. **The implementation of modern, interconnected technologies and processes presents an opportunity to realize sustainable cost reductions of over \$1 trillion in the next 10 years.** Others have reached similar conclusions. For example, a 2012 study conducted by Oxford Economics estimated that the United States could save nearly \$1 trillion through 2025 by increasing the efficiency of delivering public services by just 1%.⁵

Realizing these cost reductions will require technology innovation that supports improved processes and decision-making. According to U.S. Chief Information Officer (CIO) Tony Scott, the government's existing technology infrastructure is widely outdated, expensive to maintain, not secure, and incompatible with new innovations.⁶ Expanding current efforts to modernize the federal IT portfolio and the processes that support it will add value by enabling agencies to meet their missions more quickly and completely, with less overhead, at lower cost and with reduced risk.

In addition to the tangible cost reductions that can be delivered by existing technologies, this report identifies other opportunities and approaches that drive innovation, facilitate improved operations and provide general public benefit. Avoiding costs by preventing problems before they occur, such as those incurred from

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³ <https://www.fiscal.treasury.gov/fsreports/rpt/mthTreasStmt/mts0916.pdf>

⁴ <http://www.treasurydirect.gov/NP/debt/current>

⁵ <https://www.accenture.com/us-en/insight-outlook-radically-rethinking-public-services-government>

⁶ <http://www.nextgov.com/cio-briefing/2016/02/white-house-wants-give-agencies-new-pot-money-upgrade-aging-it/125788/>

cybersecurity attacks and duplicative investments, can be as beneficial as reducing costs over time.

Recent events have provided cautionary examples that underline the importance of modernizing the federal IT environment and business processes in order to increase security and reliability. While progress has been made by administrations over time, the extensive list of programs still appearing on U.S. Government Accountability Office (GAO) high-risk list—as well as high-profile challenges like the launch of healthcare.gov—illustrate potential negative outcomes that only become more likely as the federal IT environment grows increasingly antiquated. Furthermore, current government IT security is not sufficient to prevent future attacks and failures.

It should be noted that the cost reduction rates realized in the examples in this report are based on real experience in the private sector, and have been extrapolated to reflect the scope of the federal government. As such, they should be viewed as estimates for potential achievements based on effective implementation at a government-wide scale, and not precise budget forecasts.

This report highlights the necessity for innovation to modernize government IT, supported by clear implementation plans. The work, which builds on our 2010 *One Trillion Reasons* report,⁷ focuses on achieving this imperative across four areas of activity:

- Improving Resource Management
- Improving Government Decision-Making
- Investing in Modern Technology
- Optimizing Processes

America's technology industry is prepared to support the new administration in implementing the recommendations in this report by leveraging our collective experience and capabilities supporting federal, state and local government initiatives and managing private-sector enterprises.

We believe that the new administration has an opportunity to think strategically, operate as a modern enterprise and aggressively address the challenges facing the nation.

We urge the administration to consider the recommendations in this report in preparing policy priorities, a transition roadmap and investment strategy. It is imperative that the government not settle for operating in the status quo, but instead challenge the barriers of the current operational structure and seek to build a foundation for breakthrough innovations that better serve the American public.

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⁷ <http://www.techceoCouncil.org/clientuploads/reports/TCC%20One%20Trillion%20Reasons.pdf>

3 IMPLEMENTATION—HOW TO GET IT DONE

The cost reduction opportunities identified in this report are valuable only to the degree that they can be successfully implemented by the new administration. Understanding how, where and when to engage will be critical to incorporating these opportunities into government-wide priorities and realizing the benefits.

To implement these recommendations, we urge the following actions:

EMPOWER THE U.S. CIO.

- Hire a strong federal CIO at the start of the administration.
- The CIO should advise the Office of Management and Budget (OMB) director with input on all budget areas impacted by IT.
- The CIO should prioritize coordination of efforts across all agency CIOs.

TAKE AN ENTERPRISE/CROSS-GOVERNMENT PERSPECTIVE.

- The President should issue an executive order empowering the CIO Council as the implementing body for technology deployment, with the President's Management Council serving as a board of directors.
- The CIO Council should work closely with agency chief financial officers, chief acquisition officers and chief human capital officers councils to ensure alignment.

INCORPORATE INDUSTRY BEST PRACTICE.

- Consult with private-sector leaders on tech-enabled change management and meet with them periodically to assess progress.
- Include both short-term implementation and a plan to keep up to date on emerging commercial technologies.

PRIORITIZE AND SEQUENCE IMPLEMENTATION.

- Offer a timeline for implementing these and other recommendations over the next three years.
- Begin immediately—incorporate as many recommendations as possible in the FY 2018 budget.
- Offer five-year cost estimates, which are more consistent with private-sector experience, allowing small up-front investments to catalyze large changes that generate long-term savings.

4 COST REDUCTION OPPORTUNITIES

IMPROVING RESOURCE MANAGEMENT

Technology can enable data-driven management decisions and establish cross-agency, enterprise-wide perspectives. Too often, critical data exists in disparate systems across disconnected agencies or operational areas, hiding the overarching operational picture and hindering effective coordination. By integrating across domains and networks and raising the level at which decisions are viewed and organizational investments are aligned, the new administration can identify cost-cutting opportunities and recognize risks that are not otherwise evident. Furthermore, the federal government should continue taking steps toward defining a regulatory environment in which data can be collected and used while protecting privacy, confidentiality and security.

SHARED SERVICES

Transitioning common administrative agency functions to shared service centers is a proven method to reduce costs while increasing the effectiveness and efficiency of service delivery. Shared services represent an opportunity to transition agency resources from focusing on administrative tasks, such as processing human resources and finance transactions, toward strategic, value-added activities.

The OMB Federal Information Technology Shared Services Strategy, published in 2012, recognizes the opportunity that shared services provide for agencies “to innovate with less given current fiscal constraints, increasing mission requirements, rising customer expectations, and the ever-evolving landscape of IT.”⁸ In addition to providing higher return on investment for IT systems, the strategy also identifies

improved productivity and better communication as benefits. The shared services strategy has delivered significant value over the past decade.

The Human Resources Line of Business (HR LOB) in the Office of Personnel Management (OPM) has shown that this model can be highly effective for the federal government. By consolidating 26 agency payroll systems down to four payroll shared service centers and migrating agency HR systems to one of the six federal and four private-sector HR shared service centers, the HR LOB estimated reduced HR and payroll costs of \$1.6 billion from FY 2004 to FY 2015, and estimates continued cost reductions of \$184 million per year going forward.⁹ Applied to other administrative functions, the impact of shared services could be even more significant.

⁸ https://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/shared_services_strategy.pdf

⁹ <https://www.opm.gov/services-for-agencies/hr-line-of-business/cost-benefit-analysis/fy-2011-cost-benefit-analysis-report.pdf>

In the current government shared services model, providers have been responsible for a complete technical and operational solution including infrastructure, platform, data and services including call centers, IT support and consulting. Numerous agencies have set up shared services to support their internal departments. More recently, many in the shared services community have come to support a new “21st century delivery model.” In this configuration, the various critical components to shared services, including infrastructure and platform, are better provided “as a service.” In this new model, providers will focus their attention exclusively on service and price, and agency clients can shop for the provider best aligned with their service preferences.

Through its Unified Shared Services Management (USSM) office, the General Services Administration (GSA) has set up a framework for a 21st century delivery model that will bring stakeholders together to create standards of performance and data management. USSM hopes to create a dynamic competitive marketplace that also includes interoperability, enabling agencies to change providers if service doesn’t meet agreed-upon performance levels. This kind of competitive marketplace approach is key to achieving the efficiencies described above.

In March 2015, the Partnership for Public Service, supported by commercial and government industry participants, released a Shared Services Roundtable report¹⁰ that estimated up to \$47 billion in costs can be reduced over the next 10 years through the increased use

of shared services across six categories of administrative shared services. The cost reductions may not be “scoreable” by CBO until the projects are initiated, but the potential benefits are evident all the same.

FRAUD AND IMPROPER PAYMENTS PREVENTION

It is estimated that approximately \$3.5 trillion is lost to fraud globally each year, and the federal government is hardly exempt.¹¹ The previous administration has taken productive steps toward reducing improper payments by the government.¹² However, federal agencies still made an estimated \$137 billion in improper payments in FY 2015 and over \$1.137 trillion in improper payments since 2004.¹³

Shared services, discussed above, also can be applied beyond the administrative functions of agencies to reduce costs. For example, the Centers for Medicare & Medicaid Services (CMS) have a fraud detection unit to help identify and stop fraudulent healthcare claims. However, other large agencies processing similar claims do not have equivalent fraud detection capacities. Agencies could work together to share fraud detection services and investments, resulting in greater economies of scale, reduction of duplicative investments, development of best practices and, ultimately, lower costs and improved performance.

A state exemplar shows the potential. **Indiana has partnered with Xerox to reduce error rates and backlogs in its welfare enrollment operation.** The state worked with Xerox on a hybrid eligibility solution that

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¹⁰ <https://ourpublicservice.org/publications/viewcontentdetails.php?id=470>

¹¹ <https://www.acfe.com/rtn-highlights.aspx>

¹² <https://www.whitehouse.gov/sites/default/files/omb/memoranda/2015/m-15-02.pdf>

¹³ <https://paymentaccuracy.gov/>

blends centralization and localization in a high-tech and high-touch manner, supporting program recipients and program administrators alike. Indiana's new solution, workflows and processes have delivered these results:

- Improved citizen access to program information via phone and online. Residents can apply for benefits in person, by mail, fax and phone and online, or by using a kiosk in a local office.
- The timeliness of decisions on all programs increased from 75% in 2005 to more than 95% in late 2014.
- Error rates for the Supplemental Nutrition Assistance Program (SNAP) decreased by 48%.
- Backlog was reduced by two-thirds.
- The percentage of applications for Temporary Assistance for Needy Families (TANF) processed in a timely manner doubled.

Overall, Indiana's welfare agency returned \$22 million in gainsharing to the state based on operational efficiencies—and there was

an immediate \$40 million in savings from the agreement. These improvements took place even as program demand surged from 695,000 to more than 1.8 million applicants per year, without comparable increases in staff.

Advanced analytical models have shown a strong capability to identify and stop fraud. In 2014, the Internal Revenue Service's (IRS) Return Review Program (RRP) identified about 1 million potentially fraudulent tax returns claiming over \$10 billion in tax refunds that otherwise would have been granted.¹⁴ Leveraging predictive analytics to identify fraudulent payments also has been proven successful at the state level. **IBM supported the New York State Department of Taxation and Finance by implementing predictive modeling and advanced algorithmic capabilities that stopped \$1.2 billion in improper or questionable refunds from being paid.**¹⁵ Assuming that applying similar techniques could result in preventing 20% of improper payments, the federal government could reduce improper payments by approximately \$270 billion over 10 years.¹⁶

KEY RECOMMENDATION

Manage the federal government from an enterprise perspective, using technology enablers to drive consolidation of core services and improve analytical capabilities.

¹⁴ <https://www.treasury.gov/tigta/auditreports/2015reports/201520060fr.pdf>

¹⁵ <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=ODC03219USEN>

¹⁶ \$270 billion is 20% of the \$137 billion estimated volume of improper federal tax payments per year identified above, multiplied by 10 years.

IMPROVING GOVERNMENT DECISION-MAKING

Before an investment can be made, a project launched or services delivered, the government must decide what to do with limited resources. Where do we invest? How do we make the investment? When do we invest? In an environment with complex considerations, limited resources and time constraints, improved decision-making capabilities are critical.

Over the past five years, while the areas of opportunities to reduce costs identified in *One Trillion Reasons* have remained relatively consistent, analytics capabilities have improved significantly. These capabilities include the potential to define requirements and evaluate multiple potential solutions for augmented decision-making with cognitive technologies. Decision-making is not just about having more data, but about how to most effectively mine available data and use that data to make better decisions.

Technology-enabled decision-making has the potential to “raise the tide” and grow the national economy, rather than simply identifying opportunities to cut from the existing budget. Making existing data visible is a first step toward applying analytics, which leads to better decisions, more standard performance management and improved outcomes.

BIG DATA AND ANALYTICS

Modern tools provide unprecedented ability to consume and analyze the vast amounts of data to which government agencies, and the general public, have access.

It is estimated that we create 2.5 quintillion bytes of data per day,¹⁷ but the vast

majority of data is not effectively used. Despite the efforts of the federal government to push for greater transparency with wide-ranging initiatives, including the White House Open Government Initiative,¹⁸ more than 50% of stored data reportedly is considered “dark” data whose value is unknown and untapped.¹⁹

Lowering costs requires better leveraging of data for decision-making and the effective use of analytics capabilities to evaluate opportunities. Today, much government spending is not driven by evidence, meaning that many decisions are made based on “hunches.” However, decisions based on evidence have clear benefits. For example, CMS set out in 2011 to reduce hospital-acquired infections by 10%. With over 1 million such cases a year, analytics helped CMS identify patterns, trends and priorities to allow targeted interventions. The approach is working, as the U.S. Department of Health and Human Services has estimated that 50,000 fewer patients died in hospitals and approximately \$12 billion in healthcare costs were saved as a result of a reduction in hospital-acquired infections from 2010 to 2013.²⁰

The new administration must continue to build on the efforts of the Government

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¹⁷ <https://www-01.ibm.com/software/data/bigdata/what-is-big-data.html>

¹⁸ <https://www.whitehouse.gov/open>

¹⁹ https://www.veritas.com/content/dam/Veritas/docs/reports/scd_veritas_strike_summary_a4-is-usa_final.pdf

²⁰ <http://www.hhs.gov/about/news/2014/12/02/efforts-improve-patient-safety-result-1-3-million-fewer-patient-harms-50000-lives-saved-and-12-billion-in-health-spending-avoided.html>

Performance and Results Act (GPRA) Modernization Act of 2010²¹ to apply a fact- and evidence-based approach to budgeting. This can help the government reduce costs while delivering the same or better services to citizens.

While these types of cost reductions cannot be officially scored as “countable” reductions that can be tied to specific budget appropriation accounts by the CBO, there is broad agreement that investment in and adoption of analytics throughout the government is critical to addressing budgetary issues in the current fiscal environment.

COGNITIVE COMPUTING

The concept of analytics and its applications continues to expand as supporting technologies become more mature and move toward cognitive solutions. Analytics is the scientific process of transforming data into insight for making better decisions.²² Cognitive-based systems build knowledge and learn, understand natural language, and reason and interact more naturally with people than traditional programmable systems—cognitive approaches supplement traditional analytics by providing real-time insight that improves human decision-making.²³

The amount of data available to government continues to grow, but most of that data is unstructured (such as images or maps). Cognitive technologies can digest this unstructured information and produce valuable insights for decision-makers. Cognitive capabilities can be applied to solve some of the most challenging and mission-critical problems facing the

government today. The Federal Emergency Management Agency (FEMA) can leverage weather data to build knowledge that can help experts better predict natural disasters and make decisions for planning and response. The CDC can utilize public health data to help officials learn from a wide variety of data sources quickly to determine, for example, how best to mitigate the risk of epidemics. The U.S. Department of the Treasury and the Securities and Exchange Commission (SEC) can identify real-time trends in the financial markets and proactively take steps to reduce the likelihood of a financial crisis and provide a more stable economy. Across the federal government, the opportunities are many and the potential benefits are clear and significant.

We conservatively estimate that the federal government could save, on average, 10% on its operations and maintenance costs by implementing cognitive monitoring technologies.²⁴ The U.S. Department of Defense alone spends over \$200 billion a year on operations and maintenance costs.²⁵ Add that to the equipment maintenance per year for other large “power-user” agencies, such as the U.S. Department of Transportation and GSA, and the opportunity to reduce costs by over \$20 billion per year—or \$205 billion over 10 years—is evident and likely understated. These cost reductions are potentially “scoreable” by CBO, to the extent that they can be tied to specific projects and budget accounts.

Other technologies have great cost reduction potential for federal agencies. Our experience has shown that by adopting Internet of

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²¹ <https://www.gpo.gov/fdsys/pkg/BILLS-111hr2142enr/pdf/BILLS-111hr2142enr.pdf>

²² https://www.ibm.com/developerworks/community/blogs/jfp/entry/Cognitive_Computing_vs_Analytics?lang=en

²³ <http://www-935.ibm.com/services/multimedia/GBE03642USEN.pdf>

²⁴ <http://asmarterplanet.com/blogs/think/2016/06/02/watson-iot> and <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=WWS12351USEN>

²⁵ http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/fy2017_OM_Overview.pdf

Things (IoT) technologies, and supporting the interoperability that enables systems to work together, substantial cost savings are possible across a range of applications and industries. Additionally, though separate from this discussion of government savings, a recent study by McKinsey suggests that strategic deployment of IoT potentially could grow the global economy by \$4 trillion to \$11 trillion a year by 2025, through improvements that include better operations management in industrial production, more efficiencies in city services such as traffic and public safety, and enhancements in retail sector productivity.²⁶

In addition, cities around the world are utilizing IoT to deliver services at lower costs, among other benefits. Barcelona has adopted numerous IoT technologies that have resulted

in an estimated savings of \$58 million from reduced use of water, increased parking revenue of \$50 million per year and decreased lighting costs of \$37 million per year.²⁷ Applying similar technologies and capabilities across U.S. cities and to federal resources would be expected to yield similar benefits but at a significantly larger scale.

Using data to make informed choices that optimize limited resources while delivering timely and quality services to American taxpayers serves as a foundation for cost reduction opportunities. The government must commit to making iterative, data-driven decisions that support the opportunities identified throughout this report and effectively prepare for investment, management and optimization.

KEY RECOMMENDATION

Use analytics and cognitive capabilities to identify meaningful and actionable information from both structured and unstructured datasets and transform that data into insights—allowing officials to reason and learn in a way that enables faster, more consistent decisions and optimizes the use of limited resources.

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²⁶ <http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world>

²⁷ <http://datasmart.ash.harvard.edu/news/article/how-smart-city-barcelona-brought-the-internet-of-things-to-life-789>

INVESTING IN MODERN TECHNOLOGY

Well-planned but bold and innovative investments must be made to overcome challenges in the current federal environment. It is imperative for the new administration to capitalize on the pockets of innovation that exist today, and take the risks necessary to transform the government into a modern, efficient enterprise. While promoting an innovative culture involves accepting elements of risk and tolerating some level of failure, a resilient organization anticipates these failures and learns from them as part of empowering employees to develop truly paradigm-shifting solutions.

Strategic investment should be seen as an ongoing process, not an isolated decision or one-time fix. Identifying and prioritizing efforts for investment, integrating these priorities into federal agency and budget planning cycles, and applying appropriate measures to track the success of key efforts will strengthen the foundation for continuous improvement.

Private-sector experience has demonstrated that these investments are key to achieving long-term cost reductions and thus have significant return on investment. The U.S. government's recent proposal for an IT Modernization Fund of \$3 billion to drive progress across the \$90 billion annual IT budget is a good starting point for discussions about assessing costs and benefits.

IT MODERNIZATION

Federal IT infrastructure is aging and in need of modernization, yet federal IT spending is at an all-time high. Many agencies struggle with managing an infrastructure transition to new technology while maintaining the operational status and security of critical systems and

functions that rely on aging platforms. The government must consider its spending on IT and how to make the right investments that can increase efficiency and decrease cost.

U.S. CIO Tony Scott has estimated that \$3 billion worth of federal IT equipment will reach end-of-life status in the next three years.²⁸ According to the GAO, over 75% of spending on IT in 2016 was allocated to the operations and maintenance (O&M) of legacy systems that already are, or are rapidly becoming, obsolete.²⁹ GAO's report highlights 10 critical mission systems, such as the IRS individual taxpayer master file and the Defense Department's missile command-and-control systems, which are both over 50 years old. This allocation of IT spending is not sustainable and only treats the symptoms of the problem, instead of modernizing to actually correct the problem. For example, Intel's research shows that servers over four years old deliver just 4% of the performance of modern servers while using more energy. Continuing to funnel spending into inefficient systems only exacerbates current problems. The government should shift

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²⁸ <http://www.nextgov.com/cio-briefing/2016/06/federal-cio-it-upgrade-fund-single-biggest-opportunity-make-dent-legacy-it/129067/>

²⁹ <http://www.gao.gov/assets/680/677454.pdf>

spending away from legacy systems and into modern technologies that provide better return on investment.

Duplicative and obsolete legacy systems should be sunset wherever possible, and necessary systems should be replaced with modern technologies on more cost-efficient platforms. As a recent example, GAO and some federal agencies acted on a recommendation in *One Trillion Reasons* to consolidate data centers.³⁰ In alignment with that report's recommendation, GAO stated that agencies are expected to save over \$5 billion from the consolidation of data centers over the next three years.³¹ Ultimately, the report suggests, these cost reductions likely will be even higher given that 10 of the 24 participating agencies had not yet fully developed their cost estimates at the time of publication.

A recent report by the Information Technology and Innovation Foundation (ITIF) suggests that state governments could save \$11 billion over the next five years through increased productivity resulting from technology investment and adoption.³² Another study cited in ITIF'S report³³ estimates that every \$1 increase in new IT spending by a state government CIO led to as much as a \$3.49 reduction in overall state expenditures. Applied to the federal government, investing in new IT systems—and in so doing, shifting spending from legacy O&M to modern systems to increase

productivity—could yield billions in reduced costs. At the identified cost reduction rate, and assuming a shift of only 5% of approximately \$65 billion on federal O&M IT spending, the government could cut costs by over \$110 billion during the next decade.³⁴

Many in Congress have recognized the challenge and expense posed by such legacy systems, and lawmakers are considering legislation that would authorize working capital funds for every federal agency to upgrade and modernize IT systems. Such funds could allow agencies to innovate by repurposing unnecessary operations dollars and investing in more efficient technology, and then keeping a portion of the savings. This program could prove highly effective, encouraging federal agencies to seek out cost savings and increased productivity while also modernizing outdated IT systems and holding CIOs accountable for spending.³⁵

Dell Technologies has demonstrated the benefits of moving away from on-site IT infrastructure to a cloud-based model. Through its Collaboration Pathfinder Platform, Dell provides email, instant message, desktop voice/video communications, productivity tools and user storage to the U.S. Air Force. Not only does this solution streamline the Air Force's primary communication tools, but it also allows key technical resources to realign to mission-critical assignments. Dell estimates

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³⁰ <http://gao.gov/assets/330/322241.pdf>

³¹ <http://www.gao.gov/assets/680/675592.pdf>

³² <http://www2.itif.org/2015-next-wave-it-state-government.pdf>

³³ <http://dx.doi.org/10.1287/mnsc.2015.2164>

³⁴ Per GAO (<http://www.gao.gov/assets/680/677454.pdf>), O&M represents 75% of federal IT spending. Applied to a reported 2017 IT budget of \$89 billion (https://www.whitehouse.gov/sites/default/files/omb/budget/fy2017/assets/ap_17_it.pdf), shifting 5% of O&M spending (\$3.3 billion) and applying the ITIF report's 3.5x1 ROI spend reduction finding results in an overall cost reduction of \$11 billion per year.

³⁵ ITIF recently included a similar recommendation in a report to the new administration.
http://www2.itif.org/2016-white-house-transition-memo.pdf?_ga=1.164614904.655040967.1480432231

that the Air Force will achieve a 50% reduction in the total cost of ownership from its existing services.

In 2015, **Xerox** helped Indiana scale its eligibility and processing services to successfully launch the Healthy Indiana Plan (HIP) 2.0 at an accelerated pace. Within the first 14 months, the state successfully processed more than 800,000 applications through this scalable, flexible platform.

The Federal Communications Commission (FCC) is another example of an agency currently working through a significant IT modernization effort. The FCC began its transition by moving from a capital expenditures model to an application expenditures model. This enabled the agency to modernize its application portfolio in coordination with a move to cloud hosting. Subsequent steps will focus on data and application rationalization to support enterprise-wide modernization en route to a full cloud environment. Critical to this sequence for the FCC was a relatively small up-front investment in moving from legacy infrastructure to managed services, which left room in its budget to effectively implement other necessary changes, such as migration and rationalization.

In another example, the U.S. Army Materiel Command Logistics Support Activity (LOGSA) has significant costs. **Working with IBM, LOGSA migrated its procurement operation to an on-premises hybrid cloud model that now processes 40 million unique daily data transactions and is used by more than 150 Army suppliers around the globe. LOGSA is saving more than \$2 million a month over**

previous contracts, a reduction of 40% to 50%, while delivering greater levels of service to Army customers.

Pivotal (part of Dell Technologies) has demonstrated how leveraging modern technology platforms for building and running software applications can drive significant speed and efficiency improvements for government agencies. Software development programs and other processes, such as security accreditation for new applicants that traditionally have taken several months to complete, are now handled in a few weeks. Across agencies using these platforms, the task of setting up environments for software developers to do their work has been reduced from two to four weeks to less than a minute. In addition, these modern techniques are “cloud agnostic,” enabling the government to seamlessly shift workload between commercial cloud offerings or on-premise cloud capability whenever cloud economics shift or security requirements dictate.

While we estimate cost reductions of up to \$110 billion over 10 years by investing in modern vs. legacy systems, these estimates may not be “scoreable” by CBO in the aggregate, but could be scored for individual projects and systems.

CYBERSECURITY

The importance of strengthening and maintaining effective cybersecurity technologies and best practices for government cannot be overstated. The 2016 Ponemon Cost of Data Breach Study³⁶ found the average consolidated

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³⁶ <http://www-03.ibm.com/security/data-breach/>

total cost of a data breach grew to \$4 million, while the average cost incurred for each lost or stolen record containing sensitive and confidential information increased to \$158. OPM's 2015 data breach, in which approximately 21.5 million personnel records were compromised, has cost the government more than \$350 million thus far.³⁷ Based on the Ponemon figures, this breach could ultimately cost more than \$3.3 billion.

The government must be proactive in preparing for and identifying cyberattacks by strengthening its online infrastructure.

Akamai recently supported the U.S. State Department's implementation of a secure cloud-based web presence that has successfully denied approximately 10 million malicious triggers each month and offered full protection against one of the largest distributed denial of service (DDoS) attacks against the agency. Given that the average cost of a DDoS attack is \$40,000 per hour (for an average total cost of \$500,000 per incident),³⁸ the cost avoidance to the agency is significant.

Clearly, the cost avoidance from preventing cybersecurity attacks government-wide is immense. However, it is much more difficult to assign specific cost reduction estimates to these opportunities, let alone "scoreable" savings. If expensive breaches continue, the impact of cost reduction initiatives will almost certainly be reduced, and thus avoiding these attacks is equally as critical.

MOBILE

Mobile devices continue to transform the way Americans work, live and learn and the way all enterprises do business. Per a May 2015 GAO report, the federal government currently spends about \$1.2 billion annually on about 1.5 million mobile devices and associated services.³⁹ Continued expansion of mobile self-service and supporting infrastructure is essential to meet the needs and expectations of the federal workforce and the American public.

Xerox is helping organizations unlock the value of expanded mobile adoption. Working with cities including Los Angeles and Denver, Xerox developed an innovative mobile platform, the Mobility Marketplace, to help travelers manage multiple modes of travel using reservation and information systems from multiple federal and private enterprises to find the cheapest, fastest and most environmentally friendly routes possible. The platform also enables enterprise owners to view key metrics for their services, such as demand forecasting and payments. This platform not only provides a valuable service to citizens, it also helps governments explore opportunities to reduce transportation spending and improve sustainability. Optimized travel planning for federal employees and better management of the federal vehicle fleet are just two of the benefits that could be realized from the implementation of a similar platform at the federal level.

Mobile technologies also are critical to agencies such as FEMA and the U.S. Food and Drug Administration (FDA) that have agents and

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³⁷ <http://freebeacon.com/issues/opm-hack-costing-taxpayers-350-million/>

³⁸ <http://www.securityweek.com/ddos-attacks-cost-40000-hour-incapsula>

³⁹ <http://www.gao.gov/assets/680/670333.pdf>

first responders in the field, often in remote or disaster locations. In an interview, FEMA's CIO stated, "Our strategy focuses on getting mobile technologies into the hands of those at the end of the spear. They interface directly with survivors. We want to ensure they have the tools to quickly get information and data incorporated into devices and transmitted, as well as get appropriate funds and services out to the survivors and first responders."⁴⁰ Improving and expanding mobile capabilities for these types of specialized roles has the potential to save lives and promote increased general well-being of the American public.

The potential benefits of mobile technology to cities across the United States and worldwide go well beyond current use cases, and involve widespread application to infrastructure, energy, transportation, buildings and more. **Engineers at Qualcomm have been working with government authorities and industry partners to deploy wide- and local-area connectivity processing technologies that include Bluetooth, Wi-Fi, 3G, 4G LTE and small cells to make fast-growing**

urban environments more efficient, safe, sustainable and innovative. Qualcomm's technological solutions aim to reuse existing systems such as mobile broadband networks, reimagine existing infrastructure to derive additional value and transform single-purpose devices into multipurpose devices to maximize efficiency.

A recent cross-industry study by IBM found that, on average, return on investments in mobile initiatives results in a 7% increase in revenue and a 6% decrease in costs.⁴¹ For commercial industry, successful mobile initiatives enable enterprises to use new business models and reach new markets or audiences while helping avoid new costs. Effective management of mobile technologies can help government improve security while providing enhanced services and controlling expenses. Since this is a relatively new area, and it is unclear how cost reductions in the federal government will compare to commercial industry, we have not attempted to calculate a number for this category of cost reductions.

KEY RECOMMENDATION

Make strategic investments in modern, cloud-enabled IT infrastructure, cybersecurity and mobile services, which offer substantial cost-savings potential across the federal government and can establish the foundation for paradigm-shifting innovation.

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⁴⁰ <http://www.fedtechmagazine.com/article/2015/04/qa-fema-cio-talks-mobile>

⁴¹ <http://www-935.ibm.com/services/us/gbs/thoughtleadership/mobileroi/>

OPTIMIZING PROCESSES

As effective management and decision-making structures and processes take shape, it is critical that the new administration reinforce the need to continually improve federal government operations. Supply chain management presents a particularly impactful cost reduction opportunity. Smarter spending, network optimization, transportation analytics, inventory optimization and demand-reduction efforts have proven to be effective means to reduce supplier spending, improve mission outcomes and minimize operational costs in large commercial entities and, to a smaller degree, within the federal government.

SUPPLY CHAIN AND ACQUISITION

Federal agencies purchase more than \$450 billion of goods and services annually.⁴² Despite efforts to consolidate acquisition efforts across the federal government, these activities continue to be performed through a range of independent department and agency processes. The opportunity to leverage the collective buying power of the federal government remains largely untapped. Agencies across the government could apply their cognitive and analytics capabilities to ingest and learn the breadth and depth of complex procurement laws and procedures that individuals or standard computing models cannot process. **For example, a key enabler of IBM's \$7 billion in annual savings in supply chain spending focused on the application of cognitive and analytic tools.**

These cognitive tools will capture and use structured and unstructured data around suppliers, markets and prices, from internal and external data sources, to assist and accelerate the market intelligence process

for procurement agents. Further, these tools can capture seemingly unrelated data, like weather, and correlate them to potential supply chain risks. Cognitive tools have also ingested the Federal Acquisition Regulations (FAR) and Defense Federal Acquisition Regulations (DFAR), whereby guidance on the process can be provided to federal acquisition specialists through a Virtual Agent Assistant. Most importantly, these cognitive tools learn from every interaction to enable more targeted and relevant data capture and offer better advice, consistent with how a supply chain practitioner would address a problem.

The government's recent shift in focus to category management as a Cross-Agency Priority (CAP) goal is a positive step towards reforming federal procurement, but its implementation has had varying degrees of success and maturity across categories. The government must expand the success of GSA's Federal Strategies Sourcing Initiative (FSSI) and category management to coordinate acquisition of common IT and support services through

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⁴² <http://www.ncmahq.org/docs/default-source/default-document-library/pdfs/exec15---ncma-annual-review-of-government-contracting-2015-edition>

standard platforms. Success implementing similar programs also has been demonstrated in the government of the United Kingdom. Over the course of five years, the UK reduced costs by over \$13 billion using category management to streamline its supply chain.

McKesson, a pharmaceutical and medical supplies company, has leveraged enterprise data with advanced transportation, inventory, network and sustainability analytics to enable just-in-time inventory management. Shifting the focus from purely lowest price within each operational process to holistic optimization, McKesson gained a broad view of its supply chain that revealed substantial opportunities, leading to reduced costs and improved service to end customers. Examining these processes independently would not have made sense, but by taking a broad view the company has saved an estimated \$1 billion with its investment in advanced analytics.

Based on our experiences and the success of other government initiatives, we believe that strong category management, better use of supply chain assets across federal agencies, advanced analytics and process improvements proven to be effective with large commercial firms have the potential to reduce supply chain costs by 10% to 20%. **IBM reported annual savings of over \$7 billion from nearly \$50 billion in global supply chain spending managed (a 14.5% savings).** Conservatively, the federal government could achieve similar improvements in supply chain performance and reduce spending by more than \$500 billion

over the next 10 years. While the cost reductions related to category management may be “scoreable” by CBO, the cost reductions associated with supply chain improvements may not be—budget scoring for both initiatives will require further review.

ENERGY USE

Although the government’s energy use has been declining since its peak in the 1970s, there is an opportunity to reduce energy use further. Real industry experience demonstrates that a 10% return in energy cost reduction can be achieved by applying efficient technologies to energy use. Based on current government estimates for its energy expenditures,⁴³ the government can reduce non-petroleum-based energy costs by approximately \$3 billion over 10 years. These cost reductions are potentially “scoreable” by CBO on a project-by-project basis.

Dell EMC implemented flash technology for the Indiana Office of Information Technology (OIT), providing a 69% power and cooling reduction and a 70% decrease in floor space while accelerating the provision of virtual machines for workloads/applications from several minutes to 15 seconds.

Dell also helped the Transportation Security Administration (TSA) remove on-premise server racks, decreasing cooling costs and reducing floor space needs to save \$2 million annually. We estimate that similar efforts applied at other federal agencies could generate a 10%

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⁴³ Based on fuel consumption data from the U.S. Energy Information Administration (<http://www.eia.gov/todayinenergy/detail.php?id=19851>). Using a benchmark of \$9.4 billion in annual energy costs—a recent historical low, selected to produce a conservative estimate—and addressing non-petroleum sources, including electricity, coal, natural gas and other, produced an annual energy expenditure figure of \$3.4 billion. Conservatively applying the 10% savings rates from case studies cited in this report to the estimated expenditure produces an annual savings opportunity of at least \$300 million.

cost reduction, on average, from reducing power and cooling costs, as well as freeing up floor space.

In the private sector, GE is working with Boeing and airlines to deliver next-generation engines that use cognitive technologies to reduce fuel consumption by 11%.⁴⁴ Fuel consumption is the largest operating expense to airlines, accounting for almost one-third of operating costs and growing at an average rate of 19% per year.⁴⁵ The federal government used over 400 trillion BTUs of jet fuel in 2015,⁴⁶ costing approximately \$5 billion.⁴⁷ Investing in modernized engines that could reduce fuel consumption by 11% represents another opportunity to cut costs by over \$500 million per year.

The Federal Aviation Administration (FAA) NextGen performance-based navigation

system provides more efficient aircraft routes from departure runway to arrival runway while increasing flexibility in the national airspace. These optimized routes, already in effect at some U.S. airports, are estimated to save millions of dollars annually in each metro area.

Businesses also are effectively using analytics for route optimization, with United Parcel Service (UPS) showing how the federal government could more effectively manage federal fleets. According to company sources, when UPS's On-Road Integrated Optimization Navigation (ORION) system is fully deployed in the United States, the company will reduce by 100 million miles annually the distance driven by company drivers, saving \$300 million and 10 million gallons of fuel, along with the significant environmental benefits from reduced emissions.⁴⁸

KEY RECOMMENDATION

Optimize the federal supply chain and federal procurement processes, which has the potential to unlock substantial savings across the federal government, while enabling better, more reliable and more timely delivery of goods and services.

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⁴⁴ <http://aviationweek.com/awin/next-gen-engines-give-airlines-cost-saving-options>

⁴⁵ <https://www.ge.com/digital/blog/thrust-sale-innovation-takes-flight>

⁴⁶ <http://ctseddweb.ee.doe.gov/Annual/Report/Report.aspx>

⁴⁷ [https://web.archive.org/web/20110523093845/http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/tablefiles/c0464\(2005\).pdf](https://web.archive.org/web/20110523093845/http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/tablefiles/c0464(2005).pdf)

⁴⁸ <https://www.pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=PressReleases&id=1426329559785-791>

5 SCORING ADMINISTRATIVE SAVINGS

Specific rules govern how savings are “scored” in the federal environment. These rules are different than those that used to calculate savings estimates in the private sector, and those leading reform initiatives must recognize some of the key distinctions.

Savings from reduced administrative spending can be scored if the President proposes and Congress enacts lower appropriations for agencies, signaling agencies to realize savings via operational reforms. Agencies are likely to resist such budget reductions for fear that efficiencies are “speculative,” and lower budgets could ultimately reduce core functions and mission-related activities. In the private sector, our customers have found that administrative savings are consistently real and mission-enhancing. For government, this process could be implemented as follows:

- The President’s Budget would propose allocating overall savings targets to budget accounts for individual Agency programs. Forecasted savings would be allocated among specific programs in the President’s budget request.
- Congress would then incorporate these saving targets into its annual Budget Resolution. Savings could be achieved in individual program accounts if Congress reduced the ceiling amount that agencies could spend for those programs in that year.
- Both the Budget Resolution and subsequent appropriations legislation would have to include reductions from one of the two different overall spending caps—one for defense programs, one for non-defense programs—established by the Budget Control Act (BCA) of 2011. (This presumes that Congress has not acted in the meantime to override or waive those caps, as occurred for the first four years of the BCA.)
- With less money allocated through the Budget, agencies would have to operate these programs more efficiently, through the proven means recommended in this report and/or other methods. If the administrative savings were not achieved, agencies would still have to reduce spending in other areas of the program to stay within their overall spending targets.

Technically, this would reduce “budget authority” through a process known as “302” allocations. To score as savings, the annual Budget Resolution would have to allow appropriators to reduce the total 302(a) allocation for that year, and subsequently reduce 302(b) allocations for individual programs to appropriations subcommittees; otherwise, the savings could simply be used for other discretionary spending within the total provided in the Budget Resolution.

Alternatively, allowing agencies to retain some portion of savings for discretionary use might create greater incentives for agency leadership to drive necessary change.

- All of this would have to be tracked for each individual program for which savings was estimated, as well as at the aggregate level, to show savings relative to the previously established defense and non-defense caps. This could be a complex and lengthy process.

These steps would apply to all programs funded each year by the Budget, which are known as “discretionary” programs because Congress has discretion on whether and how much to appropriate.

For “entitlement” programs such as Medicare, a portion of the administrative costs are funded out of the overall amount collected to operate the program, as opposed to annual appropriations. These are known as “mandatory” programs, because the spending is “mandated” based on how many services participants use and how much those services cost. Reductions in mandatory spending, such as savings in improper payments identified in this report, can be scored if legislated changes to the authorities for those programs mandate the actions that produce these savings. The

savings would be scored over a multi-year period, reflected in reduced spending estimates for those programs.

In the longer term, the administration could work with Congress to develop consistent scoring rules for multi-year savings. Under existing rules, CBO would incorporate the impacts of current investments in baseline estimates, but would not normally include the changes in the legislation enacting new investments that would have future-year impact. As described above, much of the savings would arise in discretionary accounts subject to annual appropriation. Future appropriations could be lower, but under existing rules Congress could not claim any of the savings for current initiatives because the appropriation bill covers only the current year. Allowing agencies to count savings over multiple years is more consistent with how capital accounting for IT-enabled savings is done in the private sector.

6 CONCLUSION

The world is in the midst of a digital revolution, which is fundamentally transforming the way people access and act on information to benefit their lives. Technology is no longer a cost used merely to automate previously manual processes. Technology today is user-centric, integrated across platforms, ubiquitous, smart and agile. It can disrupt previously entrenched business models, drive up service quality and reduce costs.

Technology can democratize access to information and open up new uses for the vast amounts of data, leveling the playing field for all. The federal government must not only join this revolution, it needs to become a driving force behind it.

It is imperative that we take steps as a nation to reduce the budget deficit and modernize the federal IT environment. The recommendations in this report provide a realistic roadmap toward resolving both of these issues. The new administration has the opportunity to incorporate these recommendations into its policy priorities, establishing the foundation for substantial cost reduction over the next 10 years.

The recommendations in this report are not hypothetical suggestions based in hopes for the future. The opportunities are real, the

capabilities have been demonstrated and the benefits have been realized in both commercial and public-sector applications. Cumulatively, the opportunities highlighted in this report represent potential decreases in costs of over \$1 trillion over the next 10 years, in addition to other benefits to the government and public that would result from their implementation.

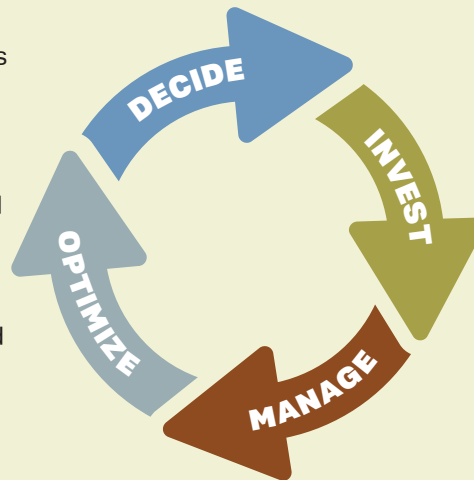
We are optimistic that the capabilities of modern technologies and our collective experience supporting the government will enable success. We look forward to supporting the transition to an efficient, modern federal IT environment that directly improves the way government works and ultimately benefits the American people.

APPENDIX: REPORT ORGANIZATION

With a focus on presenting recommendations immediately available for implementation, the opportunities highlighted in this report are presented in a project lifecycle approach—Decide, Invest, Manage and Optimize—familiar in both government and industry environments. The intent is to provide a helpful framework and also to emphasize that these opportunities are real examples of current capabilities and approaches that have been implemented with success and can be applied right away to the federal government. A structured, management-focused approach helps sequence actions, promote efficiency and enable tracking against performance targets. At the same time, the approach increases the speed at which benefits can be realized and promotes both innovative and more iterative improvements that move the government closer towards the larger goal.

■ **DECIDE:** The government can make more informed decisions that lead to reduced costs by better using the vast amounts of government, private and open data sources.

■ **INVEST:** Technology-enabled capabilities and solutions are needed to support a modern, innovative and secure federal IT environment.



■ **MANAGE:** Effective oversight, governance and management practices are required to ensure the security and performance of federal programs and investments.

■ **OPTIMIZE:** Systems and processes enable the federal government to operate efficiently and effectively, promoting continuous improvement rather than settling for the status quo.

Rather than conveying a sense that these opportunities are unrelated, stand-alone recommendations, we recognize the interdependencies and increased benefits of having a consistent vision for improving services and decreasing costs in the federal government.

We recommend that the new administration consider its priorities and evaluate how to link these initiatives together with policy proposals, staffing decisions and budget planning.

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