



May 2018

# DATA CENTER OPTIMIZATION

## Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations

Accessible Version

# GAO Highlights

Highlights of [GAO-18-264](#), a report to congressional committees

## Why GAO Did This Study

In December 2014, Congress enacted federal IT acquisition reform legislation that included provisions related to ongoing federal data center consolidation efforts. OMB's Federal Chief Information Officer launched DCOI to build on prior data center consolidation efforts; improve federal data centers' performance; and establish goals for inventory closures, cost savings and avoidances, and optimization performance.

The 2014 legislation also included a provision for GAO to annually review agencies' data center inventories and strategies. Accordingly, GAO reviewed agencies' data center closures to date and plans for further closures; evaluated agencies' progress in achieving consolidation savings and described their plans for future savings; and assessed agencies' progress against OMB's data center optimization targets. To do so, GAO assessed the 24 DCOI agencies' data center inventories as of August 2017; reviewed their reported cost savings documentation; evaluated their data center optimization strategic plans; and assessed 22 agencies' progress against OMB's established optimization targets. Two agencies did not have a basis to report planned optimization milestones.

OMB and the 24 DCOI agencies provided mixed responses to GAO's findings on the progress made towards initiative goals. GAO continues to believe that implementation of the recommendations made previously will help the agencies meet OMB's targets for cost savings and optimization of performance.

View [GAO-18-264](#). For more information, contact David A. Powner at (202) 512-9286 or [pownerd@gao.gov](mailto:pownerd@gao.gov).

May 2018

## DATA CENTER OPTIMIZATION

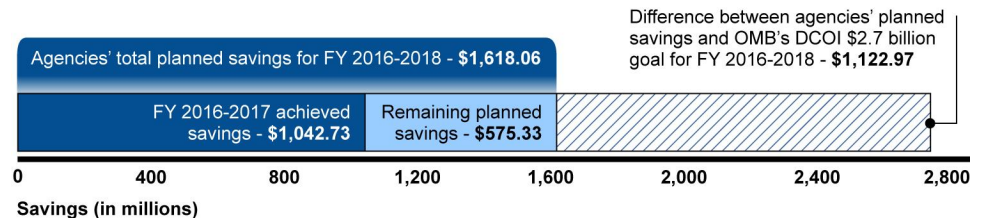
### Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations

## What GAO Found

The 24 agencies participating in the Office of Management and Budget's (OMB) Data Center Optimization Initiative (DCOI) reported mixed progress toward achieving OMB's goals for closing data centers by September 2018. Over half of the agencies reported that they had either already met, or planned to meet, all of their OMB-assigned goals by the deadline. This would result in the closure of 7,221 of the 12,062 centers that agencies reported in August 2017. However, 4 agencies reported that they do not have plans to meet all of their assigned goals and 2 agencies are working with OMB to establish revised targets.

With regard to agencies' progress in achieving cost savings, 20 agencies reported, as of August 2017, that they had achieved \$1.04 billion in cost savings for fiscal years 2016 and 2017. In addition, the agencies' DCOI strategic plans identify an additional \$0.58 billion in planned savings—for a total of \$1.62 billion for fiscal years 2016 through 2018. This total is approximately \$1.12 billion less than OMB's DCOI savings goal of \$2.7 billion (see figure). This shortfall is the result of 12 agencies reporting less in planned cost savings and avoidances in their DCOI strategic plans, as compared to the savings targets established for them by OMB.

**Agencies' Reported Achieved and Planned Data Center Optimization Initiative Savings against OMB's Goal for Fiscal Years (FY) 2016 through 2018, as of August 2017**



Source: GAO analysis of agency data. | GAO-18-264

The 24 agencies reported limited progress against OMB's five data center optimization targets for server utilization and automated monitoring, energy metering, power usage effectiveness, facility utilization, and virtualization. As of August 2017, 1 agency had met four targets, 1 agency had met three targets, 6 agencies had met either one or two targets, and 14 agencies reported meeting none of the targets. Further, as of August 2017, most agencies were not planning to meet OMB's fiscal year 2018 optimization targets. Specifically, 4 agencies reported plans to meet all of their applicable targets by the end of fiscal year 2018; 14 reported plans to meet some of the targets; and 4 reported that they do not plan to meet any targets.

In 2016 and 2017, GAO made a number of recommendations to OMB and the 24 DCOI agencies to help improve the reporting of data center-related cost savings and to achieve optimization targets. As of March 2018, 74 of these 81 recommendations had not been fully addressed.

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### Abbreviations

Agriculture	Department of Agriculture
CIO	chief information officer
Commerce	Department of Commerce
DCOI	Data Center Optimization Initiative
Defense	Department of Defense
DHS	Department of Homeland Security
Education	Department of Education
Energy	Department of Energy
EPA	Environmental Protection Agency
FDCCI	Federal Data Center Consolidation Initiative
FITARA	Federal Information Technology Acquisition Reform Act
GSA	General Services Administration
HHS	Department of Health and Human Services
HUD	Department of Housing and Urban Development
IT	information technology
Interior	Department of the Interior
Justice	Department of Justice
Labor	Department of Labor
NASA	National Aeronautics and Space Administration
NRC	Nuclear Regulatory Commission
NSF	National Science Foundation
OMB	Office of Management and Budget
OPM	Office of Personnel Management
SBA	Small Business Administration
SSA	Social Security Administration
State	Department of State
Transportation	Department of Transportation
Treasury	Department of the Treasury
USAID	U.S. Agency for International Development
VA	Department of Veterans Affairs

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May 23, 2018

Congressional Committees

The federal government’s demand for information technology (IT) is ever increasing. In recent years, as federal agencies have modernized their operations, put more of their services online, and improved their information security profiles, their need for computing power and data storage resources has grown. Accordingly, this growing demand led to a dramatic rise in the number of federal data centers and a corresponding increase in operational costs.

To reduce data center duplication and costs, the Office of Management and Budget’s (OMB) Federal Chief Information Officer (CIO) launched two initiatives. The first, launched in 2010, was the Federal Data Center Consolidation Initiative (FDCCI), which aimed to reduce the number of data centers that were outdated or duplicative. The second initiative—the Data Center Optimization Initiative (DCOI)—was launched in August 2016 and superseded FDCCI. This initiative shifted the focus to optimizing agencies’ remaining data centers by requiring, among other things, that agencies consolidate inefficient infrastructure, optimize existing facilities, and transition to more efficient infrastructure, such as cloud services.

Further, Congress has recognized the importance of reforming the government-wide management of IT and, in December 2014, enacted Federal Information Technology Acquisition Reform provisions (commonly referred to as FITARA) as a part of the *Carl Levin and Howard P. ‘Buck’ McKeon National Defense Authorization Act for Fiscal Year 2015*.<sup>1</sup> Among the requirements related to federal data center consolidation, the law requires:<sup>2</sup>

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<sup>1</sup>Pub. L. No. 113-291, division A, title VIII, subtitle D, 128 Stat. 3292, 3438 (Dec. 19, 2014). In November 2017, the *FITARA Enhancement Act of 2017* was enacted into law to extend the sunset date for the data center provisions of FITARA. The law’s data center consolidation and optimization provisions now expire on October 1, 2020. Pub. L. No. 115-88, 131 Stat. 1278 (Nov. 21, 2017).

<sup>2</sup>Pub. L. No. 113-291 § 834, 128 Stat. 3444 – 3448 (44 U.S.C. 3601 note). Unless otherwise noted, these requirements apply to the 24 agencies specified in section 834 (corresponding to those agencies covered by the *Chief Financial Officers Act of 1990*. 31 U.S.C. § 901(b)).

- Covered departments and agencies (agencies)<sup>3</sup> to annually report to OMB about federal data center inventories and strategies to achieve consolidation, including yearly calculations of investment and cost savings.<sup>4</sup>
- OMB to develop goals for the amount of planned cost savings and optimization improvements that agencies are to achieve through FDCCI. OMB is to make the goals publicly available and compare progress against the goals.

In addition to these requirements, FITARA included a provision for GAO to annually review and verify the quality and completeness of covered agencies' federal data center inventories and strategies for consolidation. Accordingly, our specific objectives were to (1) review agencies' data center closures to date and plans for further closures, (2) evaluate agencies' progress in achieving data center consolidation savings and describe plans for future savings, and (3) assess agencies' progress against OMB's data center optimization targets.

On November 13, 2017, we briefed congressional committee staff on the results of our work. This report officially transmits the results of our review to the committees.

To review agency closures to date and plans, we obtained and analyzed August 2017 data center inventory documentation from the 24 DCOI agencies. We compared information on the agencies' completed and planned data center closures to OMB's fiscal year 2018 consolidation goals, as documented in its August 2016 memorandum (M-16-19).<sup>5</sup> We

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<sup>3</sup>The 24 agencies that are required to participate in the Data Center Optimization Initiative are the Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Housing and Urban Development, the Interior, Justice, Labor, State, Transportation, the Treasury, and Veterans Affairs; the Environmental Protection Agency, General Services Administration, National Aeronautics and Space Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Small Business Administration, Social Security Administration, and U.S. Agency for International Development. These are the same agencies covered by FITARA's data center consolidation provisions.

<sup>4</sup>In lieu of submitting a data center inventory and strategy, the Department of Defense may submit this information as part of a defense-wide plan and report on cost savings, as required under §§ 2867(b)(2) and 2867(d) of the *National Defense Authorization Act for Fiscal Year 2012* (10 U.S.C. § 2223a note).

<sup>5</sup>OMB, *Data Center Optimization Initiative (DCOI)*, Memorandum M-16-19 (Washington, D.C.: Aug. 1, 2016).

determined the number of data center that had been closed by adding the closures from fiscal year 2010 through August 2017, as reported by the agencies.<sup>6</sup> We identified future closures by counting data centers that agencies reported as planned closures, as of August 2017 through fiscal year 2019.

To verify the quality, completeness, and reliability of the agencies' data center inventories, we compared the information on completed and planned data center closures to similar information reported on OMB's IT Dashboard—a public website that provides information on federal agencies' major IT investments.<sup>7</sup> We determined that the data were sufficiently reliable to report on agencies' consolidation progress and planned closures.

In order to evaluate agencies' progress in and plans for achieving data center cost savings, we reviewed August 2017 cost savings and avoidance<sup>8</sup> documentation submitted by the 24 DCOI agencies in response to OMB's March 2013 and August 2016 memorandums.<sup>9</sup> This documentation included the agencies' quarterly reports of cost savings and avoidances posted to their digital services websites and discussed in their DCOI strategic plans. We determined cost savings achieved by adding agencies' reported savings and avoidances from the start of fiscal years 2012 through August 2017, as found in the August 2017 quarterly reports posted to their digital services websites. We identified future planned savings by totaling the agencies' projected savings and avoidances from fiscal years 2016 through 2018, as reported in their DCOI strategic plans.

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<sup>6</sup>OMB launched FDCCI in February 2010, at which point, agencies were required to begin closing data centers. However, current OMB guidance only requires agencies to report historical cost savings and avoidances realized since fiscal year 2012.

<sup>7</sup>We did not physically visit agencies' data center locations to verify their inventory totals.

<sup>8</sup>Beginning in March 2013, OMB required agencies to report on both cost savings and cost avoidances. OMB defines cost savings as a reduction in actual expenditures below the projected level of costs to achieve a specific objective and defines a cost avoidance as the result of an action taken in the immediate time frame that will decrease costs in the future.

<sup>9</sup>OMB, *Fiscal Year 2013 PortfolioStat Guidance: Strengthening Federal IT Portfolio Management*, Memorandum M-13-09 (Washington, D.C.: Mar. 27, 2013) and Memorandum M-16-19.



To assess the quality, completeness, and reliability of each agency's data center consolidation cost savings information, we used the latest version of each agency's update of the August 2017 quarterly cost savings report and DCOI strategic plan. We also reviewed the quarterly reports and DCOI strategic plans for missing data and other errors, such as missing cost-savings information. In addition, we compared agencies' reported cost savings and avoidances with data from our most recently issued report on data center consolidation.<sup>10</sup> Further, we obtained written responses from agency officials regarding the steps they took to ensure the accuracy and reliability of their cost savings data. As a result, we determined that the data were sufficiently reliable to report on agencies' data center consolidation cost-savings information.

To assess agencies' progress against OMB's data center optimization targets, we obtained the August 2017 data center optimization progress information of 22 DCOI agencies, as reported on the IT Dashboard.<sup>11</sup> We then compared the agencies' optimization progress information to OMB's fiscal year 2018 optimization targets, as documented in its August 2016 memorandum.<sup>12</sup>

To assess the reliability of agencies' optimization progress information on OMB's IT Dashboard, we reviewed the information for errors or missing data, compared agencies' optimization progress information across multiple reporting quarters to identify any inconsistencies in agencies' reported progress, and discussed with OMB and agency officials the steps they took to ensure the accuracy and reliability of the reported optimization progress. We determined that the data were sufficiently reliable to report on agencies' optimization progress.

In addition, to assess the reliability of the DCOI strategic plans, we reviewed agencies' documentation to identify any missing or erroneous data. We also compared the planned data center optimization milestones contained in agencies' documentation against current optimization

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<sup>10</sup>GAO, *Data Center Consolidation: Agencies Making Progress, but Planned Savings Goals Need to Be Established [Reissued on March 4, 2016]*, [GAO-16-323](#) (Washington, D.C.: Mar. 3, 2016)

<sup>11</sup>Two agencies—the Departments of Education and Housing and Urban Development—report that they do not have any agency-owned data centers and, therefore, do not have a basis to measure and report on optimization progress.

<sup>12</sup>OMB, Memorandum M-16-19.

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progress information obtained from the IT Dashboard; we then discussed any discrepancies or potential errors that we identified with agency officials to determine the causes or request additional information. As a result of these efforts, we determined that the agencies' strategic plan information was sufficiently reliable for reporting on plans to meet or not meet OMB's fiscal year 2018 optimization targets. Appendix I provides greater details regarding our objectives, scope, and methodology.

We conducted this performance audit from July 2017 to May 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

The federal government's increasing demand for IT has led to an increase in the number of federal data centers and a corresponding increase in operational costs. According to OMB, the federal government had 432 data centers in 1998, 2,094 in July 2010, and 9,995 in August 2016.<sup>13</sup>

Operating such a large number of centers has been, and continues to be, a significant cost to the federal government.<sup>14</sup> For example, in 2007, the Environmental Protection Agency (EPA) estimated that the electricity costs to operate federal servers and data centers across the government were about \$450 million annually. According to the Department of Energy (Energy), a typical data center has 100 to 200 times the energy use intensity of a commercial building. In 2009, OMB reported that server utilization rates as low as 5 percent across the federal government's estimated 150,000 servers were a factor driving the need to establish a coordinated, government-wide effort to improve the efficiency,

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<sup>13</sup>Between 1998 and 2016, OMB used several different definitions of a data center, which contributed to the increase in the number of reported centers. This issue is discussed in more detail later in this report.

<sup>14</sup>Costs include hardware, software, real estate, electricity, and heating and cooling.

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performance, and environmental footprint of federal data center activities.<sup>15</sup>

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## OMB and the Federal CIO Established FDCCI

Concerned about the size of the federal data center inventory and the potential to improve the efficiency, performance, and the environmental footprint of federal data center activities, OMB's Federal CIO established FDCCI in February 2010. This initiative's four high-level goals were to reduce the overall energy and real estate footprint of government data centers; reduce the cost of data center hardware, software, and operations; increase the overall IT security posture of the government; and shift IT investments to more efficient computing platforms and technologies.

In February 2010, OMB required all of the agencies participating in the FDCCI to submit a data center inventory and a consolidation plan.<sup>16</sup> In October 2010, OMB also clarified the definition of a data center and noted that, for the purposes of FDCCI, a data center was to be defined as any room used for the purpose of processing or storing data that is larger than 500 square feet and meets stringent availability requirements. Under this definition, OMB reported that agencies had identified 2,094 data centers as of July 2010.

However, in 2011, the Federal CIO expanded the definition to include a facility of any size and OMB published its revised definition in March 2012.<sup>17</sup> Based on the revised definition, OMB estimated that there were a total of 3,133 federal data centers in December 2011. In addition, its goal was to consolidate approximately 40 percent, or 1,253 of these data centers, for a savings of approximately \$3 billion by the end of 2015. Figure 1 provides an example of data center server racks at the Social Security Administration's (SSA) National Support Center.

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<sup>15</sup>OMB, *Inventory of Federal Data Center Activity*, Budget Data Request No. 09-41 (Washington, D.C.: Aug. 10, 2009).

<sup>16</sup>The same 24 agencies participated in the FDCCI and DCOI.

<sup>17</sup>OMB, *Implementation Guidance for the Federal Data Center Consolidation Initiative* (Washington, D.C.: Mar. 19, 2012).

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**Figure 1: Example of Data Center Server Racks at the Social Security Administration's National Support Center**



Source: Social Security Administration. | GAO-18-264

The number of federal data centers reported by agencies has continued to grow since 2011. In March 2016, we reported that agencies had collectively identified a total of 10,584 data centers as of November 2015—an increase of about 7,500 data centers compared to OMB's October 2011 estimate.<sup>18</sup> According to the Federal CIO, the increase in the number of data centers was primarily due to the expanded definition of a data center and improved inventory reporting by the agencies.

Further, OMB placed greater emphasis on data center optimization when it issued memorandum M-13-09 in March 2013.<sup>19</sup> Specifically, OMB stated that, to more effectively measure the efficiency of an agency's data center assets, agencies would also be measured by the extent to which their primary data centers are optimized for total cost of ownership by incorporating metrics for data center energy, facility, labor, and storage, among other things. Subsequently, in May 2014, OMB issued

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<sup>18</sup>[GAO-16-323](#).

<sup>19</sup>OMB, Memorandum M-13-09.

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memorandum M-14-08, which established a set of data center optimization metrics to measure agency progress, along with target values for each metric.<sup>20</sup> All agencies were expected to achieve the target values by the end of fiscal year 2015.

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## IT Acquisition Reform Law Enhanced Data Center Consolidation and Optimization Efforts

Recognizing the importance of reforming the government-wide management of IT, Congress enacted FITARA in December 2014. Among other things, the law required agencies to:<sup>21</sup>

- Submit to OMB a comprehensive inventory of the data centers owned, operated, or maintained by or on behalf of the agency.
- Submit, by the end of fiscal year 2016, a multi-year strategy to achieve the consolidation and optimization of the agency's data centers.<sup>22</sup> The strategy was to include performance metrics that were consistent with the government-wide data center consolidation and optimization metrics.
- Report progress towards meeting government-wide data center consolidation and optimization metrics on a quarterly basis to OMB's Administrator of the Office of Electronic Government.

In addition, according to FITARA, the Office of Electronic Government at OMB was to:

- Establish metrics applicable to the consolidation and optimization of data centers (including server efficiency), ensure that agencies' progress toward meeting government-wide data center consolidation and optimization metrics is made publicly available, review agencies'

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<sup>20</sup>OMB, *Fiscal Year 2014 PortfolioStat*, Memorandum M-14-08 (Washington, D.C.: May 7, 2014).

<sup>21</sup>Pub. L. No. 113-291 § 834, 128 Stat. 3444 – 3448 (44 U.S.C. 3601 note). Unless otherwise noted, these requirements apply to the 24 agencies specified in section 834 (corresponding to those agencies covered by the *Chief Financial Officers Act of 1990*. 31 U.S.C. § 901(b)).

<sup>22</sup>In lieu of submitting a data center inventory and strategy, the Department of Defense may submit this information as part of a defense-wide plan and report on cost savings, as required under §§ 2867(b)(2) and 2867(d) of the *National Defense Authorization Act for Fiscal Year 2012* (10 U.S.C. § 2223a note).

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inventories and strategies to determine whether they are comprehensive and complete, and monitor the implementation of each agency's strategy.

- Develop and make publicly available not later than December 19, 2015, a goal broken down by year, for the amount of planned cost savings and optimization improvements to be achieved through FDCCI and, for each year thereafter until October 1, 2020, compare reported cost savings and optimization improvements against those goals.<sup>23</sup>

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## OMB Established DCOI

In August 2016, OMB issued memorandum M-16-19, which established DCOI and included guidance on how to implement the data center consolidation and optimization provisions of FITARA.<sup>24</sup> Among other things, the guidance required agencies to consolidate inefficient infrastructure, optimize existing facilities, improve their security posture, and achieve cost savings. For example, each agency was required to maintain a complete inventory of all data center facilities owned, operated, or maintained by or on its behalf, and measure progress toward defined optimization performance metrics on a quarterly basis as part of its data center inventory submission.

OMB's memorandum also directed each agency to develop a DCOI strategic plan that defined its data center strategy for fiscal years 2016 through 2018. Among other things, this strategy was to include a timeline for agency consolidation and optimization activities with an emphasis on cost savings and optimization performance benchmarks that the agency could achieve between fiscal years 2016 and 2018. For example, each agency was required to develop cost savings targets due to consolidation and optimization actions and report any realized cost savings. OMB required each agency to publicly post its DCOI strategic plan to its agency-owned digital strategy website by September 30, 2016, and to post subsequent strategic plan updates by April 14, 2017 and April 13, 2018.

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<sup>23</sup>As mentioned previously, the *FITARA Enhancement Act of 2017* extended FITARA's data center consolidation and optimization provisions until October 1, 2020. Pub. L. No. 115-88, 131 Stat. 1278 (Nov. 21, 2017).

<sup>24</sup>OMB, Memorandum M-16-19.

Further, the memorandum stated that OMB was to maintain a public dashboard (referred to as the IT Dashboard) to display government-wide and agency-specific progress in areas such as planned and achieved data center closures, consolidation-related cost savings, and data center optimization performance information. In this regard, OMB began including data center consolidation and optimization progress information on the IT Dashboard in August 2016.

OMB's memorandum also provided new guidance for the classification of a physical data center, expanding the definition of a data center. According to the revised definition, a room with at least one server that provides services (whether in a production, test, staging, development, or any other environment) should be considered a data center, while a room containing only print servers, routing equipment, switches, security devices (such as firewalls), or other telecommunication components, was not to be considered a data center.<sup>25</sup>

In light of this new definition, OMB directed each agency to perform a comprehensive review of its data centers and maintain a complete and updated data center inventory. Further, OMB directed each agency to categorize each of its data centers as either a tiered data center or a non-tiered data center. OMB's memorandum defined a tiered data center as one that uses each of the following:

- a separate physical space for IT infrastructure;
- an uninterruptible power supply;
- a dedicated cooling system or zone; and
- a backup power generator for a prolonged power outage.

According to the memorandum, all other data centers are to be considered non-tiered.<sup>26</sup>

Moreover, OMB guidance included a series of performance metrics in the areas of data center closures, cost savings, and optimization progress.

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<sup>25</sup>OMB, Memorandum M-16-19.

<sup>26</sup>The term "tiered" and its definition are derived by OMB from the Uptime Institute's Tier Classification System. However, OMB notes that no specific certification is required in order for a data center to be considered tiered by OMB.

- *Data center closures:* Agencies are expected to close at least 25 percent of tiered data centers government-wide, excluding those approved as inter-agency shared services providers, by the end of fiscal year 2018.<sup>27</sup> Further, agencies are to close at least 60 percent of non-tiered data centers government-wide by the end of fiscal year 2018. OMB's guidance further notes that, in the long term, all agencies should continually strive to close all non-tiered data centers, noting that server rooms and closets pose security risks and management challenges and are an inefficient use of resources.
- *Cost savings:* Agencies are expected to reduce government-wide annual costs attributable to physical data centers by at least 25 percent, resulting in savings of at least \$2.7 billion for fiscal years 2016 through 2018.<sup>28</sup>
- *Data center optimization:* Agencies are expected to measure progress against a series of new data center performance metrics<sup>29</sup> in the areas of server utilization, energy metering, power usage, facility utilization, and virtualization.<sup>30</sup> Further, OMB's guidance established target values for each metric that agencies are to achieve by the end of fiscal year 2018.

OMB's guidance further noted that agency progress against these performance metrics is to be measured by OMB on a quarterly basis, using agencies' data center inventory submissions and OMB-defined closures, cost savings, and optimization targets.

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<sup>27</sup>For more information about shared services, see OMB, *Federal Information Technology Shared Services Strategy* (Washington, D.C.: May 2, 2012).

<sup>28</sup>OMB established a goal of \$2.7 billion in Memorandum M-16-19. Subsequently, OMB increased the goal to \$2.74 billion when it published agency-specific targets on the IT Dashboard.

<sup>29</sup>These metrics supersede OMB's previous set of optimization metrics established in 2014.

<sup>30</sup>Virtualization is a technology that allows multiple software-based machines with different operating systems to run in isolation, side-by-side, on the same physical machine.



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## Agencies Have Taken Limited Action to Address GAO Recommendations from Prior Reports on Agencies' Consolidation and Optimization Efforts

Since the enactment of FITARA in December 2014, we have annually reviewed and verified the quality and completeness of each covered agency's inventory and DCOI strategy. We have also published reports documenting the findings from each of these reviews.<sup>31</sup> In addition, we have examined and reported on agencies' efforts to optimize their data centers, as well as the challenges encountered and successes achieved.<sup>32</sup>

In a report that we issued in March 2016, we noted that agencies had reported significant data center closures—totaling more than 3,100 through fiscal year 2015—with the Departments of Agriculture (Agriculture), Defense (Defense), the Interior (Interior), and the Treasury (Treasury) accounting for 84 percent of the total.<sup>33</sup> Although agencies fell short of OMB's fiscal year 2015 consolidation goal, their plans identified about 2,100 additional centers planned for closure through fiscal year 2019.

Agencies also reported significant consolidation cost savings and avoidances—totaling about \$2.8 billion through fiscal year 2015, and expected to increase to over \$8.0 billion in future years. The Departments of Commerce (Commerce), Defense, Homeland Security (DHS), Transportation (Transportation), and the Treasury accounted for 96 percent of the total planned savings. However, we pointed out that many agencies lacked complete cost savings goals for the next several years despite having closures planned.

In addition, we reported that 22 agencies had made limited progress against OMB's fiscal year 2015 data center optimization performance metrics, such as the utilization of data center facilities. Accordingly, we

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<sup>31</sup>[GAO-16-323](#) and *Data Center Optimization: Agencies Need to Complete Plans to Address Inconsistencies in Reported Savings*, [GAO-17-388](#) (Washington, D.C.: May 18, 2017).

<sup>32</sup>GAO, *Data Center Optimization: Agencies Need to Address Challenges and Improve Progress to Achieve Cost Savings Goal*, [GAO-17-448](#) (Washington, D.C.: Aug. 15, 2017).

<sup>33</sup>[GAO-16-323](#).

recommended that the agencies take actions to complete their cost savings targets and improve optimization progress. Of the 24 agencies to which we made recommendations, 14 agreed with our recommendations, 4 did not state whether they agreed or disagreed, and 6 stated that they had no comments. As of March 2018, 26 of the 32 recommendations from this report had yet to be fully addressed.

In May 2017, we reported that the agencies continued to report significant data center closures—totaling more than 4,300 through August 2016—with Agriculture, Defense, Interior, and the Treasury accounting for 84 percent of the total.<sup>34</sup> The agencies' plans for 2016 had identified more than 1,200 additional centers planned for closure through fiscal year 2019.

Agencies also reported significant consolidation and optimization cost savings and avoidances, which totaled about \$2.3 billion through August 2016. However, reductions in the amount of achieved savings reported to OMB, particularly by the Treasury, resulted in a net decrease of more than \$400 million in these savings, compared to amounts we previously reported in 2015.

Further, our report noted that, as of December 2016, agencies' total planned cost savings of about \$656 million were more than \$3.3 billion less, compared to the amounts that we reported in 2015, and more than \$2 billion less than OMB's fiscal year 2018 cost savings goal of \$2.7 billion. This reduction in planned savings was the result of eight agencies reporting less in planned cost savings and avoidances in their DCOI strategic plans compared to the savings amounts previously reported to us in November 2015. The reduction also reflected the absence of cost savings information for one agency (Defense) that did not submit its strategic plan in time for our review.

In addition, our May 2017 report identified weaknesses in agencies' DCOI strategic plans.<sup>35</sup> Of the 23 agencies that had submitted their strategic plans at the time of our review, 7 agencies—Agriculture, the Department of Education (Education), DHS, and the Department of Housing and Urban Development (HUD); the General Services Administration (GSA); the National Science Foundation (NSF); and the Office of Personnel

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<sup>34</sup>[GAO-17-388](#).

<sup>35</sup>[GAO-17-388](#).

Management (OPM)—had addressed all five required elements of a strategic plan, as identified by OMB (such as providing information related to data center closures and cost savings metrics). The remaining 16 agencies that submitted their plans either partially met or did not meet the requirements. We also pointed out that there were inconsistencies in the reporting of cost savings in the strategic plans of 11 agencies.

Given these findings, we recommended that OMB improve its oversight of agencies' DCOI strategic plans and their reporting of cost savings and avoidances. We also recommended that 16 agencies and Defense (which did not submit a plan in time for our review) complete the missing elements in their strategic plans, and that 11 agencies ensure the reporting of consistent cost savings and avoidance information to OMB. Of the 25 agencies (including OMB) to which we made recommendations, 12 agreed with our recommendations, 2 disagreed, and 11 did not state whether they agreed or disagreed. As of March 2018, 29 of the 30 recommendations had not been fully addressed.

In a subsequent report that we issued in August 2017, we noted that 22 of the 24 agencies required to participate in the OMB DCOI collectively had reported limited progress against OMB's fiscal year 2018 performance targets for the five optimization metrics. The 2 remaining agencies, Education and HUD, did not have agency-owned data centers and, therefore, did not have a basis to report on progress.<sup>36</sup> Specifically, for each of the five targets, no more than 5 agencies reported that they had met or exceeded that specific target. This limited progress against OMB's optimization targets was due, in part, to agencies not fully addressing our prior recommendations in this area.

In addition, we noted in the report that most agencies had not yet implemented automated monitoring tools to measure server utilization, as required by the end of fiscal year 2018. Specifically, 4 agencies reported that they had fully implemented such tools, 18 reported that they had not yet done so, and 2 did not have a basis to report on progress because they did not have agency-owned data centers.

We also noted that, although federal standards emphasize the need to establish plans to help ensure goals are met, none of the 18 agencies had fully documented plans for implementing automated monitoring tools.

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<sup>36</sup>[GAO-17-448](#).

Accordingly, we recommended that OMB formally document a requirement for agencies to include plans, as part of existing OMB reporting mechanisms, to implement automated monitoring tools at their agency-owned data centers. We also recommended that the 18 agencies without fully documented plans take action, within existing OMB reporting mechanisms, to complete plans describing how they intend to achieve OMB's requirement to implement automated monitoring tools at all agency-owned data centers by the end of fiscal year 2018. Of the 19 agencies (including OMB) to which we made recommendations, 10 agreed with our recommendations, 3 partially agreed, and 6 did not state whether they agreed or disagreed. As of March 2018, none of the 19 recommendations had been fully addressed.

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## Agencies Report Mixed Results Relative to Achieving OMB's Data Center Closure Targets

As previously mentioned, in August 2016, OMB established a goal to close at least 25 percent of each agency's tiered data centers and at least 60 percent of each agency's non-tiered data centers by the end of fiscal year 2018.<sup>37</sup> Related to doing so, agencies' August 2016 inventories reported a total of 9,995 data centers and, in August 2017, 14 agencies reported an additional 2,067 facilities, for a total of 12,062 data centers.<sup>38</sup> Based on this revised inventory, agencies will need to close 6,306 data centers (665 tiered and 5,641 non-tiered) to meet OMB's goals by the end of fiscal year 2018.

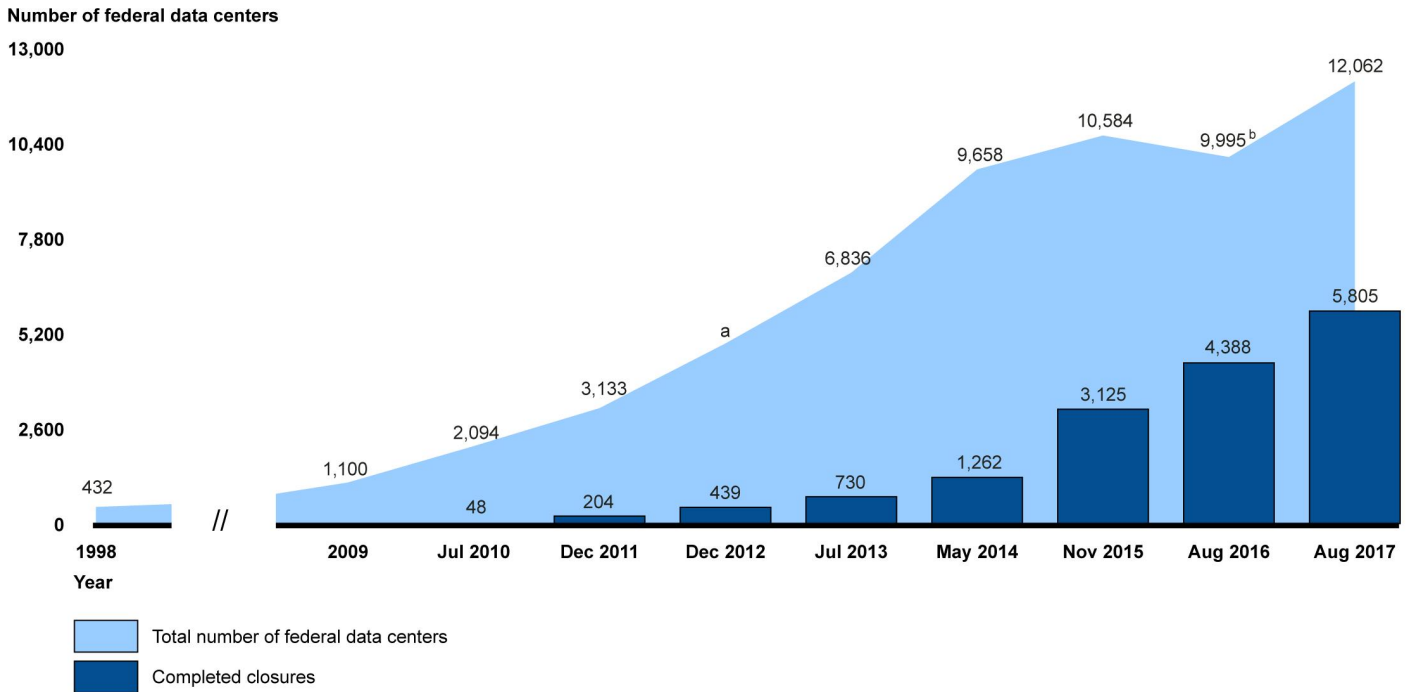
Toward this end, the 24 agencies participating in DCOI collectively have made progress on their data center closure efforts. Specifically, as of August 2017, the agencies reported that they had closed 5,805 tiered and non-tiered centers (48 percent). Figure 2 provides a summary of the total number of federal data centers and closures reported from 1998 to August 2017.

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<sup>37</sup>OMB, Memorandum M-16-19.

<sup>38</sup>The overall net increase was primarily from Treasury's Internal Revenue Service. Discussions between OMB and Treasury officials resulted in Treasury recategorizing certain telecommunications closets to be compliant with OMB's current guidance. Consequently, the department added 1,589 data centers to its 2017 inventory.

**Figure 2: Total Number of Federal Data Centers and Closures, as Reported by Agencies and OMB, from 1998 to August 2017**



Source: GAO analysis of Office of Management and Budget and agency data. | GAO-18-264

<sup>a</sup>OMB did not publicly report the total number of data centers in 2012 and expanded its definition of a data center in March 2012, which partially accounts for the sharp increase in the number of data centers.

<sup>b</sup>OMB again revised the definition of a data center in August 2016.

Figure 3 provides a further breakdown of agencies' data center inventories, as of August 2017, in terms of the total number of data centers that were closed, planned for closure, or not planned for closure.

**Figure 3: Total Number of Federal Agency Data Centers that Were Closed, Planned for Closure, or Not Planned for Closure, as of August 2017**



Nevertheless, while the agencies collectively had made progress toward OMB’s closure goals, the 24 agencies’ individual reported progress and plans showed mixed results when compared with OMB’s goal for each agency to close at least 25 percent of tiered data centers and at least 60 percent of non-tiered centers. Specifically, as of August 2017, 13 agencies reported that they had already met the goal of closing 25 percent of their tiered data centers, another 4 agencies reported that they plan to meet the goal by the end of fiscal year 2018, and 5 agencies reported that they do not currently plan to meet the goal.<sup>39</sup>

Further, as of August 2017, 7 agencies reported having already met the goal for closing 60 percent of their non-tiered centers, 6 agencies reported that they planned to meet the goal by the end of fiscal year 2018, and 10 agencies reported that they did not plan to meet the goal.<sup>40</sup> Table 1 displays a breakdown of the number of reported tiered and non-tiered data centers and completed and planned closures by agency, as of August 2017.

<sup>39</sup>Two agencies—Education and NSF— did not report any tiered data centers in their inventories.

<sup>40</sup>SSA did not report any non-tiered data centers.

**Table 1: Number of Reported Tiered and Non-tiered Federal Agency Data Centers with Completed and Planned Closures through Fiscal Year 2018, as of August 2017**

n/a  Agency	Tiered				Non-tiered			
	Total data centers	Closed through August 2017	Additional planned closures through fiscal year 2018	Percent of closed and planned closures/total	Total data centers	Closed through August 2017	Additional planned closures through fiscal year 2018	Percent of closed and planned closures/total
Department of Agriculture	35	19	9	80	2,237	2,214	16	100 <sup>a</sup>
Department of Commerce	244	27	1	11	134	56	4	45
Department of Defense	1,266	200	258	36	2,357	634	864	64
Department of Education	0	0	0	0	2	2	0	100
Department of Energy	109	18	5	21	180	66	6	40
Department of Health and Human Services	95	17	6	24	283	60	6	23
Department of Homeland Security	38	12	1	34	231	33	3	16
Department of HUD	4	1	1	50	63	11	52	100
Department of the Interior	93	26	0	28	328	161	0	49
Department of Justice	41	20	8	68	69	57	4	88
Department of Labor	10	2	6	80	76	30	46	100
Department of State	24	7	4	46	366	0	0	0
Department of Transportation	222	10	1	5	231	161	1	70
Department of the Treasury	60	25	3	47	2,401	1,688	37	72
Department of Veterans Affairs	292	21	5	9	123	18	5	19
Environmental Protection Agency	5	1	1	40	78	35	15	64
General Services Administration	42	33	2	83	92	80	2	89
National Aeronautical and Space Administration	55	31	4	64	4	4	0	100
National Science Foundation	0	0	0	0	2	0	1	50
Nuclear Regulatory Commission	5	3	0	60	14	5	3	57
Office of Personnel Management	6	3	1	67	2	1	1	100
Small Business Administration	9	0	4	44	43	8	30	88
Social Security Administration	3	1	0	33	0	0	0	0
U.S. Agency for International Development	2	2	0	100	86	2	0	2
<b>Total</b>	<b>2,660</b>	<b>479</b>	<b>320</b>	<b>30%</b>	<b>9,402</b>	<b>5,326</b>	<b>1,096</b>	<b>68%</b>

Source: GAO analysis of agency data. | GAO-18-264

Note: Light grey highlighting indicates agencies that, as of August 2017, had met—or plan to meet—their September 2018 closure target. Dark grey highlighting indicates agencies that, as of August 2017, do not have plans to meet their September 2018 closure target.

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<sup>a</sup>The Department of Agriculture plans to close 99.7 percent of its non-tiered data centers; due to rounding, this appears as 100 percent.

As shown in the table, the reported closures of Agriculture (2,233 data centers), Defense (834), and Treasury (1,713) together accounted for 4,780 (or 82 percent) of the 5,805 data center closures. However, no other agency accounted for more than 187 (or 3 percent) of those closures. In addition, the remaining 1,416 planned closures are to be carried out across 20 agencies. Further, among the agencies, 7 reported that they do not plan to meet one of their tiered or non-tiered closure goals, and 4 reported that they do not plan to meet either of the goals by the end of fiscal year 2018.

Officials from these 11 agencies that do not plan to meet one or both of their goals provided various reasons for why they currently do not plan to do so. For example, officials in USAID's Office of the Chief Information Officer stated that their agency had reported a number of server closets in overseas locations as non-tiered data centers to comply with OMB's data center definition provided in its August 2016 guidance. The officials said that, as long as USAID maintains those locations, the agency needs the services provided in those server closets and will not be able to close them to meet OMB's goal. However, the officials also said that the agency is exploring ways to replace the server closets using cloud services.

Several agencies that viewed their goals as unattainable indicated that they were seeking revised closure goals. Specifically, officials from Interior's Office of the Chief Information Officer stated that a number of the department's non-tiered data centers were either mission critical or not cost effective to close. Thus, the officials said Interior was working with OMB to establish a revised closure goal. Similarly, Transportation's Director for IT Compliance stated that the department was working with OMB to establish a revised closure goal. The department reported having 186 tiered data centers in Federal Aviation Administration control towers that it believes should be excluded from its count of data centers when OMB sets the department's goal for closures.

Further, our analysis determined that it may not always be realistic for an agency to meet OMB's targets. For example, NSF, which does not have any tiered data centers, reported that it plans to close one (50 percent) of its two non-tiered data centers. However, the only way to meet OMB's 60 percent threshold would be for the agency to close both of its non-tiered centers, which may not be an option, depending on the services provided by that one remaining center.



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Although OMB's stated time frame for closing data centers currently remains as the end of fiscal year 2018, the recent extension of FITARA's data center consolidation and optimization provisions through fiscal year 2020 provides agencies additional time to work toward meeting OMB's closure targets. However, in some cases, these efforts may require significant restructuring of an agency's business operations, or, as reported by several agencies, a revision of OMB's goals in consideration of the agencies' specific needs.

Given that agencies had been working toward OMB's DCOI goals for approximately one year as of August 2017, and because the extension of FITARA's data center provisions pushes the sunset for these efforts out through fiscal year 2020, we are not making any related recommendations to those agencies that have not met the closure goals at this time. We plan to continue to monitor the agencies' progress toward meeting the goals in our future work.

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## Agencies' Planned Savings Are Not Expected to Meet OMB's Goal

Since 2013, federal agencies have been required to report on data center cost savings. In this regard, OMB provided guidance regarding how agencies were to report cost savings and avoidances.<sup>41</sup> Specifically, it required agencies to report both data center consolidation cost savings and avoidances, among other areas, as part of a quarterly data collection process known as the integrated data collection. FITARA also called for each agency to submit a multi-year strategy for achieving the consolidation and optimization of data centers that includes year-by-year calculations of investment and cost savings through fiscal year 2018, which has now been extended to 2020.

In addition, in August 2016, OMB M-16-19 provided guidance on how agencies should implement the requirements of FITARA. Specifically, agencies were to develop a strategic plan that included information on historical cost savings and avoidances due to data center consolidation and optimization through fiscal year 2015. This guidance stated that

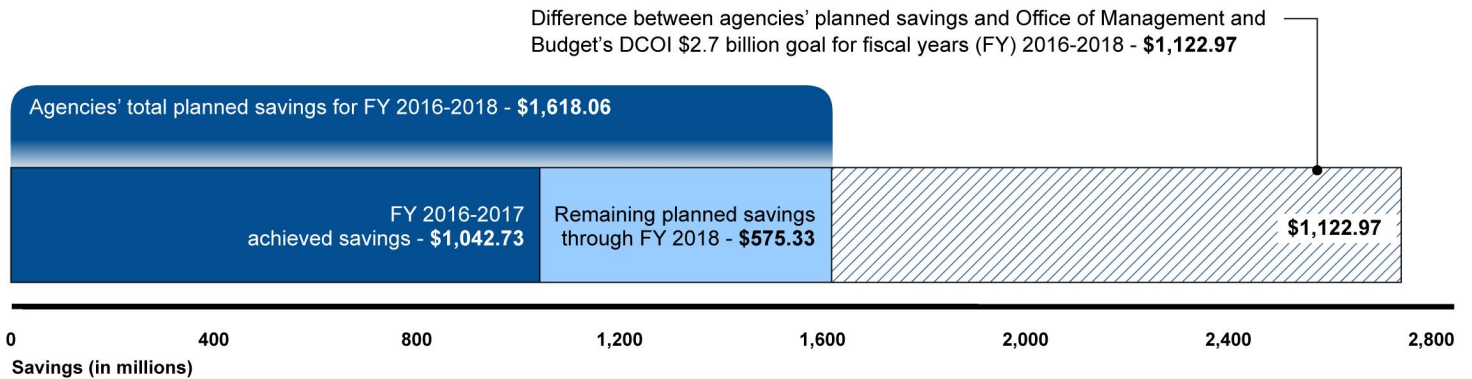
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<sup>41</sup>OMB, Memorandum M-13-09. OMB defines cost savings as a reduction in actual expenditures below the projected level of costs to achieve a specific objective and defines cost avoidances as results from an action taken in the immediate time frame that will decrease costs in the future.

agency strategic plans were also to include year-by-year calculations of target and actual agency-wide spending and cost savings on data centers from fiscal years 2016 through 2018. Further, the guidance established a DCOI government-wide cost savings goal of \$2.7 billion for all federal agencies to achieve from fiscal years 2016 through 2018. This overall goal is then broken down into agency-specific targets on the IT Dashboard.

As of August 2017, 20 agencies had reported through the integrated data collection that they had achieved \$1.04 billion in cost savings for fiscal years 2016 and 2017, while 4 agencies reported that they had not achieved any savings. Further, the 20 agencies' DCOI strategic plans identified an additional \$0.58 billion, for a total of \$1.62 billion in planned savings from fiscal years 2016 through 2018. Nevertheless, this total is about \$1.12 billion below OMB's goal of \$2.7 billion for DCOI savings. Figure 4 provides a comparison of the 24 agencies' total reported savings for fiscal years 2016 and 2017, and the planned savings through 2018, against OMB's DCOI savings goal for fiscal years 2016 through 2018.

**Figure 4: Agencies' Reported Achieved and Planned Data Center Optimization Initiative Savings against OMB's Goal for Fiscal Years 2016 through 2018, as of August 2017**



Source: GAO analysis of agency data. | GAO-18-264

Among the 24 participating DCOI agencies that reported achieving about \$1.04 billion in savings, Commerce (\$594.28 million), Defense (\$141.36 million), and DHS (\$106.51 million) were responsible for approximately \$842 million (about 81 percent) of that total. No other agency reported saving more than \$54.40 million. Table 2 provides specific data related to each agency's planned and achieved savings for fiscal years 2016 and 2017, as of August 2017.

**Table 2: Agencies' Reported Planned and Achieved Data Center Optimization Initiative Savings for Fiscal Years 2016 and 2017, as of August 2017 (dollars in millions)**

Agency	Total planned for 2016 and 2017	Total achieved for 2016 and 2017	Difference between planned and achieved
Department of Agriculture	\$8.72	\$5.71	\$(3.01)
Department of Commerce	792.18	594.28	(197.90)
Department of Defense <sup>a</sup>	141.30	141.36	0.06
Department of Education	0.76	0.57	(0.19)
Department of Energy	0	2.99	2.99
Department of Health and Human Services	3.89	5.51	1.62
Department of Homeland Security	246.17	106.51	(139.66)
Department of HUD	0	0	0
Department of the Interior	8.80	4.39	(4.41)
Department of Justice	36.07	35.69	(0.38)
Department of Labor	0.08	10.03	9.95
Department of State	27.90	54.40	26.50
Department of Transportation	1.31	3.71	2.40
Department of the Treasury	38.25	34.25	(4.00)
Department of Veterans Affairs	3.70	3.80	0.10
Environmental Protection Agency	0	0	0
General Services Administration	1.18	16.73	15.55
National Aeronautical and Space Administration	17.72	12.68	(5.04)
National Science Foundation	0	0	0
Nuclear Regulatory Commission	0	2.00	2.00
Office of Personnel Management	8.50	4.65	(3.85)
Small Business Administration	0.97	0.97	0
Social Security Administration	0.50	0	(0.50)
U.S. Agency for International Development	3.73	2.51	(1.22)
<b>Total</b>	<b>1,341.73</b>	<b>1,042.73</b>	<b>(299.00)</b>

Legend: - = 0

Source: GAO analysis of agency data. | GAO-18-264

<sup>a</sup>In a November 2014 response to our report, [GAO-14-713](#), the Department of Defense noted that, in addition to the \$2.6 billion in cost savings planned by fiscal year 2017, the department expected that figure to increase to \$4.7 billion in future years as efficiencies are gained. Subsequently, the department changed its methodology for calculating cost savings and lowered its planned cost savings estimates accordingly.

In addition, the 24 agencies reported that they have planned an additional \$0.58 billion in DCOI cost savings (for a total of \$1.62 billion) through fiscal year 2018. However, as noted earlier, this total is approximately \$1.12 billion below OMB's \$2.7 billion goal for the initiative. Table 3 provides a more detailed comparison between each agency's planned savings, as reported in its DCOI strategic plan, and OMB's agency-specific targets, as reported on the IT Dashboard.

**Table 3: Comparison of Office of Management and Budget (OMB) Targets, as Reported on the Information Technology (IT) Dashboard, and Agencies' Planned Savings, as Reported in Data Center Optimization Initiative (DCOI) Strategic Plans, as of August 2017 (dollars in millions)**

Agency	OMB savings target from IT Dashboard	2016 through 2018 planned savings from DCOI plan	Difference
Department of Agriculture	\$23.62	\$13.93	\$(9.69)
Department of Commerce	94.97	887.15	792.18
Department of Defense	1,800	205.40	(1,594.60)
Department of Education	0	1.00	1.00
Department of Energy	0	0	0
Department of Health and Human Services	77.84	11.67	(66.17)
Department of Homeland Security	154.94	254.70	99.76
Department of HUD	0	0	0
Department of the Interior	88.19	13.20	(74.99)
Department of Justice	65.86	46.96	(18.90)
Department of Labor	23.94	0.12	(23.82)
Department of State	17.07	72.40	55.33
Department of Transportation	30.26	1.31	(28.95)
Department of the Treasury	86.16	51.69	(34.47)
Department of Veterans Affairs	66.04	3.70	(62.34)
Environmental Protection Agency	0	0	0
General Services Administration	8.35	2.34	(6.01)
National Aeronautical and Space Administration	15.10	22.19	7.09
National Science Foundation	0	0	0
Nuclear Regulatory Commission	1.21	0.53	(0.68)
Office of Personnel Management	21.92	22.90	0.98
Small Business Administration	0.86	2.07	1.21
Social Security Administration	164.69	1.08	(163.62)
U.S. Agency for International Development	0	3.73	3.73
<b>Total</b>	<b>2,741.02</b>	<b>1,618.06</b>	<b>(1,122.97)</b>

Legend: - = 0

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Source: GAO analysis of agency data. | GAO-18-264

Note: Totals may not add up due to rounding.

As shown in table 3, 6 agencies identified planned savings that are expected to meet or exceed their OMB targets, while 2 agencies that did not have an OMB target also identified planned savings. In contrast, 12 agencies reported that they are not currently planning to meet their targets, and 4 agencies did not have a savings target and are not planning any savings.

These findings align with what we reported in March 2016, when we noted that 10 agencies had not established planned cost savings goals for fiscal years 2016 through 2018, even though they had closures planned during that time period.<sup>42</sup> Accordingly, in that report, we recommended that these agencies complete their planned data center cost savings targets for fiscal years 2016 through 2018. Most of the agencies agreed with the recommendations or had no comments. Nonetheless, agencies continued to be challenged in identifying and reporting their cost savings. As of August 2017, 5 of the agencies had implemented our recommendations in this area.

In the absence of consistent and full reporting of fiscal years 2016 through 2018 planned savings in agencies' DCOI strategic plans, as required by FITARA and OMB, agencies' total planned savings will likely continue to be understated. With less than a year for agencies to meet OMB's current planned savings targets, we are re-emphasizing the need for agencies to implement our prior recommendations related to establishing and meeting their planned data center cost savings targets.

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<sup>42</sup>[GAO-16-323](#).

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## Agencies Continue Reporting Limited Progress against OMB's Data Center Optimization Metrics

FITARA required OMB to establish metrics to measure the optimization of data centers, including server efficiency, and ensure that agencies' progress toward meeting the metrics is made public. Pursuant to FITARA, OMB's August 2016 memorandum established a set of five data center optimization metrics intended to measure agencies' progress in the areas of server utilization and automated monitoring, energy metering, power usage effectiveness, facility utilization, and virtualization.<sup>43</sup> According to OMB, while the server utilization and automated monitoring metric applies to agency-owned tiered and non-tiered data centers, the four remaining metrics apply only to agency-owned tiered centers.<sup>44</sup>

OMB's memorandum also established a target value for each of the five metrics, which agencies are expected to achieve by the end of fiscal year 2018. OMB measures agencies' progress against the optimization targets using the agencies' quarterly data center inventory submission and publicly reports this progress information on its IT Dashboard. Table 4 provides a description of the five data center optimization metrics and target values.

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<sup>43</sup>OMB, Memorandum M-16-19.

<sup>44</sup>While agencies can also report data centers as outsourced, co-located, or cloud provided in their inventories, OMB's optimization metrics only apply to data centers identified as agency-owned.

**Table 4: The Office of Management and Budget (OMB) Data Center Optimization Metrics and Targets**

<b>Metrics</b>	<b>Description</b>	<b>Applicable agency-owned data centers</b>	<b>Target value (to be achieved by the end of fiscal year 2018)</b>
Server utilization and automated monitoring	Percent of time busy, measured directly by continuous, automated monitoring software, discounted by the fraction of data centers fully equipped with automated monitoring.	Tiered and non-tiered data centers	At least 65 percent
Energy metering	Percent of total gross floor area in an agency's tiered data center inventory located in tiered data centers that have power metering.	Tiered data centers	100 percent
Power usage effectiveness	Proportion of total data centers energy used by IT equipment.	Tiered data centers	1.5 or lower (1.4 or lower for new data centers)
Facility utilization	Portion of total gross floor area in tiered data centers that is actively utilized for racks that contain IT equipment.	Tiered data centers	At least 80 percent
Virtualization	Ratio of operating systems to physical servers.	Tiered data centers	4 or higher

Source: OMB. | GAO-18-264

As of August 2017, 22 of the 24 DCOI agencies continued to report limited progress in meeting OMB's fiscal year 2018 data center optimization targets identified on the IT Dashboard. As noted earlier, the remaining 2 agencies—Education and HUD—reported that they did not have any agency-owned data centers in their inventory and, therefore, did not have a basis to measure and report optimization progress.

With regard to the data center optimization targets, the most progress was reported for the power usage effectiveness and virtualization metrics, with 5 and 6 agencies, respectively, reporting that they had met OMB's targets. However, only 3 agencies or fewer reported meeting the energy metering, facility utilization, and server utilization and automated monitoring metrics. Figure 5 summarizes the 24 agencies' progress in meeting each optimization target, as of August 2017.

**Figure 5: Agencies' Progress against Office of Management and Budget (OMB) Data Center Optimization Targets, as of August 2017**

OMB metrics

Server utilization and automated monitoring



Energy metering



Power usage effectiveness



Facility utilization

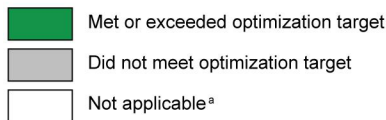


Virtualization



0 5 10 15 20 25

Number of agencies



Source: GAO analysis of data from OMB's Information Technology Dashboard. | GAO-18-264

<sup>a</sup>Two agencies did not have any reported agency-owned data centers in their inventory and, therefore, did not have a basis to measure and report on optimization progress. In addition, two other agencies did not have any agency-owned tiered data centers and, therefore, did not have a basis to measure and report on four of the five metrics.



As of August 2017, SSA and EPA reported the most progress among the 22 agencies with a basis to report against OMB’s metrics targets—meeting 4 and 3 targets, respectively. Six agencies met either one or two targets, and 14 agencies reported meeting none of the targets.

Further, of the 22 agencies, 9 were not able to report any progress against either the server utilization metric or power usage effectiveness metric, or both, because their data centers lacked the required monitoring tools to measure progress in these areas. OMB began requiring the implementation of these monitoring tools in August 2016; however, as of August 2017, these 9 agencies had not reported that they had implemented the tools at any data centers. The remaining 13 agencies reported that they had implemented the tools in at least one data center. Table 5 depicts the agencies and whether they met or did not meet each OMB target.

**Table 5: Agency Data Center Optimization Performance Compared to Office of Management and Budget Optimization Targets, as of August 2017**

Agency	Server utilization and automated monitoring <sup>a</sup>	Energy metering	Power usage effectiveness	Facility utilization	Virtualization
Department of Agriculture	not met	not met	not met	not met	met
Department of Commerce	not met	not met	not met	not met	not met
Department of Defense	not met <sup>b</sup>	not met	not met	not met	not met
Department of Education <sup>c</sup>	n/a	n/a	n/a	n/a	n/a
Department of Energy	not met	not met	not met	not met	not met
Department of Health and Human Services	not met	not met	not met	not met	not met
Department of Homeland Security	not met	not met	not met <sup>b</sup>	not met	not met
Department of Housing and Urban Development <sup>c</sup>	n/a	n/a	n/a	n/a	n/a
Department of the Interior	not met	not met	not met	not met	not met
Department of Justice	not met	not met	not met	not met	not met
Department of Labor	not met <sup>b</sup>	not met	not met <sup>b</sup>	not met	not met
Department of State	not met <sup>b</sup>	not met	met	not met	not met
Department of Transportation	not met <sup>b</sup>	not met	not met	not met	not met
Department of the Treasury	not met <sup>b</sup>	not met	not met	not met	not met
Department of Veterans Affairs	not met	not met	met	not met	not met
Environmental Protection Agency	not met	met	met	not met	met
General Services Administration	not met	met	not met	not met	met
National Aeronautics and Space Administration	not met	not met	not met	not met	not met

Agency	Server utilization and automated monitoring <sup>a</sup>	Energy metering	Power usage effectiveness	Facility utilization	Virtualization
National Science Foundation <sup>d</sup>	not met	n/a	n/a	n/a	n/a
Nuclear Regulatory Commission	not met <sup>b</sup>	not met	not met <sup>b</sup>	not met	met
Office of Personnel Management	not met <sup>b</sup>	not met	not met	not met	met
Small Business Administration	not met <sup>b</sup>	not met	not met <sup>b</sup>	not met	not met
Social Security Administration	not met <sup>e</sup>	met	met	met	met
U.S. Agency for International Development <sup>d</sup>	not met	n/a	n/a	n/a	n/a

Legend: ● = met—the agency’s reported progress met or exceeded OMB’s target for the related metric.

○ = not met—the agency’s reported progress did not meet OMB’s target for the related metric.

n/a = not applicable.

Source: GAO analysis of data from OMB’s IT Dashboard. | GAO-18-264

<sup>a</sup>For this metric only, OMB’s IT Dashboard displays agency progress for tiered and non-tiered data centers separately. However, for the purpose of this table, and to be consistent with how this metric was established in OMB’s August 2016 memorandum (M-16-19), we combined the progress information for tiered and non-tiered data centers into a single assessment.

<sup>b</sup>According to OMB’s IT Dashboard, the agency did not report any progress made on this metric. This is due to the agency lacking the monitoring tools required to measure progress and report on this metric.

<sup>c</sup>Agency did not have any reported agency-owned data centers in its inventory and, therefore, does not have a basis to measure and report on optimization progress.

<sup>d</sup>Agency did not have any reported agency-owned tiered data centers in its inventory and, therefore, does not have a basis to measure and report on four of the five metrics.

<sup>e</sup>Although not yet reported on OMB’s IT Dashboard, the Social Security Administration reported in its data center optimization strategic plan that it has met this metric.

Agencies’ limited progress against OMB’s optimization targets is due, in part, to not fully addressing our prior recommendations in this area. As discussed earlier, in March 2016, we reported<sup>45</sup> on weaknesses in agencies’ data center optimization efforts, including that 22 agencies<sup>46</sup> did not meet OMB’s fiscal year 2015 optimization targets.<sup>47</sup> We noted that this was partially due to the agencies facing challenges in optimizing their

<sup>45</sup>[GAO-16-323](#).

<sup>46</sup>These 22 agencies are the Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Housing and Urban Development, the Interior, Justice, Labor, State, Transportation, the Treasury, and Veterans Affairs; the Environmental Protection Agency, General Services Administration, National Aeronautics and Space Administration, Nuclear Regulatory Commission, Office of Personnel Management, Social Security Administration, and U.S. Agency for International Development.

<sup>47</sup>OMB established fiscal year 2015 targets for the first set of 11 optimization metrics that it established in May 2014. OMB subsequently revised the optimization metrics and issued a new set of five metrics in August 2016.

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data centers, including their decentralized organizational structures that made consolidation and optimization difficult, and competing priorities for resources. In addition, consolidating certain data centers was problematic because the volume or type of information involved required the data center to be close in proximity to the users. Accordingly, we recommended that the agencies take action to improve optimization progress, to include addressing any identified challenges. Most agencies agreed with our recommendations or had no comments.

In response to our recommendation, 19 of the 22 agencies submitted documentation to us that described steps they intended to take to improve their data center optimization efforts. The planned steps included completion dates ranging between April 2016 and September 2019.<sup>48</sup> Among the steps described by the agencies was developing internal scorecards to track and report on optimization progress, including progress at their component agencies, and launching more aggressive efforts to optimize data centers using virtualization and cloud computing solutions. However, as of February 2018, only 1 of the 22 agencies (Education) had fully addressed our recommendation.

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### Agencies' Planned Optimization Progress Will Not Meet OMB's Fiscal Year 2018 Targets

In addition to reporting current optimization progress on the IT Dashboard, OMB requires agencies' DCOI strategic plans to include, among other things, planned performance levels for fiscal years 2017 and 2018 for each optimization metric.

However, according to the 24 agencies' DCOI strategic plan information as of August 2017, most are not planning to meet OMB's optimization targets by the end of fiscal year 2018. More specifically, of the 24 agencies, only 4—Commerce, EPA, NSF, and USAID—reported plans to fully meet their applicable targets by the end of fiscal year 2018. Of the remaining agencies, 14 reported plans to meet some, but not all, of the targets; 4 reported that they do not plan to meet any targets; and—as already discussed—Education and HUD do not have a basis to report planned optimization milestones because they do not report having any

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<sup>48</sup>The three agencies that did not submit documentation to us in response to our recommendation are the Departments of Agriculture, Education, and the Treasury.

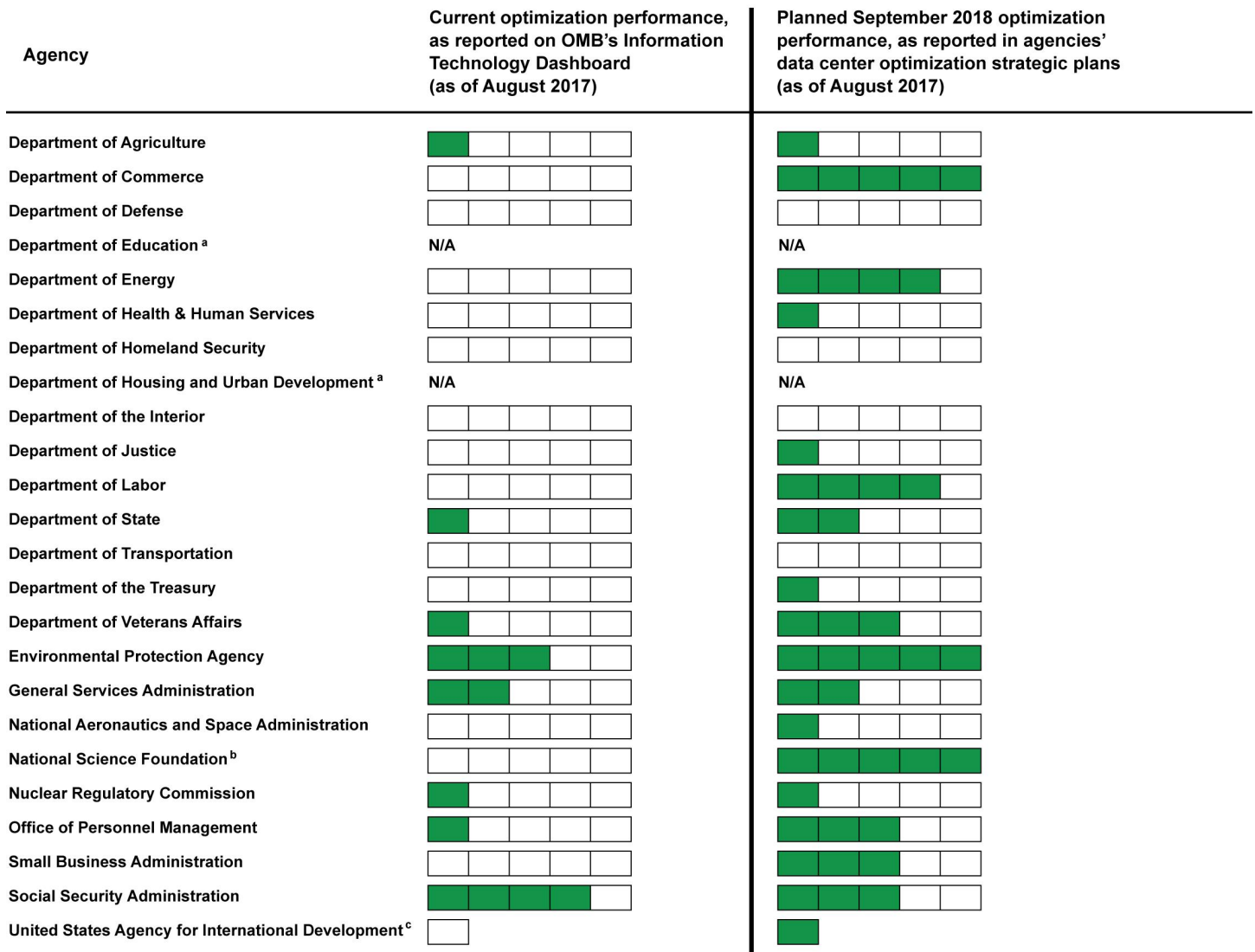
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agency-owned data centers.<sup>49</sup> Figure 6 summarizes agencies' progress, as of August 2017, in meeting OMB's optimization targets and planned progress to be achieved by September 2018.

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<sup>49</sup>USAID does not have any tiered data centers in its data center inventory. Therefore, the agency only has a basis to report on its plans to meet the one OMB optimization metric applicable to its non-tiered data centers (i.e., server utilization and automated monitoring).

**Figure 6: Agency-Reported Plans to Meet or Exceed the Office of Management and Budget’s (OMB) Data Center Optimization Targets**



Source: GAO analysis of OMB Information Technology Dashboard and agency data. | GAO-18-264

Note: The five boxes in each column represent OMB’s five optimization targets. The shaded areas identify agencies’ current and planned progress in meeting or exceeding OMB’s fiscal year 2018 target for each metric.

<sup>a</sup>Agency did not have any reported agency-owned data centers in its inventory and, therefore, did not have a basis to measure and report on optimization progress.

<sup>b</sup>The National Science Foundation did not have any reported agency-owned tiered data centers in its inventory as of February 2017 and, therefore, did not have a basis to report on progress for four of

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the five metrics. However, according to the agency's April 2017 data center optimization strategic plan, it will have a basis to report on all five metrics in fiscal years 2017 and 2018.

<sup>c</sup>The U.S. Agency for International Development did not have any reported agency-owned tiered data centers in its inventory and, therefore, did not have a basis to measure and report on four of the five metrics.

The limited progress made by agencies in optimizing their data centers, combined with the lack of established plans to improve progress, makes it unclear whether agencies will be able to achieve OMB's optimization targets by the end of fiscal year 2018. Considering that OMB is expecting at least \$2.7 billion in cost savings from agencies' optimization efforts, the ability of agencies to meet the optimization targets will be critical to meeting this savings goal. However, only four agencies are planning to meet all of their applicable targets. If the remaining agencies take steps to implement the prior recommendations we have made in this area, it should increase the likelihood that DCOI can achieve the expected benefits of optimization and the resulting cost savings.

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## Summary

With less than a year remaining to meet OMB's current targets for data center closures, cost savings, and optimization performance, the 24 agencies participating in DCOI are reporting mixed results. Further, many agencies do not currently plan to meet all of the initiative's goals by the September 2018 deadline, and a number of the agencies do not plan to meet any of the goals by the deadline. While a number of agencies have ongoing discussions with OMB to revise their closure targets, even with the recent extension of FITARA's provisions on data center consolidation, savings, and performance metrics, it remains important for all agencies to continue their efforts to meet their goals.

In light of these agencies' ongoing discussions with OMB, as well as our March 2016, May 2017, and August 2017 recommendations to the DCOI agencies concerning greater cost savings and improved optimization performance, we are not making any new recommendations in this report. However, we encourage the agencies to further their implementation of our prior recommendations.

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## Agency Comments and Our Evaluation

We requested comments on a draft of this report from OMB and the 24 other agencies that we reviewed. Of these, 5 agencies indicated that they agreed with our report and 20 acknowledged receiving the draft, but did not state whether they agreed or disagreed with the report. Agencies also offered various comments in support of the DCOI effort and actions taken to improve performance. Additionally, multiple agencies provided technical comments, which we have incorporated, as appropriate.

The following five agencies agreed with our report:

- In emails received from Agriculture, Energy, VA, and NRC, the agencies agreed with the findings in the draft report. In written comments, SSA agreed with the draft report's characterization of the agency's DCOI efforts. SSA's comments are reprinted in appendix II.

In addition, the following 20 agencies did not state whether they agreed or disagreed with the report and offered other comments:

- In written comments, HUD and Transportation did not agree or disagree with the draft report. The departments' comments are reprinted in appendices III and IV, respectively.
- In emails received from Commerce, Defense, Education, HHS, DHS, Justice, Labor, State, Treasury, EPA, NASA, NSF, OPM, SBA, and USAID, the agencies did not agree or disagree with the draft report.
- In written comments, Interior did not agree or disagree with the draft report's findings.

In addition, Interior provided a technical comment related to our calculation of the department's achieved optimization savings for fiscal years 2016 and 2017. Specifically, the department provided updated savings figures for those years, which were based on Interior's February 2018 quarterly submission to OMB.

However, the effective date of the updated data (February 2018) is outside the scope of our review, which relied solely on data reported in August 2017, as detailed in appendix I. While we recognize the department's efforts to ensure that its past reporting is updated and as accurate as possible, our report only presents data as reported by agencies in August 2017. Consequently, we believe that the achieved cost savings for Interior accurately reflect what the department

reported at the time of our review. The department's comments are reprinted in appendix V.

- In an e-mail received on March 27, 2018, GSA did not agree or disagree with the draft report's findings, and provided comments questioning the methodology we used to determine the number of data center closures. Specifically, GSA stated that, by including facilities that are now closed in our reporting of the federal government's inventory of 12,062 data centers, our report gives the impression that the government is currently operating 12,062 open data centers. GSA also asserted that we should include in our counts facilities identified as using cloud computing providers.

In our report, we consistently state that the 12,062 data centers reflect the overall count of federal facilities identified since the launch of FDCCI in 2010. Further, we clearly identify the portion of the overall count of data centers that have since closed, or that are planned to close. By doing so, we provide a perspective of consolidation progress against the overall inventory over the past 8 years.

Further, in regard to facilities using cloud providers, OMB's August 2016 guidance specifically states that such facilities are not to be considered data centers. As such, we did not include them in our totals. Accordingly, we maintain that our methodology is reasonable and continue to believe that our report accurately reports the status of federal data center consolidation efforts.

GSA also suggested that we confirm with OMB our statement that the *FITARA Enhancement Act of 2017's* extension of the sunset provides agencies with an additional 2 years to accomplish the goals of DCOI. It is true that OMB has not issued guidance that extends the existing August 2018 DCOI deadlines. However, it is appropriate to note that the 2017 law extends the DCOI sunset date for the data center requirements that govern agencies.

Finally, GSA expressed concern that the data on optimization metrics that we drew from the IT Dashboard were not representative of the data provided by agencies in their August 2017 quarterly submissions to OMB. Further, GSA noted that such a selection of mixed data sources may present an incomplete and inaccurate picture and recommended that we note the date on which we accessed the IT Dashboard data, note that those data are frequently updated, and specify the date of other sources of data that we used for our analysis.

In this report, we present an analysis of agencies' progress against OMB's data center optimization metrics, using data that were taken from the IT Dashboard. These data are posted to the Dashboard after



being automatically calculated from agencies' quarterly submissions to OMB. For the purposes of this report, we pulled the data from the Dashboard a week after agencies' August 2017 submissions were due to OMB. We then confirmed with the agencies that the data we collected were consistent with their August 2017 submissions to OMB and we labeled the data as being effective as of August 2017.

We also analyzed other data from the agencies' August 2017 quarterly submissions, such as the status of data center closures and associated cost savings, and showed the effective date of our analysis as being August 2017. Based on these actions, which are also discussed in the description of the scope and methodology of our audit work found in app. I, we believe that our presentation of the data on optimization metrics is accurate, appropriately labeled, and correctly reflects the status of agency efforts at a specific moment in time.

- In an e-mail received on April 18, 2018, OMB did not agree or disagree with our report, but offered several comments on our findings. Specifically, OMB noted that some agencies may be reporting their planned savings incorrectly in their DCOI strategic plans in that agencies may be reporting annual savings figures instead of the required cumulative figures. OMB further described plans to update the IT Dashboard in the near future to more accurately reflect planned DCOI savings and added that, as a result, the data in our report likely will not match the data OMB intends to publish.

In conducting our analysis, on two occasions, we requested and received agencies' validation of the results of our analysis of their planned cost savings. This process resulted in minor technical changes to some agencies' data. We believe that our continued efforts to validate these data provide reasonable assurance as to the accuracy of the agency reported information that we analyzed. The implementation of OMB's proposed changes to the IT Dashboard should provide yet another tool that can be used to improve how agencies report their cost savings—an important measure of DCOI's success.

Additionally, the comments noted that GAO and OMB use a different basis to calculate agencies' data center closure targets, with OMB using a baseline inventory from the beginning of DCOI in 2016, which does not recognize changes in agencies' inventories since that point. OMB asserted that, because GAO's calculations account for changes in agencies' inventories since the beginning of DCOI, OMB's targets differ from GAO's calculations.

We recognize the difference in approach for calculating data center closures that we used, as compared to that used by OMB. As detailed in our report, when DCOI was launched in August 2016, agencies reported an overall inventory of 9,995 data centers. One year later, in August 2017, agencies reported more than 2,000 additional facilities, for a total of 12,062 centers.

Because OMB's closure targets required agencies to close a certain percentage of their data centers, basing agency goals on an outdated inventory (that did not include the additional facilities) does not give a true picture of progress towards consolidation of data centers. Conversely, our methodology (detailed in app. I) takes into account inventory growth and uses the same percentage-based closure goals defined in OMB's guidance. Our methodology presents a more accurate status of progress based on the growth of the inventory over time. Consequently, we believe that our methodology allows us to present a reasonable status of agencies' progress against OMB's goals.

We are sending copies of this report to interested congressional committees, the Director of OMB, the secretaries and heads of the departments and agencies addressed in this report, and other interested parties. In addition, the report will be available at no charge on GAO's website at <http://www.gao.gov>.

If you or your staffs have any questions about this report, please contact me at (202) 512-9286 or [pownerd@gao.gov](mailto:pownerd@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix VI.



David A. Powner  
Director, Information Technology  
Management Issues

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*List of Committees*

The Honorable John McCain  
Chairman

The Honorable Jack Reed  
Ranking Member  
Committee on Armed Services  
United States Senate

The Honorable Ron Johnson  
Chairman

The Honorable Claire McCaskill  
Ranking Member  
Committee on Homeland Security and Governmental Affairs  
United States Senate

The Honorable Mac Thornberry  
Chairman

The Honorable Adam Smith  
Ranking Member  
Committee on Armed Services  
House of Representatives

The Honorable Trey Gowdy  
Chairman

The Honorable Elijah Cummings  
Ranking Member  
Committee on Oversight and Government Reform  
House of Representatives

# Appendix I: Objectives, Scope, and Methodology

Our objectives for this engagement were to: (1) review agencies' data center closures to date and plans for further closures, (2) evaluate agencies' progress in achieving data center consolidation savings and describe plans for future savings, and (3) assess agencies' progress against the Office of Management and Budget's (OMB) data center optimization targets.

To address the first objective, we obtained and analyzed August 2017 data center inventory documentation from the 24 departments and agencies (agencies)<sup>1</sup> that participate in OMB's Data Center Optimization Initiative (DCOI).<sup>2</sup> To determine data center closures to date, we totaled agency reported closures from fiscal year 2010 through August 2017 and, to identify future closures, we totaled agency reported planned closures through fiscal year 2019. We also compared agencies' completed and planned closures to OMB's fiscal year 2018 consolidation goals, as documented in its August 2016 memorandum (M-16-19).<sup>3</sup>

To verify the quality, completeness, and reliability of the agencies' data center inventories, we compared information on completed and planned data center closures to similar information reported on OMB's Information Technology (IT) Dashboard—a public website that provides information on federal agencies' major IT investments.<sup>4</sup> We also checked for missing

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<sup>1</sup>The 24 agencies that are required to participate in the Data Center Optimization Initiative are the Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Housing and Urban Development, the Interior, Justice, Labor, State, Transportation, the Treasury, and Veterans Affairs; the Environmental Protection Agency, General Services Administration, National Aeronautics and Space Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Small Business Administration, Social Security Administration, and U.S. Agency for International Development.

<sup>2</sup>Agencies' data center optimization progress information displayed on OMB's IT Dashboard is updated by OMB on a quarterly basis based on data center inventory data collected from agencies at the end of February, May, August, and November of each year.

<sup>3</sup>OMB, *Data Center Optimization Initiative (DCOI)*, Memorandum M-16-19 (Washington, D.C.: Aug. 1, 2016).

<sup>4</sup>We did not physically visit agencies' data center locations to verify their inventory totals.

data and other errors, such as missing closure status information. Further, we obtained written responses from agency officials regarding actions taken to ensure the reliability of their inventory data, and discussed any discrepancies or potential errors identified to determine the causes or to request additional information. We determined that the data were sufficiently complete and reliable to report on agencies' consolidation progress and planned closures.

For the second objective, we obtained and analyzed cost savings and avoidance<sup>5</sup> documentation from the 24 DCOI agencies. This documentation is required by OMB's March 2013 and August 2016 memorandums and included the agencies' quarterly reports of cost savings and avoidances posted to their digital services websites and their DCOI strategic plans.<sup>6</sup> To determine cost savings achieved, we totaled agencies' reported savings and avoidances from the start of fiscal years 2012 through August 2017, as found in the August 2017 quarterly reports posted to the agencies' digital services websites.<sup>7</sup> To identify future planned savings, we totaled the agencies' projected savings and avoidances from fiscal years 2016 through 2018, as reported in their DCOI strategic plans.

To assess the quality, completeness, and reliability of each agency's data center consolidation cost savings information, we used the latest version of each agency's update of the August 2017 quarterly cost savings report and DCOI strategic plan. We also reviewed the quarterly reports and DCOI strategic plans for missing data and other errors, such as missing cost-savings information. In addition, we compared agencies cost savings and avoidances with data from our most recent data center consolidation

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<sup>5</sup>Beginning in March 2013, OMB required agencies to report on both cost savings and cost avoidances. OMB defines cost savings as a reduction in actual expenditures below the projected level of costs to achieve a specific objective and defines a cost avoidance as the result of an action taken in the immediate time frame that will decrease costs in the future.

<sup>6</sup>OMB, Memorandum M-16-19 and *Fiscal Year 2013 PortfolioStat Guidance: Strengthening Federal IT Portfolio Management*, Memorandum M-13-09 (Washington, D.C.: Mar. 27, 2013).

<sup>7</sup>OMB launched FDCCI in February 2010, at which point, agencies were required to begin closing data centers. However, current OMB guidance only requires agencies to report historical cost savings and avoidances realized since fiscal year 2012.

report.<sup>8</sup> Further, we obtained written responses from agency officials regarding the steps taken to ensure the accuracy and reliability of their cost savings data. As a result, we determined that the data were sufficiently complete and reliable to report on agencies data center consolidation cost-savings information.

For our third objective, we analyzed the August 2017 data center optimization progress information of the 24 DCOI agencies. This progress information was obtained from the IT Dashboard—an OMB public website that provides information on federal agencies' major IT investments. We then compared the agencies' optimization progress information against OMB's fiscal year 2018 optimization targets,<sup>9</sup> as documented in its August 2016 memorandum.<sup>10</sup> Although OMB's memorandum establishes a single optimization target value for the server utilization and automated monitoring metric, the IT Dashboard displays agencies' progress for tiered and non-tiered data centers separately. To report consistently with OMB's implementation memorandum, we combined the progress information for tiered and non-tiered data centers into a single assessment in this report.

To assess the reliability of agencies' optimization progress information on OMB's IT Dashboard, we reviewed the information for errors or missing data, such as progress information that was not available for certain metrics. We also compared agencies' optimization progress information across multiple reporting quarters to identify any inconsistencies in agencies' reported progress. We discussed with staff from OMB's Office of the Federal Chief Information Officer any discrepancies or potential errors identified to determine the causes.

In addition, we interviewed OMB officials to obtain additional information regarding the steps taken to ensure the reliability of and validate the optimization data on the Dashboard. Moreover, we obtained written responses from agency officials regarding the steps taken to ensure the

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<sup>8</sup>GAO, *Data Center Consolidation: Agencies Making Progress, but Planned Savings Goals Need to Be Established [Reissued on March 4, 2016]*, [GAO-16-323](#) (Washington, D.C.: Mar. 3, 2016)

<sup>9</sup>Two agencies—the Departments of Education and Housing and Urban Development—do not have any agency-owned data centers and, therefore, do not have a basis to measure and report on optimization progress.

<sup>10</sup>OMB, Memorandum M-16-19.

accuracy and reliability of the reported optimization progress. We discussed with agency officials any discrepancies or potential errors identified during our reviews to determine the causes or request additional information. We determined that the data were sufficiently reliable to report on agencies' optimization progress.

To assess the reliability of the DCOI strategic plans, we reviewed agencies' documentation to identify any missing data or errors. We also compared the planned data center optimization milestones in agencies' documentation against current optimization progress information obtained from the IT Dashboard. In addition, we discussed with agency officials any discrepancies or potential errors identified during our reviews of the DCOI strategic plans to determine the causes or request additional information. As a result of these efforts, we determined that the agencies' strategic plan information was sufficiently reliable for reporting on plans to meet or not meet OMB's fiscal year 2018 optimization targets.

We conducted this performance audit from July 2017 to May 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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# Appendix II: Comments from the Social Security Administration





**SOCIAL SECURITY**  
Office of the Commissioner

Mr. David A Powner  
Director, Information Technology  
Management Issues  
United States Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Powner:

Thank you for the opportunity to review the draft report, "DATA CENTER OPTIMIZATION: Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations" (GAO-18-264). The report accurately reflects our current Data Center Optimization Initiatives (DCOI). We continue to take the necessary actions to address any missing elements in the DCOI strategic plan, as identified in the prior recommendation. We have no additional comments.

If you have any questions, please contact me at (410) 965-9704. Your staff may contact Trae Sommer, Acting Director for the Audit Liaison Staff, at (410) 965-9102.

Sincerely,

A handwritten signature in blue ink that reads "Stephanie Hall".

Stephanie Hall  
Acting Deputy Chief of Staff

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# Appendix III: Comments from the Department of Housing and Urban Development

Appendix III: Comments from the Department  
of Housing and Urban Development



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
WASHINGTON, DC 20410-3000

CHIEF INFORMATION OFFICER

APR 10 2018

Mr. Justin Booth  
Senior IT Analyst, Information Technology  
Management Issues  
U.S. Government Accountability Office  
441 G Street NW  
Washington, DC 20548

Dear Mr. Booth:

Thank you for the opportunity to comment on the U.S. Government Accountability Office (GAO) draft report entitled, *Data Center Optimization: Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations* (GAO-18-264). The Department of Housing and Urban Development reviewed the draft report and has no comments.

If you have questions or require additional information, please contact Janice Ausby, Deputy Chief Information Officer, Business and IT Resource Management Office, at (202) 402-7605 ([Janice.L.Ausby@hud.gov](mailto:Janice.L.Ausby@hud.gov)), or Juanita L. Toatley, Audit Liaison, Audit Compliance Branch, at (202) 402-3555 ([Juanita.L.Toatley@hud.gov](mailto:Juanita.L.Toatley@hud.gov)).

Sincerely,

A handwritten signature in cursive script that reads "Chad Cowan".

Chad Cowan, Jr.  
Acting Chief Information Officer

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**Appendix III: Comments from the Department  
of Housing and Urban Development**

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cc:

Kevin R. Cooke, Jr., Principal Deputy Chief Information Officer, Q  
Janice Ausby, Deputy CIO for Business and IT Resource Management, QRM  
Mark Hayes, Chief Technology Officer, OCIO, QN  
Wynee Watts-Mitchell, Director, Audit Compliance Branch, OCIO, QMAC  
Juanita Toatley, IT Specialist, Audit Compliance Branch, OCIO, QMAC  
Helen McBride, Senior Advisor to the Principal Deputy Chief Information Officer, Q  
Michael A. Simms, Administrative Officer, Administrative Services Branch, OCIO, QMAS  
Steven J. Parker, Jr., Management Analyst, Administrative Services Branch, OCIO, QMAS  
Larry McGhee, Director, Audit Liaison Division, OCFO, FMA

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# Appendix IV: Comments from the Department of Transportation

**Appendix IV: Comments from the Department of Transportation**



**U.S. Department of  
Transportation**

Office of the Secretary  
of Transportation

Assistant Secretary for Administration

1200 New Jersey Avenue SE  
Washington, DC 20590

APR 13 2018

David A. Powner  
Director, Information Technology Management Issues  
U.S. Government Accountability Office (GAO)  
441 G Street NW  
Washington, DC 20548

Dear Mr. Powner:

The Department of Transportation (DOT) has been working diligently with both internal and external stakeholders to improve DOT's Data Center Optimization Initiative (DCOI) reporting. Over the last few months, the Department prioritized implementing past GAO's DCOI recommendations relating to reporting deficiencies. Specifically, DOT has taken the following actions to further improve its DCOI progress reporting, which were not identified in the draft report:

- Developed and implemented a methodology to determine the cost savings and avoidance figures achieved due to data center closures occurring between Fiscal Year (FY) 2010 and FY 2018;
- Entered the cost savings and avoidance figures associated with the data center closings (by year) into the Department's *Cost Savings and Avoidance Initiatives JSON file* and posted it to <https://www.transportation.gov/digitalstrategy> as part of the Department's February 2018 Integrated Data Collection submission to OMB; and
- Updated the Department's *DCOI Strategic Plan JSON file* with the most current information on the DCOI optimization metrics, data center closure cost savings and/or avoidance totals, and data center closure totals. As mandated by OMB, this file has also been posted on <https://www.transportation.gov/digitalstrategy> for public consumption and OMB review.

We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline M. Chulumovich, Director, Audit Relations and Program Improvement, at (202) 366-6512 with any questions or if you would like to obtain additional details.

Sincerely,

Keith Nelson  
Assistant Secretary for Administration

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**Appendix IV: Comments from the Department  
of Transportation**

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# Appendix V: Comments from the Department of the Interior





United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, DC 20240

APR 17 2018

Mr. David Powner  
Director, Information Technology Management Issues  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Powner:

Thank you for providing the Department of the Interior (Department) the opportunity to review and comment on the draft Government Accountability Office (GAO) report entitled, *Data Center Optimization: Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations* (GAO-18-264). We appreciate GAO's review of federal agencies' data center inventories and strategies.

The Department has the following technical comments for your consideration when finalizing the report.

Page 24, Table 2

- Total Achieved for 2016 and 2017 - 4.39 is incorrect. The correct number is 10.15, based on the data reported through the Department's Data Center Optimization Initiative strategic plan and the Integrated Data Collection.
- Difference Between Planned and Achieved - (4.41) is incorrect. The correct number should be 1.35 based on the above adjustment.

The Department strongly believes in achieving efficiencies through data center optimization and is working closely with the Office of Management and Budget on a strategy that will best achieve data center efficiency, to address critical priorities (i.e., cybersecurity), and empower the Department to meet its mission and goals.

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**Appendix V: Comments from the Department  
of the Interior**

If you have any questions or need additional information, please contact Sylvia Burns, Chief Information Officer at [Sylvia\\_Burns@ios.doi.gov](mailto:Sylvia_Burns@ios.doi.gov).

Sincerely,



Scott J. Cameron  
Principal Deputy Assistant Secretary  
for Policy, Management and Budget  
Exercising the Authority of the  
Assistant Secretary for Policy,  
Management and Budget

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# Appendix VI: GAO Contact and Staff Acknowledgments

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## GAO Contact

David A. Powner, (202) 512-9286 or [pownerd@gao.gov](mailto:pownerd@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, individuals making contributions to this report included Dave Hinchman (Assistant Director), Justin Booth (Analyst-in-Charge), Chris Businsky, Nancy Glover, Linda Kochersberger, and Jonathan Wall.

# Appendix VII: Accessible Data

## Data Tables

**Accessible Data for Figure 3: Total Number of Federal Agency Data Centers that Were Closed, Planned for Closure, or Not Planned for Closure, as of August 2017**

Closed data centers	Data centers planned for closure	Data centers not planned for closure	Total data centers
5805	1416	4841	12062

**Accessible Data for Figure 5: Agencies' Progress against Office of Management and Budget (OMB) Data Center Optimization Targets, as of August 2017**

Category	Total meeting or exceeding metric	Did not meet metric	Not Applicable
Server utilization and automated monitoring	0	22	2
Energy metering	3	17	4
Power usage effectiveness	4	16	4
Facility utilization	1	19	4
Virtualization	6	14	4

## Agency Comment Letters

### Accessible Text for Appendix II: Comments from the Social Security Administration

SOCIAL SECURITY

Office of the Commissioner

Mr. David A Powner

Director, Information Technology Management Issues

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United States Government Accountability Office

441 G Street, NW

Washington, DC 20548

Dear Mr. Powner:

Thank you for the opportunity to review the draft report, "DATA CENTER OPTIMIZATION: Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations" (GAO- 18-264). The report accurately reflects our current Data Center Optimization Initiatives (DCOI). We continue to take the necessary actions to address any missing elements in the DCOI strategic plan, as identified in the prior recommendation. We have no additional comments.

If you have any questions, please contact me at (410) 965-9704. Your staff may contact Trae Sommer, Acting Director for the Audit Liaison Staff, at (410) 965-9102.

Sincerely,

Stephanie Hall

Acting Deputy Chief of Staff

SOCIAL SECURITY ADMINISTRATION BALTIMORE, MD 21235-0001

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Accessible Text for Appendix III: Comments from the  
Department of Housing and Urban Development

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U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

WASHINGTON, DC 20410-3000

CHIEF INFORMATION OFFICER

APR 10 2018

Mr. Justin Booth

Senior IT Analyst, Information Technology

Management Issues

U.S. Government Accountability Office

441 G Street NW

Washington, DC 20548

Dear Mr. Booth:

Thank you for the opportunity to comment on the U.S. Government Accountability Office (GAO) draft report entitled, *Data Center Optimization: Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations* (GAO-18-264). The Department of Housing and Urban Development reviewed the draft report and has no comments.

If you have questions or require additional information, please contact Janice Ausby, Deputy Chief Information Officer, Business and IT Resource Management Office, at (202) 402- 7605 (Janice.L.Ausby@hud.gov), or Juanita L. Toatley, Audit Liaison, Audit Compliance Branch, at (202) 402-3555 (Juanita.L.Toatley@hud.gov).

Sincerely,

Chad Cowan, Jr.

Acting Chief Information Officer

Page 2

cc:

Kevin R. Cooke, Jr., Principal Deputy Chief Information Officer, Q

Janice Ausby, Deputy CIO for Business and IT Resource Management, QRM

Mark Hayes, Chief Technology Officer, OCIO, QN

Wynee Watts-Mitchell, Director, Audit Compliance Branch, OCIO, QMAC

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Juanita Toatley, IT Specialist, Audit Compliance Branch, OCIO, QMAC

Helen McBride, Senior Advisor to the Principal Deputy Chief Information Officer, Q

Michael A. Simms, Administrative Officer, Administrative Services Branch, OCIO, QMAS

Steven J. Parker, Jr., Management Analyst, Administrative Services Branch, OCIO, QMAS

Larry McGhee, Director, Audit Liaison Division, OCFO, FMA

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### Accessible Text for Appendix IV: Comments from the Department of Transportation

U.S. Department of Transportation

Office of the Secretary of Transportation

Assistant Secretary for Administration

1200 New Jersey Avenue SE

Washington, DC 20590

David A. Powner

Director, Information Technology Management Issues

U.S. Government Accountability Office (GAO)

441 G Street NW

Washington, DC 20548

Dear Mr. Powner:

APR 13 2018

The Department of Transportation (DOT) has been working diligently with both internal and external stakeholders to improve DOT's Data Center

Optimization Initiative (DCOI) reporting. Over the last few months, the Department prioritized implementing past GAO's DCOI recommendations relating to reporting deficiencies. Specifically, DOT has taken the following actions to further improve its DCOI progress reporting, which were not identified in the draft report:

- Developed and implemented a methodology to determine the cost savings and avoidance figures achieved due to data center closures occurring between Fiscal Year (FY) 2010 and FY 2018;
- Entered the cost savings and avoidance figures associated with the data center closings (by year) into the Department's *Cost Savings and Avoidance Initiatives JSON file* and posted it to <https://www.transportation.gov/digitalstrategy> as part of the Department's February 2018 Integrated Data Collection submission to OMB; and
- Updated the Department's *DCOI Strategic Plan JSON file* with the most current information on the DCOI optimization metrics , data center closure cost savings and/or avoidance totals, and data center closure totals. As mandated by OMB, this file has also been posted on <https://www.transportation.gov/digitalstrategy> for public consumption and OMB review.

We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline M. Chulumovich, Director, Audit Relations and Program Improvement, at (202) 366-6512 with any questions or if you would like to obtain additional details.

Sincerely,

Keith Nelson

Assistant Secretary for Administration

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Accessible Text for Appendix V: Comments from the  
Department of the Interior

Page 1

United States Department of the Interior



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OFFICE OF THE SECRETARY

Washington, DC 20240

APR 17 2016

Mr. David Powner

Director, Information Technology Management Issues

U.S. Government Accountability Office

441 G Street, NW

Washington, DC 20548

Dear Mr. Powner:

Thank you for providing the Department of the Interior (Department) the opportunity to review and comment on the draft Government Accountability Office (GAO) report entitled, *Data Center Optimization: Continued Agency Actions Needed to Meet Goals and Address Prior Recommendations* (GAO-18-264). We appreciate GAO's review of federal agencies' data center inventories and strategies.

The Department has the following technical comments for your consideration when finalizing the report.

Page 24, Table 2

- Total Achieved for 2016 and 2017 - 4.39 is incorrect. The correct number is 10.15, based on the data reported through the Department's Data Center Optimization Initiative strategic plan and the Integrated Data Collection.
- Difference Between Planned and Achieved - (4.41) is incorrect. The correct number should be 1.35 based on the above adjustment.

The Department strongly believes in achieving efficiencies through data center optimization and is working closely with the Office of Management and Budget on a strategy that will best achieve data center efficiency, to address critical priorities (i.e., cybersecurity), and empower the Department to meet its mission and goals.

A/N: Interior neither agreed nor disagreed with the reports findings. The department also categorized its comments as technical. Regarding the \$10.15 figure, that data would be accurate based on the Feb 2018 update. However, we are reporting figures as of August 2017 and accordingly, the figures we report are correct as of that time frame. No changes or further response required. - JB 4/20/18

Page 2

If you have any questions or need additional information, please contact Sylvia Burns, Chief Information Officer at [Sylvia\\_Burns@ios.doi.gov](mailto:Sylvia_Burns@ios.doi.gov).

Sincerely,

Scott J. Cameron

Principal Deputy Assistant Secretary for Policy, Management and Budget  
Exercising the Authority of the Assistant Secretary for Policy,  
Management and Budget

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