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Report to Congressional Requesters

September 2016

INFORMATION TECHNOLOGY

Agencies Need to Improve Their Application Inventories to Achieve Additional Savings

GAO-16-511

GAO Highlights

Highlights of GAO-16-511, a report to congressional requesters

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INFORMATION TECHNOLOGY

Agencies Need to Improve Their Application Inventories to Achieve Additional Savings

Why GAO Did This Study

The federal government is expected to spend more than $90 billion on IT in fiscal year 2017. This includes a variety of software applications supporting agencies' enterprise needs. Since 2013, OMB has advocated the use of application rationalization. This is a process by which an agency streamlines its portfolio of software applications with the goal of improving efficiency, reducing complexity and redundancy, and lowering the cost of ownership.

GAO's objectives were to determine (1) whether agencies have established complete application inventories and (2) to what extent selected agencies have developed and implemented processes for rationalizing their portfolio of applications. To do this, GAO assessed the inventories of the 24 CFO Act agencies against four key practices and selected six agencies—the Departments of Defense, Homeland Security, the Interior, Labor, and NASA and NSF—due to their IT spending, among other factors, to determine whether they had processes addressing applications.

What GAO Recommends

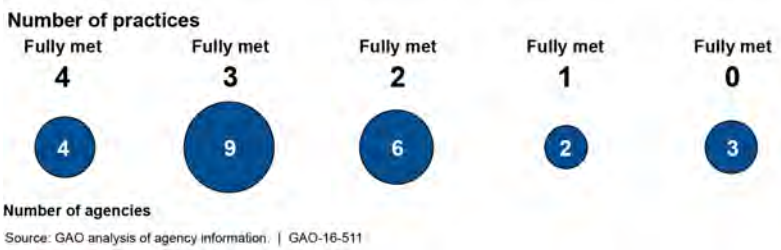
GAO is recommending that 20 agencies improve their inventories and five of the selected agencies take actions to improve their processes to rationalize their applications more completely. The Department of Defense disagreed with both recommendations made to it. After reviewing additional evidence, GAO removed the recommendation associated with improving the inventory but maintained the other. The other agencies agreed to or had no comments on the draft report.

View GAO-16-511. For more information, contact David Powner at (202) 512-9286 or pownerd@gao.gov.

What GAO Found

Most of the 24 Chief Financial Officers (CFO) Act of 1990 agencies in the review fully met at least three of the four practices GAO identified to determine if agencies had complete software application inventories. To be considered complete, an inventory should (1) include business and enterprise information technology (IT) systems as defined by the Office of Management and Budget (OMB); (2) include these systems from all organizational components; (3) specify application name, description, owner, and function supported; and (4) be regularly updated. Of the 24 agencies, 4 (the Departments of Defense, Homeland Security, and Justice, and the General Services Administration) fully met all four practices, 9 fully met three practices, 6 fully met two practices, 2 fully met one practice, and 3 did not fully meet any practice (see figure).

Assessment of Whether Agencies Fully Met Practices for Establishing Complete Software Application Inventories



Source: GAO analysis of agency information. | GAO-16-511

A January 2016 OMB requirement to complete an IT asset inventory by the end of May 2016 contributed to most of the agencies fully meeting the first three practices. Agencies that did not fully address these practices stated, among other things, their focus on major and high risk investments as a reason for not having complete inventories. However, not accounting for all applications may result in missed opportunities to identify savings and efficiencies. It is also inconsistent with OMB guidance regarding implementation of IT acquisition reform law, referred to as the Federal Information Technology Acquisition Reform Act, which requires that Chief Information Officers at covered agencies have increased visibility into all IT resources. Not accounting for all applications also presents a security risk since agencies can only secure assets if they are aware of them.

Each of the six selected agencies relied on their investment management processes and, in some cases, supplemental processes to rationalize their applications to varying degrees. However, five of the six agencies acknowledged that their processes did not always allow for collecting or reviewing the information needed to effectively rationalize all their applications. The sixth agency, the National Science Foundation (NSF), stated its processes allow it to effectively rationalize its applications, but agency documentation supporting this assertion was incomplete. Only one agency—the National Aeronautics and Space Administration (NASA)—had plans to address shortcomings. Taking action to address identified weaknesses with agencies' existing processes for rationalizing applications would assist with identifying additional opportunities to reduce duplication and achieve savings.

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Abbreviations

CFO	Chief Financial Officer
CIO	Chief Information Officer
DHS	Department of Homeland Security
DOD	Department of Defense
FISMA	Federal Information Security Modernization Act of 2014/ Federal Information Security Management Act of 2002
FITARA	Federal Information Technology Acquisition Reform Act
Interior	Department of the Interior
IT	information technology
Labor	Department of Labor
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
OMB	Office of Management and Budget

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

September 29, 2016

The Honorable Ron Johnson
Chairman
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Jason Chaffetz
Chairman
Committee on Oversight and Government Reform
House of Representatives

In fiscal year 2017, the federal government is expected to spend more than $90 billion on information technology (IT), including software applications. Applications are software components and supporting software hosted on an operating system that create, use, modify, share, or store data in order to enable a business or mission function to be performed. This includes custom, commercial off-the-shelf, government off-the-shelf, or open-sourced software. In a memorandum issued in March 2013, the Office of Management and Budget (OMB) advocated the use of application rationalization—streamlining the portfolio with the goal of improving efficiency, reducing complexity and redundancy, and lowering the cost of ownership. Through this process agencies can identify duplicative, wasteful, and low-value applications and identify opportunities for savings.

You asked us to review federal agencies' efforts to rationalize their portfolio of applications. Our objectives were to determine (1) whether agencies have established complete application inventories and (2) to what extent selected agencies have developed and implemented processes for rationalizing their portfolio of applications. For consistency, we defined applications as those commodity IT assets associated with

enterprise IT systems and business systems commodity IT categories identified in OMB guidance.[1]

To address the first objective, we identified four practices for establishing complete inventories. We derived them primarily from our guide for assessing the reliability of computer-processed data and best practices identified in our 2014 report on federal software licenses. These practices are (1) including the business and enterprise IT systems defined by OMB, (2) including systems from all organizational components, (3) specifying basic application attributes—namely application name, description, owner, and function supported—, and (4) regularly updating the inventory with quality controls to ensure the reliability of the data in the inventory. The 24 Chief Financial Officers (CFO) Act of 1990 agencies provided us with their software application inventories. We analyzed the inventories, reviewed documentation, and interviewed agency staff to determine the extent to which agencies implemented the practices we identified.

To address the second objective, we selected six agencies—the Departments of Defense (DOD), Homeland Security (DHS), Labor (Labor), and the Interior (Interior); the National Aeronautics and Space Administration (NASA); and National Science Foundation (NSF). We selected them based on their fiscal year 2015 IT spending—we selected two large agencies, two medium agencies, and two small agencies—and whether they claimed to have an application rationalization process. We also included agencies recognized for effective rationalization efforts based on our research and OMB observations. We identified a set of common application rationalization practices, reviewed documentation, and interviewed agency officials to determine whether the agencies had processes addressing these practices.

We conducted this performance audit from May 2015 to September 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain

[1]According to OMB's memorandum *Chief Information Officer Authorities* M-11-29 (Washington, D.C.: Aug. 8, 2011), enterprise IT systems include e-mail, identity and access management, IT security, web infrastructure, and collaboration tools. Business systems include finance, human resources, and other administrative functions. In addition, while commodity IT assets represent a range of applications, systems, and investments, we are using the term application to address them all.

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. See appendix I for a more detailed discussion of our objectives, scope, and methodology.

Background

In March 2012, OMB launched the PortfolioStat initiative which required agencies to conduct an annual review of their commodity IT portfolio to, among other things, achieve savings by identifying opportunities to consolidate investments or move to shared services.[2] For PortfolioStat, OMB defined broad categories of commodity IT:

- enterprise IT systems, which include e-mail, identity and access management, IT security, web infrastructure, and collaboration tools;
- business systems, which include finance, human resources, and other administrative functions; and
- IT infrastructure, which includes data centers, networks, desktop computers, and mobile devices.

Of those categories, the first two include software applications, which are software components and supporting software hosted on an operating system that create, use, modify, share, or store data in order to enable a business or mission function to be performed. This includes custom, commercial off-the-shelf, government off-the-shelf, or open-sourced software. The memorandum establishing the PortfolioStat initiative also required agencies to develop a commodity IT baseline including the number, types, and costs of investments for all commodity IT categories.

In a subsequent memorandum, OMB advocated the use of application rationalization to inform data center optimization efforts.[3] Application rationalization is the process of streamlining the portfolio to improve efficiency, reduce complexity and redundancy, and lower the cost of

[2]OMB, *Implementing PortfolioStat* M-12-10 (Washington, D.C.: Mar. 30, 2012).

[3]OMB, *Fiscal Year 2013 PortfolioStat Guidance: Strengthening Federal IT Portfolio Management* M-13-09 (Washington, D.C.: Mar. 27, 2013). While OMB advocated the use of application rationalization in its memorandum, it did not define a process or propose steps for carrying it out.

ownership. It can be done by retiring aging and low-value applications, modernizing aging and high-value applications, eliminating redundant applications, standardizing on common technology platform and version (as is the case for moving to shared services), or consolidating applications.[4] OMB stated in its memorandum that application rationalization would be a focus of PortfolioStat sessions and required agencies to describe their approach to maturing the IT portfolio, including rationalizing applications, in the information resource management plans and enterprise roadmaps that are required to be updated annually.

In December 2014, the law commonly referred to as the Federal Information Technology Acquisition Reform Act (FITARA) was enacted and required covered executive branch agencies (except for DOD) to ensure that Chief Information Officers (CIO) have a significant role in the decision making process for IT budgeting, as well as the management, governance, and oversight processes related to IT.[5] The act also required that CIOs (in each covered agency except DOD) review and approve (1) all contracts for IT services prior to their execution and (2) the appointment of any other employee with the title of CIO, or who functions in the capacity of a CIO, for any component organization within the agency. OMB issued guidance in June 2015 that reinforces the importance of agency CIOs and describes how agencies are to implement the law.[6]

In that same memorandum, OMB changed PortfolioStat from being an annual review session to quarterly reviews including a discussion of portfolio optimization efforts and focus on commodity IT. Specifically, the memorandum stated that agencies are to discuss how they use category management to consolidate commodity IT assets; eliminate duplication between assets; and improve procurement and management of

[4]Oracle, *An Oracle White Paper in Enterprise Architecture, Application Portfolio Rationalization: How IT Standardization Fuels Growth* (Redwood Shores, CA, May 2010). Reprinted with permission from Oracle.

[5]Federal Information Technology Acquisition Reform provisions of the Carl Levin and Howard P. 'Buck' McKeon National Defense Authorization Act for Fiscal Year 2015, Pub. L. No. 113-291, div. A, title VIII, subtitle D, 128 Stat. 3292, 3438-3450 (Dec. 19, 2014).

[6]OMB, *Management and Oversight of Information Technology Memorandum* M-15-14 (Washington, D.C.: June 10, 2015).

hardware, software, network, and telecom services during the sessions. Furthermore, agencies are to share lessons-learned related to commodity IT procurement policies and efforts to establish enterprise-wide inventories of related information. The memorandum also specified key responsibilities for CIOs—including having increased visibility into all IT resources—and required agencies to develop plans to implement these responsibilities by December 2015.

Further, during the course of our review, in January 2016, OMB updated guidance to agencies requiring that they provide information regarding their IT asset inventories when making integrated data collection submissions.[7] The guidance required agencies to provide a preliminary inventory by the end of February 2016 and a complete IT asset inventory, including information on systems, sub-systems, and applications by the end of May 2016 to OMB.

Finally, federal law and guidance specify requirements for protecting federal information and systems. Specifically, the Federal Information Security Management Act (FISMA) of 2002,[8] among other things, requires agencies to maintain and update an inventory of major information systems at least annually, and the National Institute of Standards and Technology specifies that this should include an accurate inventory of software components, including the software applications which are the subject of our review. OMB plays a key role in monitoring and overseeing agencies' security activities and their FISMA implementation. This includes tracking how well agencies are managing their inventories of hardware and software assets and protecting them.

[7]OMB M-13-09 created the integrated data collection approach to streamline agency reporting functions and reduce agency burden.

[8]The *Federal Information Security Modernization Act of 2014* (FISMA 2014) (Pub. L. No. 113-283, Dec. 18, 2014) largely superseded the *Federal Information Security Management Act of 2002* (FISMA 2002), enacted as Title III, E-Government Act of 2002, Pub. L. No. 107-347, 116 Stat. 2899, 2946 (Dec. 17, 2002).

GAO Has Reported on Efforts Related to Application Rationalization

In November 2013, we reported that agency commodity IT baselines were not all complete and recommended that 12 agencies complete their commodity IT baselines.[9] As of March 2016, 6 of the 12 agencies—the Departments of Agriculture, Commerce, Housing and Urban Development, and Labor; the Social Security Administration; and the U.S. Agency for International Development—reported that they had completed their commodity IT baseline. The remaining 6 agencies reported making progress towards completion.

In May 2014, in a review examining federal agencies' management of software licenses (which are types of enterprise IT applications), we determined, among other things, that only 2 of the 24 CFO Act agencies—the Department of Housing and Urban Development and the National Science Foundation—had comprehensive software license inventories. Twenty had partially complete inventories and two did not have any inventory.[10] We recommended that agencies complete their inventories. We also recommended that OMB issue a directive to help guide agencies in managing licenses and that the 24 agencies improve their policies and practices for managing licenses. In June 2016, OMB issued a memorandum that is intended to improve agencies' acquisition and management of enterprise software, consistent with our May 2014 recommendation.[11] The memorandum contains elements related to having a comprehensive policy, such as developing and implementing a plan for centralizing the management of software licenses.

[9]GAO, *Information Technology: Additional OMB and Agency Actions Are Needed to Achieve Portfolio Savings*, GAO-14-65 (Washington, D.C.: Nov. 6, 2013).

[10]GAO, *Federal Software Licenses: Better Management Needed to Achieve Significant Savings Government-Wide,* GAO-14-413 (Washington, D.C.: May 22, 2014).

[11]OMB, *Category Management Policy 16-1 Improving the Management and Acquisition of Common Information Technology: Software Licensing, Memorandum* M-16-12 (Washington, D.C.: Jun. 2, 2016).

Most Agencies Fully Met at Least Three of the Four Practices for Establishing Complete Application Inventories

We identified four practices to determine whether agencies had a complete software application inventory. To do so, we primarily relied on best practices used in our recent report on federal software licenses which determined, among other things, whether agencies had a comprehensive software license inventory,[12] and our guide for assessing the reliability of computer-processed data. We determined that to be considered complete agencies' inventories should:

- include business systems and enterprise IT systems, as defined by OMB;
- include these systems from all organizational components;
- specify basic attributes, namely application name, description, owner, and function supported; and
- be regularly updated with quality controls in place to ensure the reliability of the information collected.

Most of the agencies fully met at least three of the four practices. Specifically,

- 4 agencies fully met all four practices;
- 9 agencies fully met three practices and 8 of these partially met the fourth,
- 6 agencies fully met two practices and 5 of these partially met the others,
- 2 agencies fully met one practice and partially met the three others, and
- 3 agencies did not fully meet any practice.

Of the three agencies that did not fully meet any practice, one partially met all four practices, and two partially met three practices and did not meet the fourth. Table1 lists the 24 agencies and shows whether they fully met, partially met, or did not meet each of the four practices, and figure 1 graphically depicts this status.

[12]GAO-14-413.

Table 1: GAO Assessment of Agencies' Efforts to Establish a Complete Application Inventory

Agency	Includes business and enterprise IT systems	Includes systems from all organizational components	Specifies basic application attributes	Is regularly updated with quality controls to ensure reliability
Department of Agriculture	●	●	●	◐
Department of Commerce	●	●	●	○
Department of Defense	●	●	●	●
Department of Education	●	●	●	◐
Department of Energy	●	◐	◐	◐
Department of Health and Human Services	●	●	●	◐
Department of Homeland Security	●	●	●	●
Department of Housing and Urban Development	●	◐	◐	◐
Department of the Interior	◐	●	●	○
Department of Justice	●	●	●	●
Department of Labor	◐	◐	◐	○
Department of State	●	●	◐	◐
Department of Transportation	◐	◐	◐	◐
Department of the Treasury	●	●	◐	◐
Department of Veterans Affairs	●	●	●	◐
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	●	◐	●	◐
U.S. Agency for International Development	●	◐	●	◐

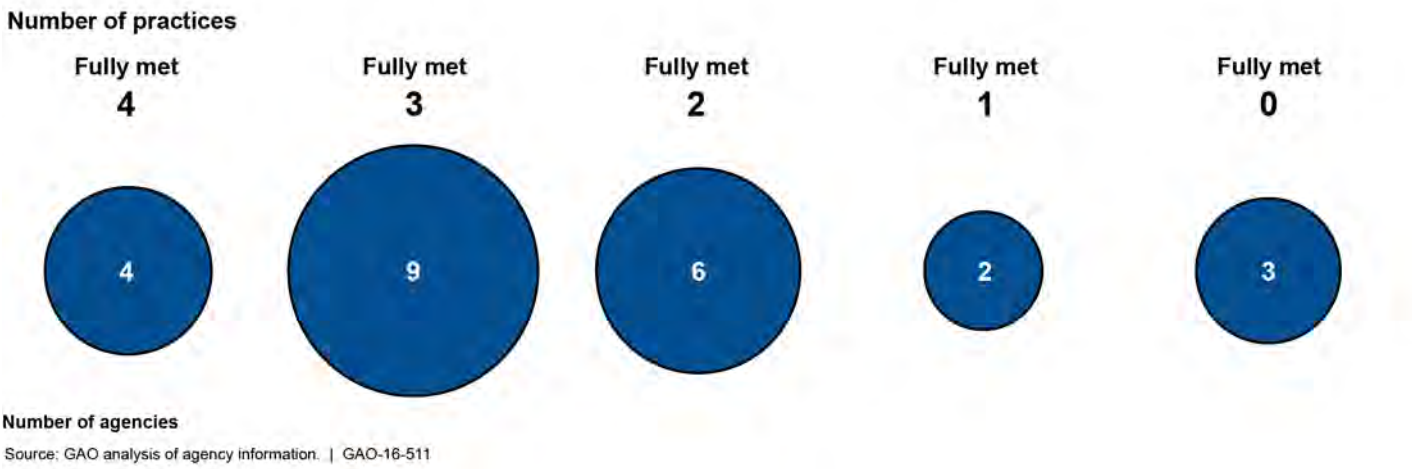
Key: ● Fully met—the agency provided evidence that it fully or largely addressed the key practice for establishing a complete application inventory

◐ Partially met—the agency provided evidence that it addressed some, but not all, of the key practice for establishing a complete application inventory

○ Not met—the agency provided evidence that it largely did not meet the key practice for establishing a complete application inventory or did not provide any evidence that it addressed the key practice

Source: GAO analysis of agency documentation. I GAO-16-511

Figure 1: Assessment of Whether Agencies Fully Met Practices for Establishing Complete Software Application Inventories



Source: GAO analysis of agency information. | GAO-16-511

Table 2 ranks the agencies first by the number of fully met practices, then by the number of partially met practices.

Table 2: Agency Ranking by Number of Fully Met and Partially Met Practices

Agency	Number of fully met practices	Number of partially met practices	Number of not met practices
Department of Defense	4	0	0
Department of Homeland Security	4	0	0
Department of Justice	4	0	0
General Services Administration	4	0	0
Department of Education	3	1	0
Department of Health and Human Services	3	1	0
Department of Veterans Affairs	3	1	0
Environmental Protection Agency	3	1	0
National Science Foundation	3	1	0
Nuclear Regulatory Commission	3	1	0
Office of Personnel Management	3	1	0
Department of Agriculture	3	1	0
Department of Commerce	3	0	1
Department of State	2	2	0
Department of the Treasury	2	2	0
National Aeronautics and Space Administration	2	2	0
Social Security Administration	2	2	0
U.S. Agency for International Development	2	2	0

Agency	Number of fully met practices	Number of partially met practices	Number of not met practices
Department of the Interior	2	1	1
Department of Energy	1	3	0
Department of Housing and Urban Development	1	3	0
Department of Transportation	0	4	0
Department of Labor	0	3	1
Small Business Administration	0	3	1

Source: GAO analysis. I GAO-16-511

The following are examples of how we assessed agencies against our practices. See appendix II for a detailed assessment of all the agencies.

- **The Environmental Protection Agency fully met three practices and partially met one.** The agency fully met the first practice because its inventory includes enterprise IT and business systems, with the exception of very small systems. In addition, it included applications from all offices and regions in the organization. The agency partially met the practice for including application attributes in the inventory because, although it identifies the application name, and description, component managing the applications, and the business function associated with its applications, it does not identify the business function for every application. Officials stated that they are working to have this information populated for all applications. Lastly, the agency fully met the fourth practice of regularly updating the inventory because it has processes to update its inventory through the agency's software life cycle management procedure and provided evidence of the annual data call issued by the CIO to ensure that the inventory is current.
- **The U.S. Agency for International Development fully met two practices and partially met two.** Specifically, the agency's inventory includes business and enterprise IT systems and the inventory includes basic application attributes. However, the agency's inventory does not include systems from all organizational components because officials stated that coordination and communication in the geographically-widespread agency is difficult. In addition, the agency has processes for updating its inventory; however, it relies on manual processes to maintain it.
- **The Department of Transportation partially met all four practices.** While the department's inventory for the common operating environment includes all business and enterprise IT systems and its inventory of applications includes business systems, the inventory of applications does not include all enterprise IT systems. Furthermore,

both of its inventories do not include applications used by all of its components. Specifically, the inventory does not include applications used by the Federal Highway, Federal Railroad, and Federal Transit Administrations, among others, and the inventory for its common operating environment does not include applications used by the Federal Aviation Administration. The department also partially met the practice of including basic application attributes because, although the department's inventory includes these attributes, its common operating environment does not provide the business function that the applications support. Further, while the Department of Transportation has a process for its partners to provide information on its individual inventories in order to update the inventory of applications, it does not have processes in place to ensure the reliability and accuracy of the reported information, and thus partially met this practice.

Regarding the four practices, the majority of the agencies fully met the practices of including business systems and enterprise IT system; including these systems from all organizational components; and specifying the application name, description, owner, and business function supported. Only five agencies fully met the practice of regularly updating the inventory and implementing quality controls for ensuring the reliability of the inventory data because they provided evidence of performing both of these activities. Table 3 shows the number of agencies who fully met, partially met, and did not meet the practices.

Table 3: Number of Agencies that Fully Met, Partially Met, or Did Not Meet the Practices for Establishing a Complete Application Inventory

Rating	Includes business and enterprise IT systems	Includes systems from all organizational components	Specifies basic application attributes	Is regularly updated with quality controls to ensure reliability
Fully met	20	16	16	5
Partially met	4	8	8	15
Not met	0	0	0	4

Source: GAO analysis. I GAO-16-511

OMB's requirement for agencies to complete an IT asset inventory by the end of May 2016 greatly contributed to most of the agencies including business systems and enterprise IT systems for all of their organizational components and specifying key attributes for them. Those agencies that did not fully address these practices provided various reasons for not doing so. For example, one agency stated that it has not made its software application inventory a priority because it has been focusing on major and high risk investments, while delegating applications to the component level. Others noted that the lack of automated processes

make collecting complete inventory information difficult. Further, others noted that it is challenging to capture applications acquired by components in the department-wide inventory.

While it is reasonable to expect that priority be given to major and high risk investments, applications are nevertheless part of the portfolio and should be accounted for as such. Not accounting for them may result in missed opportunities to identify savings and efficiencies. It is also inconsistent with OMB guidance for implementing FITARA which requires that CIOs have increased visibility into all IT resources.

In addition, the lack of a comprehensive inventory presents a security risk. If agencies are not aware of all of their assets, they cannot secure them, resulting in a vulnerable posture. Given the importance of securing federal systems and data to ensuring public confidence and the nation's safety, prosperity, and well-being, we designated federal information security as a government-wide high-risk area in 1997.[13] In 2003, we expanded this area to include computerized systems supporting the nation's critical infrastructure. In our high risk update in February 2015, we further expanded this area to include protecting the privacy of personal information that is collected, maintained, and shared by both federal and nonfederal entities.

Agencies Rationalize Some, but Not All Applications through Existing Investment Management Processes

As previously noted, application rationalization is the process of streamlining the portfolio to improve efficiency, reduce complexity and redundancy, and lower the cost of ownership. It can be done in many ways, including retiring aging and low-value applications, modernizing aging and high-value applications, eliminating redundant applications, standardizing on common technology platform and version (as is the case for moving to shared services), or consolidating applications. Based on common practices identified in technical papers from industry experts, to effectively perform rationalization, an agency should first establish a complete inventory of applications. It should then collect and review cost, technical, and business value information for each application, and use that information to make rationalization decisions. These practices are

[13]GAO, *High-Risk Series: An Overview*, GAO/HR-97-1 (Washington, D.C.: February 1997); GAO, *High-Risk Series: An Update*, GAO-15-290 (Washington, D.C.: February 2015).

consistent with those used to manage investment portfolios. Therefore an agency can achieve application rationalization through established practices related to investment management, including budget formulation, security, or enterprise architecture.[14]

Each of the six selected agencies relied on their investment management processes and, in some cases, supplemental processes to rationalize their applications to varying degrees. However, five of the six agencies acknowledged that their processes did not always allow for collecting or reviewing the information needed to effectively rationalize all their applications. The sixth agency, NSF, stated its processes allow it to effectively rationalize its applications, but we found supporting documentation to be incomplete. Only one agency, NASA, had plans to address shortcomings. The following describes the six selected agencies' processes for rationalizing their applications, provides rationalization examples, identifies weaknesses and challenges, and addresses plans, if any, the agencies have for addressing them.

- **DOD:** The department uses its investment management process for defense business systems[15] to annually review its applications. Officials noted that the department's enterprise architecture is also used to identify duplication and overlap among these applications. In addition, the department has identified eight enterprise common services for collaboration, content discovery, and content delivery it is requiring its components to use to, among other things, improve warfighting efficiency and reduce costs.

  One example of rationalization that DOD provided resulting from its efforts with Executive Business Information System that was replaced

[14]An architecture is a "blueprint" that describes how an organization operates in terms of business processes and technology, how it intends to operate in the future, and how it plans to transition to the future state.

[15]Pursuant to title 10 U.S.C § 2222, a "defense business system" is an information system that is operated by, for, or on behalf of DOD, including any of the following: a financial system; a financial data feeder system; a contracting system; a logistics systems; a planning and budgeting system; an installations management system; a human resources management system; a training and readiness system. The term does not include a national security system or an information system used exclusively by and within the defense commissary system or the exchange system or other instrumentality of the Department of Defense conducted for the morale, welfare, and recreation of members of the armed forces using nonappropriated funds.

by the Navy Enterprise Resource Planning system in a full migration in 2014. Estimated cost savings or avoidances were estimated at $268,000 in fiscal year 2012 and almost $200,000 per year in fiscal years 2013 through 2015. In addition, in an effort to improve its financial management systems, the department has efforts underway to reduce the number of financial management systems from 327 to 120 by fiscal year 2019.

However, officials acknowledged that its processes do not address all applications. Specifically, according to information provided by the department, about 1,200 enterprise IT and business systems which are associated with the Enterprise Information Environment Mission Area are not reviewed by the department—though they are reviewed by components—because they do not meet the definition of a defense business system.

Officials cited several challenges with implementing systematic rationalization efforts, including the department's organizational structure and contractual agreements. As an example, they noted that the Navy's Next Generation e-mail system is being procured through a contract with a particular vendor and as such would be difficult to consolidate with other department e-mail systems. They also noted that the cost of collecting additional cost, technical, and business value information, along with maintaining even more data at greater granularity, may outweigh the benefits.

The department does not have plans at this time to further enhance its processes to rationalize its applications. While we recognize the challenges and costs that may be associated with systematic rationalization efforts, the Enterprise Information Environment Mission Area could be considered as a near-term target for rationalization given the large number of enterprise IT and business systems associated with it. Modifying existing processes to allow for the collection, review, and evaluation of cost, technical, and business information of these systems at the department level could help identify opportunities for savings and efficiencies.

- **DHS:** DHS has several processes for rationalizing applications. For example, through its investment management process, portfolios are regularly assessed against criteria which help identify duplication. In

addition, the department uses its *DHS Collaborative Architecture Methodology* in conjunction with its segment architectures to help identify duplication and fragmentation, at different levels, including at the application level.[16] The DHS IT Duplication Reduction Act of 2015 mandated the department to report on a strategy for reducing duplicative IT systems[17] and the department used the *DHS Collaborative Architecture Methodology* process to address this mandate, including about 700 commodity IT and back-office applications in the scope of the effort.

Further, the department recently established an Application Services Council, chaired by its Enterprise Business Management Office. According to its charter, the council is a cross-component and cross-disciplined leadership team responsible for developing, maintaining, and overseeing the Enterprise Information Technology Services Portfolio, Lifecycle Governance Model, and Roadmap. It is expected to take a strategic approach to evaluating existing and future IT service offerings—including software, platform, and infrastructure services—and provide a forum to identify strategies, best practices, processes, and approaches for enterprise IT services, cloud computing, and shared service challenges. For example, officials reported the council is currently developing a standard service level agreement template and guidance, as well as a cloud adoption strategy. The department also reported other mechanisms related to rationalization include its Joint Requirements Council, strategic sourcing initiatives, IT acquisition reviews, and executive-level portfolio reviews.

In addition, it reported that it uses its DHS Enterprise Architecture Information Repository Technical Reference Model to track application products and software versions—mainly consisting of commercial off-the-shelf software. The product information is gathered through the use of continuous network discovery scans.

[16]DHS's Collaborative Architecture Methodology is the department's multi-disciplinary analysis approach that results in recommendations formed in collaboration with leaders, stakeholders, planners, and implementers for segment architecture planning. These analyses support portfolio-based decisions and include functionally-based Executive Steering Committees as the primary decision-making authorities for segment architecture planning and governance.

[17]Pub. L. No. 114-43, 129 Stat. 470 (Aug. 6, 2015).

Examples of rationalization include the consolidation of learning management systems and the consolidation of site services, including help desk operations. The consolidation of learning management systems was identified through the segment architecture process and is expected to result in projected savings of 10 to 20 percent in fiscal year 2016 after transition costs are addressed. The modernization of the department's help desk and on-site operations resulted in savings that cumulatively accrued to $202 million by fiscal year 2015 due to similar efforts among all department components.

However, DHS's processes do not address all applications because, while the components may carry out their own rationalization efforts, the department does not always collect the application-level cost, technical, or business information for applications used by its components. Specifically, officials reported challenges tracking product level information for deployed applications and difficulty gaining visibility into all the supporting application products for large systems. Officials particularly noted they have been challenged to collect such information and cited a general lack of visibility into the components' budget and their spending. They also noted it was not clear whether there was a good return on investment for the resources needed to collect additional technical, cost, and business value data for systematic application rationalization efforts. Officials reported the department had a financial systems modernization effort underway which would provide greater visibility into components' spending but they did not have a plan to address the collection and review of technical and business value information.

While we recognize that collecting additional details on all applications may not be cost-beneficial, the department could consider taking a segmented approach and initially identify one high-cost function it is currently not collecting or reviewing detailed cost, technical, and business information for across the department. It could then modify existing processes to collect and review this information. These actions would assist the CIO in gaining visibility into all IT resources as specified in the OMB implementation guidance for FITARA and also help identify additional opportunities for savings and efficiencies.

- **NASA:** NASA uses its current investment management process—the Capital Planning and Investment Control process—and its configuration management tools—to review its applications.

NASA reported examples of rationalization resulting in significant savings according to NASA officials. These included the NASA.gov Portal Cloud Transition which resulted in estimated savings of $4 million and the Enterprise Business Portal Transition/Consolidation which resulted in estimated savings of about $184,000 per year.

However, NASA officials acknowledged that their current processes do not provide the level of detail needed to effectively rationalize the agency's applications.

In terms of challenges to rationalizing applications, officials stated that it is difficult to obtain transparency on all applications since each of the agency's centers runs independently. In addition, officials stated that determining application business value is currently subjective to users because the agency's process for obtaining this information is to ask the application owner the impact on the agency if the application did not exist, whereas application technical health information is more concrete. Furthermore, NASA officials stated that there is no systematic process to review applications facing end-of-life issues due to flat budgets and budget cuts.

NASA has developed a plan for a supplemental process (the annual capital investment review process) that is to allow the agency to, among other things, collect detailed data about its applications. The agency has begun to implement the plan and has completed the first milestone of the process, which included conducting a data call to gather and validate application information provided by the various centers and agency stakeholders. At the time of our review, NASA had also performed an initial review and analysis of the information collected and identified optimization opportunities, including developing a plan to consolidate, decommission, or invest to achieve maximum cost efficiencies and process effectiveness across the application program. Fully implementing the annual capital investment review process could better position the agency to identify additional opportunities for savings and efficiencies.

- **Interior:** As part of its budget formulation process, Interior performs rationalization through annual reviews of its portfolio of investments (and supporting applications) against criteria which measure business value and technical fit.

  Reported examples of application rationalization include Interior's cloud e-mail and collaboration services initiative, which consolidated

14 disparate systems into a single enterprise system and achieved a cost savings/avoidance of $13.56 million, and the consolidation of the Enterprise eArchive System with the eMail Electronic Records and Document Management System which resulted in cost savings/avoidance of $6.1 million.

However, the department reported that its portfolio review process is not standardized because it has not been fully defined or established in policy. In addition, it has only been used at the department level, not at the bureaus or offices, and there is a lack of confidence in the data that is collected to support the analyses. In comments on a draft of this report, the department noted that it has also yet to document a plan to implement policy associated with these efforts which they believe would establish a standard analytical technique for rationalizing the investment portfolio. Such a plan would also help secure the commitment needed to carry out planned efforts.

The department reported several challenges to rationalizing its applications, including (1) ensuring the quality and accuracy of data collected since it relies largely on manual processes for collecting information and (2) the lack of standard portfolio evaluation techniques to support information resource management decision-making across the department.

The department has efforts underway which should help address these challenges. Specifically, it is making changes to its information resource management governance. According to the department, these changes, combined with efforts to implement the CIO responsibilities specified in FITARA, should help to address the challenges to rationalizing its applications and allow for rationalization of all applications. However, while the department has defined and begun to implement criteria to assess whether or not an investment and its underlying applications are wasteful, low-value, or duplicative, it has not documented its plan for improving its governance—which, according the department, would support application rationalization. Such a plan would help secure the commitment needed to carry out planned efforts.

- **Labor:** Similar to the other agencies, the department uses its investment management process to review the majority of its business and enterprise IT applications. In addition, officials stated that the department initiated an enterprise-wide budget formulation and Information Technology Acquisition Review Board approval function beginning in fiscal year 2013 which has helped with rationalization.

Officials stated that their efforts have resulted in rationalization of commodity applications and on a case-by-case basis the rationalization of other applications, such as for a case management platform and an acquisition management system. Additional examples of application rationalization include the deployment of a web-based conferencing and collaboration shared service to employees which resulted in cost avoidance of travel costs of about $2.3 million. The department also noted benefits of moving to a cloud e-mail solution, such as saved time and increased user satisfaction.

However, officials identified weaknesses and challenges with rationalizing their applications. Specifically, they reported that, in most cases, IT investments are associated with a group of IT assets, including applications, and individual application information is therefore not reviewed, making it difficult to effectively rationalize. In addition, officials stated that the fact that each bureau-level agency has had authority and responsibility for managing its own applications and that the department has over 600 locations present challenges. Further, though senior officials including the CIO, agreed with the benefits of rationalization, they did not have any plans to rationalize. They questioned the value of developing such plans stating that (1) maintaining mission critical applications and the department's aging infrastructure are current priorities and (2) funding may not be available to implement rationalization plans. While we agree that mission critical applications should be given priority, rationalizing mission support applications, including enterprise IT and business systems, could result in solutions which allow agencies to focus more on mission capabilities and at the same time generate savings which could be reinvested. As we noted for DHS, the department could consider taking a segmented approach to further rationalize and identify a function for which it could modify existing processes to collect and review detailed application cost, technical, and business value information.

- **NSF:** NSF also uses its investment management processes and supporting budget formulation process—with key stakeholders such as the Executive IT Resources Board, Capital Planning and Investment Control Working Group, and Enterprise Architecture Working Group—to collect and review information for its investments. In addition, NSF's Enterprise Modernization Roadmap—which is updated annually—identifies applications along with their associated business segment and modernization status and plans.

NSF identified its e-mail migration to a new platform, which was completed in July 2013, as an example of an application rationalization effort with the highest savings. According to the agency's November 2015 integrated data collection submission to OMB, the migration effort resulted in cost avoidances of $60,000 in 2014. Other examples of application rationalization include modernization and consolidation of NSF's grant systems, the 2014 retirement of the financial functions of a legacy system, and the implementation of its financial system modernization initiative.

However, while officials told us that evaluations for all applications meeting the scope of our review would be included in the roadmap, we only identified half of the applications (9 out of 18). In addition, cost information was only provided in the roadmap for three individual applications.

NSF officials told us that because they are a relatively small agency with a single mission in a single location, many of their processes are handled informally and not thoroughly documented but they are able to discuss all the applications with each other on a regular basis and as a result there is no duplication. Nevertheless, consistently documenting the evaluations and costs for all applications in the roadmap would improve transparency.

Conclusions

While it is encouraging that 13 of the 24 CFO Act agencies fully met at least three of the four practices for establishing a complete software application inventory, most could improve their software applications inventories—albeit to varying degrees—by taking steps to fully meet the practices we identified as being either partially met or not met. Doing so would better position them to identify opportunities to rationalize their applications, which could lead to savings and efficiencies. In addition, they would be better positioned to comply with OMB issued implementation guidance for the recent IT acquisition reform law which requires that CIOs have increased visibility into all IT resources and ensure they are effectively securing their IT assets.

Six selected agencies used their investment management processes and sometimes supplemental processes to rationalize their applications. Of the six agencies, one—NSF—had processes that allowed it to rationalize all applications, though the supporting documentation was not always complete. In addition, while the remaining five agencies' processes did not allow for rationalizing all applications, only one—NASA—had plans to

address identified weaknesses. While these agencies all had examples of rationalization resulting in savings and efficiencies, modifying their existing processes to more completely address their applications would help identify additional opportunities to achieve such savings and efficiencies, which even small, would add up across agencies and over time.

Recommendations for Executive Action

To improve federal agencies' efforts to rationalize their portfolio of applications, we are recommending that:

- the heads of the Departments of Agriculture, Commerce, Education, Energy, Health and Human Services, Housing and Urban Development, the Interior, Labor, State, Transportation, the Treasury, and Veterans Affairs; and heads of the Environmental Protection Agency; 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 direct their CIOs and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met; and
- the Secretaries of Defense, Homeland Security, the Interior, and Labor; and the Director of the National Science Foundation to direct the CIOs and other responsible officials to modify existing investment management processes to address applications more completely. Specifically,
    - the Secretary of Defense should direct the responsible official to modify the department's existing processes to collect and review cost, technical, and business information for the enterprise and business IT systems within the Enterprise Information Environment Mission Area applications which are currently not reviewed as part of the department's process for business systems;
    - the Secretary of Homeland Security should direct the department's CIO to identify one high-cost function it could collect detailed cost, technical, and business information for and modify existing processes to collect and review this information;
    - the Secretary of the Interior should direct the department's CIO to document and implement a plan for establishing policy that would define a standard analytical technique for rationalizing the investment portfolio;

- the Secretary of Labor should direct the department's CIO to consider a segmented approach to further rationalize and identify a function for which it would modify existing processes to collect and review application-specific cost, technical, and business value information; and
- the Director of the National Science Foundation should direct the CIO to consistently document evaluations for all applications and report cost information for them in the roadmap or other documentation.

Agency Comments and Our Evaluation

We provided a draft of this report to the 24 CFO Act agencies in our review for comment and received responses from all 24. Of the 24, 17 agreed with the recommendations directed to them; one (the Department of Defense) disagreed with the recommendations directed to it; five (the Department of the Treasury, the National Science Foundation, the Nuclear Regulatory Commission, the Small Business Administration, and the and U.S. Agency for International Development) stated that they had no comments; and one (the Department of Justice) agreed with the assessment and conclusion for three of the four practices associated with establishing a complete software application inventory and provided clarifying information on the two other practices. Several agencies also provided technical comments, which we incorporated as appropriate. The agencies' comments and our responses are summarized below.

- In e-mail comments, the Department of Agriculture's Senior Advisor for Oversight and Compliance Enterprise Management stated that the department concurred with our recommendation. The department also provided technical comments which we incorporated as appropriate. As a result of these comments and additional documentation provided, we changed our evaluation of the practice associated with updating the software application inventory from not met to partially met.
- In written comments, the Department of Commerce concurred with our recommendation and stated that the department is committed to implementing a more efficient process by regularly updating its application inventory to ensure the reliability of the data collected. The department also specified actions it plans to take to provide regular updates of its inventory. The department's comments are reprinted in appendix III.
- In written comments, the Department of Defense disagreed with both of our recommendations to the department. For the first recommendation, the department provided evidence showing that it

updated its inventory subsequent to us sending the report for comment. As a result, we changed the rating for the related practice from partially met to fully met and removed the associated recommendation.

For the second recommendation, the department stated that 53 percent of the inventory records for the Enterprise Information Environment Mission Area we focused on were IT infrastructure assets (specifically network enclaves or circuits) and not applications subject to rationalization. The mission area nevertheless includes enterprise and business IT applications which could benefit from rationalization, as evidenced by the example of e-mail system consolidation provided in the comments. Given the number of systems involved (at least 1,200), collecting and reviewing cost, technical, and business information for them would help identify additional rationalization opportunities which could yield savings and efficiencies. We therefore believe a recommendation to address these systems is still warranted.

The department also stated that our draft implied that major IT infrastructure modernization efforts, many of which involve the Enterprise Information Environment Mission Area, were not reviewed or properly managed by the department. However, as noted in our report, we did not include IT infrastructure assets in the scope of our review and therefore made no comment on how these assets are being managed. We have restated our emphasis on enterprise and business IT systems as it relates to the mission area where appropriate.

Finally, in its comments the department stated that our report ignored significant Enterprise Information Environment Mission Area application rationalization efforts, such as the Pentagon IT consolidation under the Joint Service Provider, the Business Process and System Review, and ongoing efforts concerning public-facing websites and associated systems. While we were not informed of these efforts during our review, our intent was to highlight additional opportunities for rationalization, not discount any that might have already been implemented. The department also provided technical comments, which we incorporated into the report as appropriate. The department's comments are reprinted in appendix IV.

- In written comments, the Department of Education concurred with our recommendation and described actions it plans to take to address it. The department's comments are reprinted in appendix V.

- In written comments, the Department of Energy concurred with our recommendation. In addition, the department stated that it partially met the four practices associated with establishing a complete software application inventory and provided the IT Asset Inventory it submitted to OMB in May 2016 and other documentation supporting this claim. Our review of the documentation found that the inventory includes business and enterprise IT systems; however, it does not include those systems from all organizational components and it is missing the business function code for a large number of systems. Furthermore, while the department is updating the IT Asset inventory in response to OMB guidance for the fiscal year 2016 integrated data collection submission process, it has not implemented quality control processes to ensure the reliability of the data within the inventory. As a result, we changed the department's rating for the practice associated with including business and enterprise IT systems from not met to fully met and from not met to partially met for the remaining three practices. We modified sections of the report specific to the department accordingly. The department's comments are reprinted in appendix VI.
- In written comments, the Department of Health and Human Services concurred with our recommendation and stated that that it would review the feasibility of fully addressing the practices it partially met. The department's comments are reprinted in appendix VII.
- In written comments, the Department of Homeland Security concurred with our recommendation and described actions it plans to take to implement it. The department's comments are reprinted in appendix VIII.
- In written comments, the Department of Housing and Urban Development concurred with our recommendation and stated that more definitive information with timelines will be provided once the final report has been issued. The department's comments are reprinted in appendix IX.
- In written comments, the Department of the Interior stated that it would agree with the recommendations if we made its requested changes. However, we disagreed with the request to change the rating for the practice associated with regularly updating the inventory from not met to partially met because, while the department provided evidence supporting its claim that it recently updated its inventory, the evidence was not sufficient. Specifically, the department provided an e-mail requesting the bureaus and offices to complete an inventory survey. However, the department did not show how the survey resulted in updates to the inventory. We incorporated the remaining

requested changes in the report as appropriate. The department's comments are reprinted in appendix X.

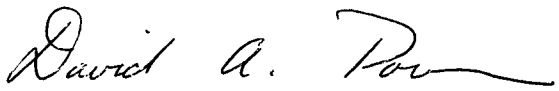
- In written comments, the Department of Justice stated that it concurred with our assessment and conclusions. The department also provided clarifying information regarding its procedures to ensure application inventory accuracy and provided documentation showing that it updates the inventory and implements quality controls to ensure its reliability. As a result, we changed the rating for the related practice from partially met to fully met and removed the recommendation made to the department. The department's comments are reprinted in appendix XI.
- In written comments, the Department of Labor concurred with our recommendations to the department and stated that it would take the necessary steps to address the recommendations. The department's comments are reprinted in appendix XII.
- In written comments, the Department of State concurred with our recommendation to the department, and described current and planned actions to fully address it. The department's comments are reprinted in appendix XIII.
- In e-mail comments, the Department of Transportation's Audit Liaison stated that the department concurred with our findings and recommendation.
- In e-mail comments, the Department of the Treasury's Audit Liaison stated that the department did not have any comments.
- In written comments, the Department of Veterans Affairs concurred with our conclusions and recommendation. The department also provided information on the actions it plans to take to address the recommendation. The department's comments are reprinted in appendix XIV.
- In written comments, the Environmental Protection Agency generally agreed with our recommendation. The agency also asked that we include some of the language from the detailed evaluation in appendix II of the report to the example we have in the body to provide the full context of its practices. We added the language as requested. The agency's comments are reprinted in appendix XV.
- In e-mail comments, the General Services Administration's Associate CIO of Enterprise Planning and Governance concurred with the report. The agency also provided evidence of its processes to update the inventory and ensure the reliability of the data in the inventory,

including the coordination between its Enterprise Architecture Team and subject matter experts. As a result, we changed the agency's rating for the related practice from partially met to fully met and removed our recommendation to the agency.

- In written comments, the National Aeronautics and Space Administration concurred with our recommendation and stated that it would utilize the capital investment review process it is currently implementing to improve its inventory. The agency's comments are reprinted in appendix XVI.
- In e-mail comments, the National Science Foundation Office of Integrated Activities' Program Analyst stated that it had no comments on the draft report.
- In written comments, the Nuclear Regulatory Commission stated that it is in general agreement with the report. The agency's comments are reprinted in appendix XVII.
- In written comments, the Office of Personnel Management concurred with our recommendation and described plans to fully address it. The agency's comments are reprinted in appendix XVIII.
- In e-mail comments, the Small Business Administration Office of Congressional and Legislative Affairs' Program Manager stated that the Office of the Chief Information Officer believes the report captures its current posture.
- In written comments, the Social Security Administration agreed with our recommendation to the agency, but disagreed with the partially met rating for regularly updating the inventory, including implementing quality controls, stating that it had provided evidence supporting its implementation of the practice. However, as noted in the report, the Social Security Administration reported that its systems development lifecycle contains steps for maintaining the inventory but did not provide evidence showing that it is using this process to regularly update the inventory. Therefore we did not change our rating. The agency's comments are reprinted in appendix XIX.
- In an e-mail, the U.S. Agency for International Development Audit, Performance and Compliance Division's Management Analyst stated that the agency did not have any comments.

We are sending copies of this report to interested congressional committees; the heads of 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; the General Services Administration; the National Aeronautics and Space Administration; the National Science Foundation; the Nuclear Regulatory Commission; the Office of Personnel Management; the Small Business Administration; the Social Security Administration; the U.S. Agency for International Development; the Director of the Office of Management and Budget; and other interested parties. This report will also be available at no charge on our website at http://www.gao.gov.

If you or your staff have any questions on matters discussed in this report, please contact me at (202) 512-9286 or 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 III.



David A. Powner
Director
Information Technology Management Issues

Appendix I: Objectives, Scope, and Methodology

Our objectives were to determine (1) whether agencies have established complete application inventories and (2) to what extent selected agencies have developed and implemented processes for rationalizing their portfolio of applications.

For the first objective, we reviewed the 24 major agencies covered by the Chief Financial Officers (CFO) Act of 1990.[1] To ensure consistency, we decided to focus on the software applications associated with the business and enterprise information technology (IT) commodity IT categories defined in the Office of Management and Budget (OMB) guidance since they would be familiar to the agencies in our scope.[2] OMB defines enterprise IT systems as e-mail, identity and access management, IT security, web infrastructure, and collaboration tools; and business systems as finance, human resources, and other administrative functions.[3]

We then identified practices to assess whether agencies had a complete software application inventory. To identify these practices, we primarily relied on our guide for assessing the reliability of computer-processed data which addresses questions about the currency of the data and how often it is updated, procedures for ensuring the completeness of the data, and quality control processes in place to ensure the accuracy of the data; and on criteria used in our recent report on federal software licenses which determined whether agencies had a comprehensive software

[1]The 24 major federal agencies covered by the Chief Financial Officers Act of 1990 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; 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.

[2]OMB, *Chief Information Officer Authorities*, M-11-29 (Washington, D.C.: Aug. 8, 2011).

[3]OMB also defined a third commodity IT category—infrastructure—but we excluded it from our scope because it is primarily made up of hardware assets. In addition, while commodity IT assets represent a range of applications, systems, and investments, we used the term application to address them all.

license inventory, among other things.[4] To be considered complete, we determined an inventory should:

- include business systems and enterprise IT systems, as defined by OMB;
- include these systems from all organizational components;
- specify basic attributes, namely, application name, description, owner, and function supported; and be regularly updated with quality controls in place to ensure the reliability of the information collected.

Following the identification of these four practices, we asked the 24 CFO Act agencies for their software application inventories. We used a set of structured questions to determine whether the agencies implemented the practices and identify lessons learned and challenges faced in establishing a complete software application inventory. We analyzed supporting documentation, such as agency and departmental guidance, policies, and procedures for updating the inventories, and interviewed relevant agency officials, as needed. We compared the information received to the four practices. We determined a practice to be fully met if agencies provided evidence that they fully or largely implemented the practice for establishing a complete application inventory; partially met if agencies provided evidence that they addressed some, but not all, of the practice for establishing a complete application inventory; and not met if the agencies did not provide any evidence that they implemented the practice for establishing a complete application inventory.

To verify the inclusion of business and enterprise IT systems, we analyzed agencies' inventories and looked for examples of each type of system identified by OMB in the business and enterprise IT commodity categories. We followed up with agencies when we were not able to identify a type of system to determine the reason for the omission. We considered the practice to be fully met if agencies' inventories included all of the business and enterprise IT system types or if agencies provided valid reasons for excluding them. We considered the practice to be partially met if agencies acknowledged they were missing applications or if we determined system types to be missing and agencies did not provide

[4]GAO, *Federal Software Licenses: Better Management Needed to Achieve Significant Savings Government-wide*, GAO-14-413 (Washington, D.C.: May 22, 2014).

a valid reason for this. Although we followed up with agencies to determine whether they maintained separate inventories of software licenses when they were not included in the inventories provided, we did not consider the inclusion of these applications in determining our rating because software licenses are expected to be tracked separately by OMB.

To verify the inclusion of systems from all organizational components, we analyzed agencies' inventories against the list of organizational components to determine whether they were included. We followed up with agency officials to determine causes, if any, for missing components. We considered the practice to be fully met if inventories included applications from all organizational components or if agencies provided valid reasons for excluding them. We considered the practice to be partially met if agencies acknowledged they were missing organizational components or if we determined several components to be missing and agencies did not provide a valid reason for this.

Regarding application attributes, we determined that, at a minimum, agencies should have a name, a description, an owner, and function supported for each application. We considered the practice to be fully met if inventories included these attributes for all or most applications or the agencies provided evidence that attributes not included in the inventory provided were being tracked separately. We determined the practice to be partially met if agencies acknowledged that they were missing any of the attributes or if we determined them to be missing from the inventory and agencies did not provide alternate sources for them.

For the last practice, we determined whether agencies (1) used relevant methods to update and maintain the application inventory and (2) implemented controls to ensure the reliability of the information collected. Regarding these controls, we looked for the use of automated tools to collect and track information as their use increases reliability. We determined the practice to be fully met if agencies provided evidence that they regularly updated the inventory and had controls for ensuring the reliability of information collected, including the use of automated tools, or if agencies had mitigating factors when these processes were not in place. We determined the practice to be partially implemented when agencies provided policies and procedures but no evidence of actual inventory updates or quality controls. We also determined the practice to be partially implemented if agencies provided evidence of either regular updates or controls for ensuring reliability but not both or did not make use of automated tools for collecting or maintaining information and had

no mitigation factors. Finally, we also determined the practice to be partially implemented if agencies provided draft policy and guidance of their processes.

For our second objective, we selected 6 of the 24 CFO Act agencies—the Departments of Defense, Homeland Security, the Interior, and Labor; and the National Aeronautics and Space Administration and National Science Foundation—to assess their application rationalization plans and efforts to implement them. We selected the agencies based on three factors:

- whether they had an application rationalization process; in our initial set of structured questions to agencies, we asked whether they had a plan or process for rationalizing applications and selected those that reported having one;
- the size of the agency based on fiscal year 2015 IT spending; we selected two large agencies (i.e., with spending equal to or greater than $3 billion), two medium agencies (i.e., with spending between $1 billion and $3 billion), and two small agencies (i.e., with spending of less than $1 billion) for a full range of IT spending; and
- if they were known for effectively rationalizing their applications based on OMB observations and our research on IT acquisition reform recognizing agencies for their application rationalization efforts.

We identified key practices for effectively rationalizing applications. To do so, we reviewed OMB guidance[5] on federal IT management. We also reviewed technical reports on application rationalization from industry experts. We synthesized the information collected, looked for themes, and determined that, to effectively rationalize applications, agencies should have a process addressing the following four key practices:

- establish an application inventory;
- collect information on each application, such as total cost, technical details, and business value;

[5]OMB, *Memorandum for Heads of Executive Departments and Agencies: Fiscal Year 2013 PortfolioStat Guidance: Strengthening Federal IT Portfolio Management*, M-13-09 (Washington, D.C.: Mar. 27, 2013); and *Memorandum for Heads of Executive Departments and Agencies: Management and Oversight of Federal Information Technology,* M-15-14 (Washington, D.C.: June 10, 2015).

- evaluate the portfolio and make application rationalization decisions based on a review of collected information and determine what applications to retain, retire, replace, eliminate, modernize, or consolidate/move to shared services; and
- execute and manage the process by implementing decisions from the evaluation and evaluate process outcomes against defined metrics and adjust, as needed.

While our research identified specific processes for rationalizing applications, the principles of collecting application information and reviewing it to inform decision making are consistent with those used to manage investment portfolios. Therefore we considered established practices related to investment management, budget formulation, security, or enterprise architecture.[6]

Since the first key practice was addressed in our first objective, we focused on the last three practices. To do so, we interviewed relevant officials using a structured set of questions that were developed in conjunction with internal experts. We also reviewed documentation to determine the extent to which agencies had processes addressing these practices. We also asked agencies to provide their two best examples of application rationalization in terms of savings or cost avoidance—to illustrate the results of rationalization. When agencies did not provide two examples meeting these conditions—the case for DOD, DHS, and NSF—we drew examples from other documentation they had provided.

Finally, we interviewed staff from OMB's Office of the Federal Chief Information Officer to determine whether and how the office monitors agencies' efforts to rationalize their portfolio of applications as recommended in OMB guidance.[7] We also interviewed the staff to determine the impetus for the IT asset data inventory guidance and the planned used for the information collected.

[6]An architecture is a "blueprint" that describes how an organization operates in terms of business processes and technology, how it intends to operate in the future, and how it plans to transition to the future state.

[7]OMB M-13-09.

We conducted this performance audit from May 2015 to September 2016 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.

Appendix II: GAO's Evaluation of Agencies' Application Inventories

The following tables provide our evaluation of the 24 agencies' application inventories.

Table 4: Department of Agriculture

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided its fiscal year 2016 IT Asset Inventory that includes enterprise IT and business systems.
Includes these systems from all organizational components	●	The inventory includes enterprise IT and business systems from all organizational components.
Specifies basic application attributes	●	The inventory includes application name, owner, description, and business function.
Agency regularly updates the application inventory	◐	The department updated its IT Asset Inventory to coincide with OMB's integrated data collection submission process. The department provided emails requiring it components to respond to a data call that informed the update to the IT Asset Inventory for its final submission to OMB in May 2016. The department is expected to regularly reconcile and verify the data in its Enterprise Architecture Repository, which maintains the IT Asset Inventory, against data in the Cyber Security Administration and Management system to ensure the data within the repository is accurate, and officials provided examples of memoranda to component Chief Information Officers addressing this reconciliation. However, officials stated that the department has not completed the reconciliation process for the IT Asset Inventory since it was moved to the Enterprise Architecture Repository. In addition, department officials stated that they have initiatives in place to improve the department's IT Asset Inventory, including conducting crosswalks of the data in the IT Asset Inventory, Cyber Security Administration and Management system, and Capital Planning and Investment Control inventories.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 5: Department of Commerce

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided its fiscal year 2016 IT Asset Inventory that includes enterprise IT and business systems.
Includes these systems from all organizational components	●	The inventory includes enterprise IT and business systems from all organizational components.
Specifies basic application attributes	●	The department's inventory includes application name, owner, description, and business function.
Agency regularly updates the application inventory	○	The department did not provide any evidence of a process to regularly update its inventory or quality controls to ensure the reliability of the data collected.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 6: Department of Defense (DOD)

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department has a *DOD IT Portfolio Repository* which includes the department's business systems.[a] Two of the repository's mission areas—the enterprise information environment area and the business mission area—include the business and enterprise IT systems in the scope of our review.
Includes these systems from all organizational components	●	The inventory includes enterprise IT and business systems from all DOD's organizational components.
Specifies basic application attributes	●	The inventory includes system name, owner, description, and business function.
Agency regularly updates the application inventory	●	The inventory is expected to be updated on a real-time basis and during annual reviews of business systems and DOD officials provided evidence of DOD officials provided an example of a system update as supporting evidence. Department officials also stated that data quality reviews are performed on its inventory. To support this, they provided evidence of validations of the system update example and an investment decision memo showing that investments are reviewed before they are certified. The department also provided metrics related to other data quality reviews that it performs. For example, in 2014, officials identified 178 systems that were potentially categorized in the enterprise information environment mission area instead of business mission area.

Source: GAO analysis of agency documentation. I GAO-16-511

[a]Pursuant to title 10 section 2222, a "defense business system" is and information system that is operated by, for, or on behalf of DOD, including any of the following: a financial system; a financial data feeder system; a contracting system; a logistics systems; a planning and budgeting system; an installations management system; a human resources management system; a training and readiness system. The term does not include a national security system or an information system used exclusively by and within the defense commissary system or the exchange system or other instrumentality of the Department of Defense conducted for the morale, welfare, and recreation of members of the armed forces using nonappropriated funds.

Table 7: Department of Education

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The Department of Education provided its IT Asset Inventory which officials stated was created in response to the Office of Management and Budget's request to establish one. The inventory includes business and enterprise IT systems.
Includes these systems from all organizational components	●	The department's IT inventory includes systems associated with all organizational components, with the exception of the Office of Legislative and Congressional Affairs, International Affairs Office, and Office of Education Technology, which, according to agency officials, use shared services and enterprise IT and do not own any IT systems.
Specifies basic application attributes	●	The department's IT inventory specifies the name, description, owner and executive sponsor, and business function code associated with the systems.
Agency regularly updates the application inventory	◐	Department officials stated that they have not established policy for updating the IT Asset Inventory; however, they plan to publish inventory maintenance procedures specific to the Cyber Security Asset Management System, which the department plans to merge the inventory into by December 2016. In regards to quality control processes, officials stated that it is assumed that all identified systems have an authorization to operate because they would not be considered an official system without it. However, there is no policy explicitly stating this. Officials stated that they will work with the department's Information Assurance team to document the operating assumption for the systems inventory.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 8: Department of Energy

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department's IT Asset Inventory includes business and enterprise IT systems.
Includes these systems from all organizational components	◐	The inventory does not include systems associated with all organizational components. Department officials stated that the inventory is not representative of the entire department.
Specifies basic application attributes	◐	The department's IT Asset Inventory includes system name, description, owner and executive sponsor contact information, and identifies the business function code for some, but not all, of the systems listed in the inventory.

Agency regularly updates the application inventory	◐	The department updated its IT Asset Inventory in conjunction with OMB's integrated data collection submission for fiscal year 2016 and conducted a data call requesting that program offices submit their inventories in support of this update. In regards to quality controls to ensure the reliability of the inventory, department officials stated that they plan to use governance boards to review and validate the information included in the IT Asset Inventory, as they have done in years past. Officials also stated that they are working to make the inventory more comprehensive and accurate.

Source: GAO analysis of agency documentation. | GAO-16-511

Table 9: Department of Health and Human Services

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided its fiscal year 2016 IT Asset Inventory that includes enterprise IT and business systems.
Includes these systems from all organizational components	●	The inventory includes enterprise IT and business systems from all organizational components.
Specifies basic application attributes	●	The inventory includes system name, description, owner, and business function.
Agency regularly updates the application inventory	◐	The department provided its policies and guidelines establishing requirements for systems to be entered into the inventory. However, it did not provide any evidence showing that it has implemented them. In addition, the department did not provide any evidence that it has implemented quality control processes to ensure the reliability of the data in the inventory.

Source: GAO analysis of agency documentation. | GAO-16-511

Table 10: Department of Homeland Security (DHS)

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided an inventory that includes enterprise IT and business systems.
Includes these systems from all organizational components	●	The inventory contains enterprise IT and business systems from the DHS's organizational components.
Specifies basic application attributes	●	The inventory contains application name, description, business function, and owner.

Practice	Rating	Explanation
Agency regularly updates the application inventory	●	The inventory is updated through routine change management and an annual refresh, and both of these activities are expected to be performed by the Inventory Management Team as part of the FISMA compliance process. For the change management activity, components are required to submit change requests to the Inventory Management Team when there is a change in systems' status. The department provided change control forms as evidence that it regularly updates the inventory using this process. For the annual refresh process, the department reported that the Inventory Management Team works with the components to identify errors or omissions in the inventory and to make the changes and provided evidence of a refresh performed in 2016. DHS also has quality control processes for ensuring the reliability of the data in the inventory. In addition to the annual refresh mentioned earlier, they include the process for discovering hidden applications for which DHS provided a Software Approval Report. According to the department, this process entails comparing software associated with devices to the software in the inventory to ensure it is approved and resolving cases where components are using "prohibited" or "not approved" software.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 11: Department of Housing and Urban Development

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided its Inventory of Automated Systems which includes enterprise IT and business systems in its managed service environment.
Includes these systems from all organizational components	◐	While the department's inventory includes enterprise IT and business systems, it does not include all systems from its local offices.
Specifies basic application attributes	◐	The inventory includes application name, owner, and description; however, it does not include business function.
Agency regularly updates the application inventory	◐	The department provided its IT security policy, inventory user guide, and a description of past validations as support that it regularly updates its inventory. Nevertheless, the department did not provide any artifacts to corroborate that it actually regularly updates its inventory. Furthermore, it reported that it does not currently have in place any quality assurance processes to ensure the reliability of the data in the inventory.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 12: Department of the Interior (Interior)

Practice	Rating	Explanation
Includes business and enterprise IT systems	◐	Interior provided a spreadsheet of its applications associated with IT investments in the mission delivery and management support area. Department officials stated that the inventory likely does not include all applications supporting business functions. In addition, it does not include enterprise IT systems.
Includes these systems from all organizational components	●	The inventory contains business systems from all organizational components.
Specifies basic application attributes	●	Interior's inventory includes system name, description, function, and business sponsor.
Agency regularly updates the application inventory	○	The department stated that it reviews the inventory data on at least an annual basis. However, officials said it is reliant on manual data collection and lacks robust automated tools to manage and analyze the data. Officials also reported that the department updated its inventory through its annual inventory update process subsequent to a February 2016 meeting that was held with its organizational components to discuss the future collection of application information. However, while they provided evidence of the meeting, they did not provide evidence of updates to the inventory or quality control processes to ensure its reliability.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 13: Department of Justice

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department and the Federal Bureau of Investigation provided inventories that include enterprise IT and business systems.[a]
Includes these systems from all organizational components	●	Together the inventories include enterprise IT and business systems from all organizational components.
Specifies basic application attributes	●	The inventories each include system name, description, owner, and business function.

Practice	Rating	Explanation
Agency regularly updates the application inventory	●	The department updates its Cyber Security and Assessment Management inventory system continuously as the condition of systems change. It also performs quality control processes to ensure the reliability of the data in the inventory. It provided evidence of these processes and its Security Authorization and Assessment Handbook which includes requirements for the department's inventory to be updated regularly and validated through system assessments for security purposes. The Federal Bureau of Investigation's inventory is updated through user submitted change requests. The bureau also performs quality control processes on its inventory on a daily, weekly, monthly, annual and ad hoc basis. The Federal Bureau of Investigation provided evidence of these quality control processes and its Data Quality Procedures and Checklist document.

Source: GAO analysis of agency documentation. | GAO-16-511

[a]According to officials, the Federal Bureau of Investigation's inventory—known as the Bureau IT Know ledge Repository—was created to manage the FBI's IT portfolio; identify systems for consolidation, replacement, or retirement; and facilitate responding to data calls from DOJ and OMB. It is currently use to capture and register information about IT systems w ithin the FBI in a central repository.

Table 14: Department of Labor (Labor)

Practice	Rating	Explanation
Includes business and enterprise IT systems	◐	Labor provided a list of applications which it stated includes 22 business mission support applications, but does not include all of its enterprise IT and business systems. According to officials, including the Chief Information Officer, there is no comprehensive inventory of enterprise IT and business systems.
Includes these systems from all organizational components	◐	The department does not have a comprehensive list of applications from all its organizational components.
Specifies basic application attributes	◐	The list includes application name, description, and owner. However, it does not include business function.
Agency regularly updates the application inventory	○	The department did not provide any evidence of a process to regularly update its inventory or quality controls to ensure the reliability of the data collected.

Source: GAO analysis of agency documentation. | GAO-16-511

Table 15: Department of State

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided an inventory that includes enterprise IT and business systems.
Includes these systems from all organizational components	●	The inventory includes enterprise IT and business systems from all the department's organizational components.
Specifies basic application attributes	◐	The inventory includes application name, description, and owner. However, it does not include a business function for the majority of inventory entries.
Agency regularly updates the application inventory	◐	The department provided documentation of one of its periodic data calls to investment owners and program managers as evidence that it regularly updates the inventory. However, it did not provide evidence that quality control processes are in place to ensure the reliability of the data in the inventory.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 16: Department of Transportation

Practice	Rating	Explanation
Includes business and enterprise IT systems	◐	The Department of Transportation provided a spreadsheet containing its list of applications and investments, which officials stated are associated with enterprise IT and business systems. We verified that the list included business systems but was missing some enterprise IT systems associated with e-mail and security. The department also provided an inventory for its common operating environment, which includes commodity IT applications.
Includes these systems from all organizational components	◐	The department's list of applications and investments includes software applications from some, but not all components. In addition, the inventory for the common operating environment does not include software owned by the Federal Aviation Administration.
Specifies basic application attributes	◐	The department's inventory has basic attribute information, to include the component using it, the application name and description, department enterprise architecture segment it is mapped to, and the federal enterprise architecture business function it supports, among other things. However, the inventory for its common operating environment does not identify the business function supported.

Practice	Rating	Explanation
Agency regularly updates the application inventory	◐	In 2014 the department's application inventory was updated through the update to the Enterprise Architecture Roadmap and it was determined that this effort would continue annually; however, officials did not provide evidence of any efforts to inform the next update to the Enterprise Architecture Roadmap. In addition, while officials stated that they rely on their Operating Administration partners to provide up-to-date and accurate information on their individual inventories in order to develop the department's list of applications and investments, the department does not have processes for ensuring the reliability of the reported information.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 17: Department of the Treasury

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The Department of the Treasury provided its inventory as contained in the Treasury FISMA Inventory Management System, which officials stated includes most of the applications associated with business and enterprise IT systems with the exception of e-mail, which, according to officials, are part of a general support system and not required to be listed individually.
Includes these systems from all organizational components	●	The department's inventory includes applications from all of its bureaus and departmental offices.
Specifies basic application attributes	◐	The inventory identifies the component using the system and system name. However, it does not include a basic description of the applications, or the business segment/function they support. While officials stated that the department's FISMA Inventory Management System includes these attributes, they did not provide supporting evidence.
Agency regularly updates the application inventory	◐	According to officials and department policy, the inventory is updated continuously as applications are deployed, upgraded, or decommissioned. However, the department did not provide evidence of actual updates to the inventory. In addition, officials stated that they conduct quality control processes to ensure the reliability of the inventory data through the annual FISMA audit performed by the department's Office of Inspector General. However, our review of the 2014 FISMA evaluation report found that the audit addressed the inventory compliance with FISMA and other related information security policies, procedures, standards and guidelines, but did not include quality control processes to ensure the reliability of the data collected. Such processes are critical given that the department relies on information provided by its bureaus.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 18: Department of Veterans Affairs

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The department provided a table of support systems contained in its Systems Inventory, which includes business and enterprise IT systems.
Includes these systems from all organizational components	●	The list provided includes IT support systems used by all of the department's organizations, with the exception of the Office of Inspector General—due to statutory independence—and the Office of Government Relations, which does not sponsor any IT systems.
Specifies basic application attributes	●	The inventory provided specifies basic attribute information, to include the system name, the parent organizations, a basic description of the applications, and the business function they support.
Agency regularly updates the application inventory	◐	The department provided a table of support systems contained in its Systems Inventory, which includes business and enterprise IT systems.
		The list provided includes IT support systems used by all of the department's organizations, with the exception of the Office of Inspector General—due to statutory independence—and the Office of Government Relations, which does not sponsor any IT systems.
		The inventory provided specifies basic attribute information, to include the system name, the parent organizations, a basic description of the applications, and the business function they support.
		The department updates the inventory continuously as changes occur. Furthermore, department policy requires that system inventory information be updated or validated during operational assessments or any IT system reviews, The department also has quality control processes to ensure the reliability of the information collected. For example, officials stated that the Enterprise Architecture Management Suite environment enables reporting against information in the enterprise architecture. In addition, the department reports on inventory performance metrics, which officials stated are to ensure that leadership has visibility into any dated or missing information. However, while officials stated that their repository of systems is viewed as complete, the information within the repository is still maturing and work is being done to automate data capture and integration with other sources.

Source: GAO analysis of agency documentation. | GAO-16-511

Table 19: Environmental Protection Agency

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The agency provided its Registry of Environmental Protection Agency Applications, Models and Databases system, which contains its application inventory. The commodity IT categories of enterprise IT systems and business systems are included in the inventory with the exception of very small systems (e.g., local office carpool tracking systems), which agency officials stated are not required to be registered, but can be added at the discretion of component offices.
Includes these systems from all organizational components	●	The inventory includes software applications from all offices and regions of the organization.
Specifies basic application attributes	◐	The inventory includes the component or region managing the application, the application name, and application description. The inventory also includes the Primary Business Reference Model name and code that identify the primary business function of the application. Although the inventory does not identify the business function associated with all applications, officials stated that they are working to have this information populated for all applications.
Agency regularly updates the application inventory	●	The agency has processes to routinely update its application inventory and does so consistent with policy. Officials stated that program offices use the annual data call issued by the Chief Information Officer (CIO) to ensure their respective portfolios in its registry are current. They provided an example e-mail from the CIO which requests that the program offices perform their annual data call and update, and it includes requirements and instructions for doing so. In addition, the agency implements quality control processes to ensure the reliability of the inventory in its registry. For example, although officials stated that they rely on self-reported information from program offices and Information Management Officers to update the inventory, there is a steward for each record who officials stated is knowledgeable about the particular system and has edit rights to update that record. In addition, a notification is sent to the officers when a record that they are responsible for is updated or changed, and agency officials stated that a report can be generated that will show which records are missing information. The agency provided sample e-mails from stewards to the officers requesting changes to records and from the registry to the officers notifying them of record updates.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 20: General Services Administration

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The agency provided its inventory of applications, which officials stated is contained in IBM's System Architect tool. The inventory includes enterprise IT and business systems.
Includes these systems from all organizational components	●	The inventory includes software applications from all components/bureaus of the organization, except the Board of Contract Appeals, which does not have any applications of its own.
Specifies basic application attributes	●	The inventory specifies the application name and description, the office associated with the application, and the business capability each application is mapped to.
Agency regularly updates the application inventory	●	The agency updates its application inventory on an ongoing basis based on customer input, the Enterprise Architecture team's interaction with subject matter experts, and other methods. To ensure the reliability of the data in the inventory, the Enterprise Architecture Team reaches out to the subject matter experts at a minimum quarterly to review their applications. The agency also makes use of scanning tools to discover technologies and software components on its networks—some of which make up the business and enterprise IT applications in the inventory. Officials told us they are working to map the IT technologies and software components to the business applications.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 21: National Aeronautics and Space Administration (NASA)

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	NASA provided a spreadsheet containing a list of applications derived from its System for Tracking and Registering Applications and Websites for external facing applications and various tools that capture application information for internal facing systems. The list included business and enterprise IT systems, with the exception of e-mail because, according to officials, the agency acquires enterprise licenses for applications such as these and they are tracked separately by NASA's Enterprise License Management Team.
Includes these systems from all organizational components	◐	The inventory does not include all software applications from all the agency components. NASA officials stated that, where available, center-specific software applications are included in the inventory provided; however, they are currently working with agency business owners, through the preliminary Annual Capital Investment Review, to ensure complete inventories of center-specific applications.

Practice	Rating	Explanation
Specifies basic application attributes	●	The inventory specifies application name and description. In addition, the agency component using the listed application and business segment/function that the applications support are tracked in a separate tool.
Agency regularly updates the application inventory	◐	The agency described its continuous and annual update processes and provided documentation of external facing systems being added or updated in the System for Tracking and Registering Application and Websites. Agency officials stated that they are also currently updating its processes for including internally facing applications, as part of the Annual Capital Investment Review process. In regards to implementing quality control processes, agency officials stated that, for external systems, they reconcile security scan data with the inventory. However, they did not provide documentation showing that they actually perform this reconciliation.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 22: National Science Foundation (NSF)

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	NSF provided its inventory of business support applications contained in the NSF FISMA inventory. The inventory includes the agency's business and enterprise IT applications.
Includes these systems from all organizational components	●	NSF's FISMA inventory includes systems from all organizational components.
Specifies basic application attributes	●	The inventory includes the application sponsor (i.e., owner), name, and class (e.g., minor, major, or general support system). In addition, the agency's Enterprise Modernization Roadmap provides a basic description for, and identifies the business segment/function supported by most applications.
Agency regularly updates the application inventory	◐	NSF's inventory is updated as needed through IT governance, enterprise architecture management, budgeting and planning, and the system development life cycle. NSF provided documentation of the retirement of its legacy financial system and replacement with another system, which informed the update to the NSF FISMA inventory as an example. Regarding quality control processes, agency officials stated that they conduct a major validation review of the inventory annually as a part of its FISMA processes to ensure the reliability of the information in it; however, they did not provide any evidence of the validation review.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 23: Nuclear Regulatory Commission

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The agency provided a spreadsheet containing its application inventory maintained in the NRC System Inventory Control Database. The inventory includes custom-developed systems and shared services that are associated with business and enterprise IT systems.
Includes these systems from all organizational components	●	The systems inventory includes software applications from all offices in the agency with the exception of the offices which, according to officials, do not use custom developed systems or own any software applications. These offices include the Office of Commission Appellate Adjudication, Office of Congressional Affairs, and Office of Small Business and Civil Rights; its Office of International Programs and Region IV do not own any software applications.
Specifies basic application attributes	●	The list includes the application name, a brief description, associated office, business segment it supports, and the Federal Enterprise Architecture business function name.
Agency regularly updates the application inventory	◐	The agency has processes to routinely update its application inventory; however, documentation associated with these processes has not been finalized. Further, according to officials, the inventory is updated monthly through software detection. In addition, the agency implements quality control processes to ensure the reliability of the application information collected through NRC's Cybersecurity Program and Information Security Continuous Monitoring process. Specifically, it requires continuous application scanning to be performed to identify changes to any systems and environments in which those systems operate in order for them to maintain authorization to operate. In addition, NRC's Cybersecurity Assessment process includes policies and procedures for manually examining system and information integrity.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 24: Office of Personnel Management

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The agency provided its application inventory, which includes business and enterprise IT systems.
Includes these systems from all organizational components	●	The repository includes systems from all organizational components with the exception of the Offices of Diversity and Inclusion, Procurement Operations, and Small and Disadvantaged Business Utilization, which are small offices.
Specifies basic application attributes	●	The application inventory provided includes the application name, description, and associated organization. The business function mappings are included in the IT asset inventory required by OMB.

Practice	Rating	Explanation
Agency regularly updates the application inventory	◐	The agency described the process for updating the inventory, including procedures for adding new applications; however, it did not provide evidence of actual updates to the inventory. In addition, the agency stated it relies on manual reviews of the data in the application to ensure that it is complete and current. The agency reported it is taking steps to implement scanning tools to verify the reliability of the data in the inventory.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 25: Small Business Administration

Practice	Rating	Explanation
Includes business and enterprise IT systems	◐	The agency provided a list of applications and systems that includes some, not all of its business and enterprise IT systems.
Includes these systems from all organizational components	◐	The list provided only includes systems from some headquarters offices. In addition, the agency stated that a number of field offices are running unsupported applications to help them with their work tasks. Officials reported that the agency has begun an initiative to identify and document unreported systems.
Specifies basic application attributes	◐	The list includes system name, description, and owner; however, it does not include business function.
Agency regularly updates the application inventory	○	The agency reported that it has begun using automated tools in efforts to develop a complete application inventory but provided no supporting evidence. In addition, the agency stated it will continue to refine its automation efforts and work on its draft Software Asset Lifecycle Management framework with criteria that will be applied to each application in the portfolio. SBA reported that it hopes to publish this framework by the end of the year.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 26: Social Security Administration

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The agency provided its Application Portfolio Management Inventory that includes applications aligned with IT and mission support functions. The inventory includes enterprise IT and business systems.
Includes these systems from all organizational components	◐	The inventory contains enterprise IT and business systems developed within its systems organization; however, it does not include applications developed by its operational components.
Specifies basic application attributes	●	The inventory provides the application name, description, function, owner, and business sponsor.

Practice	Rating	Explanation
Agency regularly updates the application inventory	◐	The agency reported that its systems development lifecycle contains steps to register and maintain application information but did not provide evidence to show that it is using this process to regularly update the inventory. Regarding quality control processes, the agency reported that applications are discovered through the architecture review board processes and provided a data discovery report as supporting evidence. It also reported that it has efforts underway to catalog applications outside its systems organization and has begun implementing an additional data discovery process using interviews with project teams.

Source: GAO analysis of agency documentation. I GAO-16-511

Table 27: U.S. Agency for International Development

Practice	Rating	Explanation
Includes business and enterprise IT systems	●	The agency provided a list of applications that includes the business and enterprise IT commodity IT categories.
Includes these systems from all organizational components	◐	Officials stated that coordination and communication in their geographically widespread agency presents challenges to including systems from all organizational components. For example, identifying the appropriate points of contact and receiving a timely response from all bureaus and Independent Offices makes it difficult to do so.
Specifies basic application attributes	●	The application inventory includes the system name, owner, description, and the service area aligned to the applications.
Agency regularly updates the application inventory	◐	The agency has processes for updating its inventory; however, it relies on manual processes for doing so. Specifically, officials stated that the application list is updated through data calls and research conducted by the enterprise architecture team. Also, the agency implements quality control processes to ensure the reliability of application information. For example, it provided documentation of its FISMA data collection conducted on every computer system.

Source: GAO analysis of agency documentation. I GAO-16-511

Appendix III: Comments from the Department of Commerce

THE DEPUTY SECRETARY OF COMMERCE
Washington, D.C. 20230

August 10, 2016

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

Dear Mr. Powner:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report titled *Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings (*GAO-16-511, September 2016). On behalf of the Department of Commerce, I have enclosed our comments on the draft report.

We have concurred with the recommendation and are committed to implementing a more efficient process by regularly updating the Department's application inventory to ensure the reliability of the data collected. We will do this following a process consistent with one described in the report.

If you have any questions, please contact Steve Cooper, Chief Information Officer, at (202) 482-4797.

Sincerely,

Bruce H. Andrews

Enclosure

Department of Commerce's Comments on the Government Accountability Office's (GAO) draft report titled Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings (GAO-16-511, September 2016)

The Office of the Chief Information Officer has reviewed the draft report, and we offer the following comments for GAO's consideration.

General Comments

The report on Information Technology (IT) does a fair and thorough job in assessing Federal agencies' efforts to rationalize their portfolio of applications. The report's discussion of the degree to which the 26 agencies established complete application inventories and developed and implemented processes for rationalizing their portfolio of applications is generally well-informed, thorough, and balanced.

Comments on Recommendations

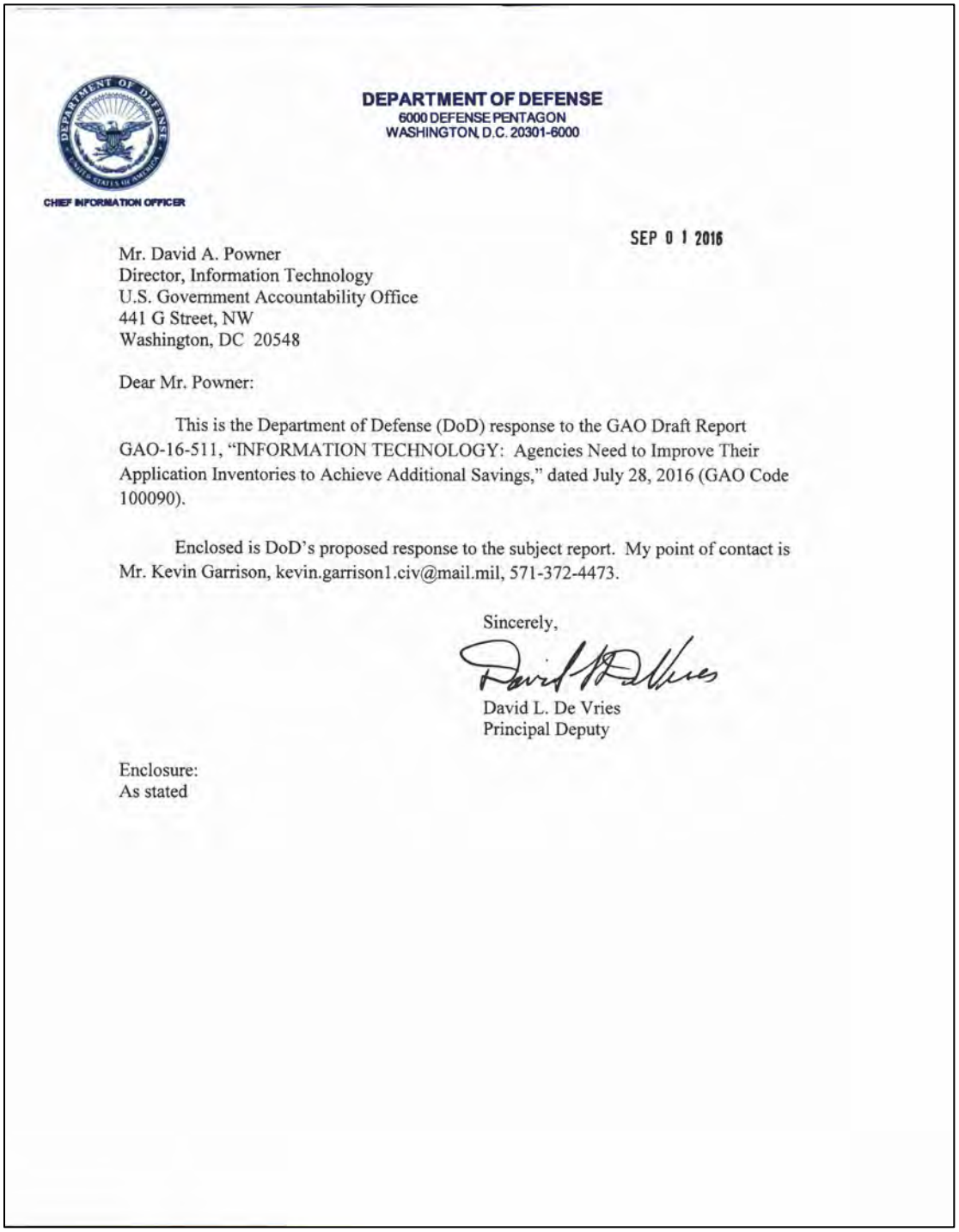
The Government Accountability Office made one recommendation to the Department of Commerce in the report.

Recommendation:

GAO made one recommendation, which was "to improve federal agencies' efforts to rationalize their portfolio of applications, GAO is recommending that the Department of Commerce direct their CIOs, and other responsible officials, to improve their inventories by taking steps to fully address the practices identified in the report as being partially met or not met."

Commerce Response: Commerce agrees with this recommendation. In the report, Commerce received credit for meeting three out of the four criteria used to assess efforts to rationalize its portfolio of applications. Commerce was listed as needing to provide regular updates of its applications inventory. As part of its integrated data collection submission to OMB, Commerce will continue to collect and report all initiatives resulting in cost savings and avoidances to ensure IT savings are being realized. In addition, as part of our Commerce Federal Information Technology Acquisition Reform Act program, we will direct the Bureau CIOs and other responsible Program Managers to maintain and manage an inventory of all appropriate cost saving/avoidance IT initiatives, encompassing the practices outlined in the GAO report.

Appendix IV: Comments from the Department of Defense



DEPARTMENT OF DEFENSE
6000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-6000

CHIEF INFORMATION OFFICER

SEP 0 1 2016

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

Dear Mr. Powner:

This is the Department of Defense (DoD) response to the GAO Draft Report GAO-16-511, "INFORMATION TECHNOLOGY: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings," dated July 28, 2016 (GAO Code 100090).

Enclosed is DoD's proposed response to the subject report. My point of contact is Mr. Kevin Garrison, kevin.garrison1.civ@mail.mil, 571-372-4473.

Sincerely,

David L. De Vries
Principal Deputy

Enclosure:
As stated

Department of Defense (DoD) Comments on GAO Draft Report GAO-16-511
(GAO Code 100090)
"Agencies Need to Improve Their Application Inventories to Achieve Additional Savings"

Recommendation 1 (page 22): The Secretary of Defense direct the CIOs and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met.

DoD Response: Non-concur. The Draft Report incorrectly states that the DoD "partially meets" GAO's recommended practice that the Department's application inventory be regularly updated. On August 4, 2016, DoD provided GAO with evidence regarding the Department's process for regularly updating the inventory and GAO agreed that its assessment should be changed to indicate that DoD "fully meets" that practice.

Therefore recommend Tables 1, 2 and 5 in the Draft Report, and the accompanying narrative, be updated to reflect that DoD fully meets all four practices.

Further, recommend that the first practice listed under DoD in Table 5 on page 31 be modified to accurately reflect that the DoD inventory maintained in the DoD IT Portfolio Repository does contain and include email systems, and four email systems were identified in the EIEMA record extract provided to GAO on May 31, 2016.

DoD believes it has fully met all four of the inventory criteria and, therefore, Recommendation 1 does not apply to DoD.

Recommendation 2 (page 23): The Secretary of Defense should direct the responsible official to modify the department's existing processes to collect and review cost, technical and business information for the Enterprise Information Environment Mission Area applications which are currently not reviewed as part of the department's process for business systems.

DoD Response: Non-concur. DoD recommends that the first paragraph on page 16 associated with DoD Enterprise Information Environment Mission Area (EIEMA) investments be deleted in its entirety since it is inaccurate. This paragraph incorrectly characterizes DoD EIEMA systems as being synonymous with applications. The majority of the EIEMA systems identified in the DoD inventory are network enclaves or circuits, and fall into the category of "IT infrastructure," not systems or applications that can be rationalized. Specifically, of the almost 2,500 EIEMA records provided to GAO over 1300 (53%) are network enclaves or circuits, which fall into the category of "IT infrastructure." They are not "applications" subject to rationalization.

As stated on page 5 of the draft GAO report, OMB defines three broad categories of commodity IT: enterprise IT, business systems, and IT infrastructure. Paragraph two states: "Of those categories, the first two include software applications, which are software components and supporting software hosted on an operating system that create, use, modify, share, or store data in order to enable a business or mission function to be performed. This includes custom, commercial off-the-shelf, government off-the-shelf, or open-sourced software." DoD's application rationalization efforts are focused on the first two categories, and in particular on

DoD Comments on Draft GAO Report GAO-16-511 (cont.)

defense business systems to help facilitate the Department's parallel data center consolidation effort. EIEMA application rationalization has been done on a case by case basis where the business case was obvious with near-term payoffs. For example, the DoD implementation of enterprise email has resulted in a reduction of the number of email systems operated across the Department.

Additionally, as currently drafted the GAO report implies that major DoD IT infrastructure modernization efforts, such as Joint Regional Security Stacks, Mission Partner Environment, Data Center Consolidation, and Circuit Convergence, which involve many of EIEMA "systems" are not reviewed or properly managed by the Department. These efforts, which have senior DoD leadership support and oversight, are critical to optimizing DoD IT infrastructure so that it supports the warfighter capabilities, enhances the Department's cybersecurity posture, and improves information sharing with mission partners. The Report also ignores significant EIEMA application rationalization efforts, such as the Pentagon IT consolidation under the Joint Service Provider, the Business Process and System Review, and ongoing efforts concerning public facing websites and associated systems.

Appendix V: Comments from the Department of Education

UNITED STATES DEPARTMENT OF EDUCATION

OFFICE OF THE CHIEF INFORMATION OFFICER

August 11, 2016 THE CHIEF INFORMATION OFFICER

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

Dear Mr. Powner:

I am writing to respond to the recommendation made in the Government Accountability Office (GAO) draft report entitled "Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings (GAO-16-511)." This recommendation was made to all of the 24 CFO Act Agencies. The report says that the Department of Education (Department) has fully implemented three of the four software application inventory practices listed below, and that we have partially implemented the fourth:

1. Includes business and enterprise IT systems, as defined by OMB (Fully);
2. Includes these systems from all organizational components (Fully);
3. Includes basic attributes, namely application name, description, owner, and function supported (Fully); and
4. Agency regularly updates with quality controls in place to ensure the reliability of the information collected (Partially).

Recommendation: Establish an Agency policy for regularly updating the IT Asset Inventory.

Response: The U.S. Department of Education concurs with GAO's recommendation and will merge the IT Asset Inventory into the Cyber Security Assessment and Management System by December 2016. As part of this effort, we will publish inventory maintenance procedures for creation, read, update, and deletion of IT systems records and quality control processes, which will explicitly state that an IT system included in the IT Asset Inventory must have an authorization to operate (ATO).

We appreciate the opportunity to respond to the GAO report as we continue our effort to improve the management and oversight of the information technology (IT) portfolio. If you or your staff members have any questions regarding our response, please contact me at (202) 245-6252 or e-mail (Jason.Gray@ed.gov).

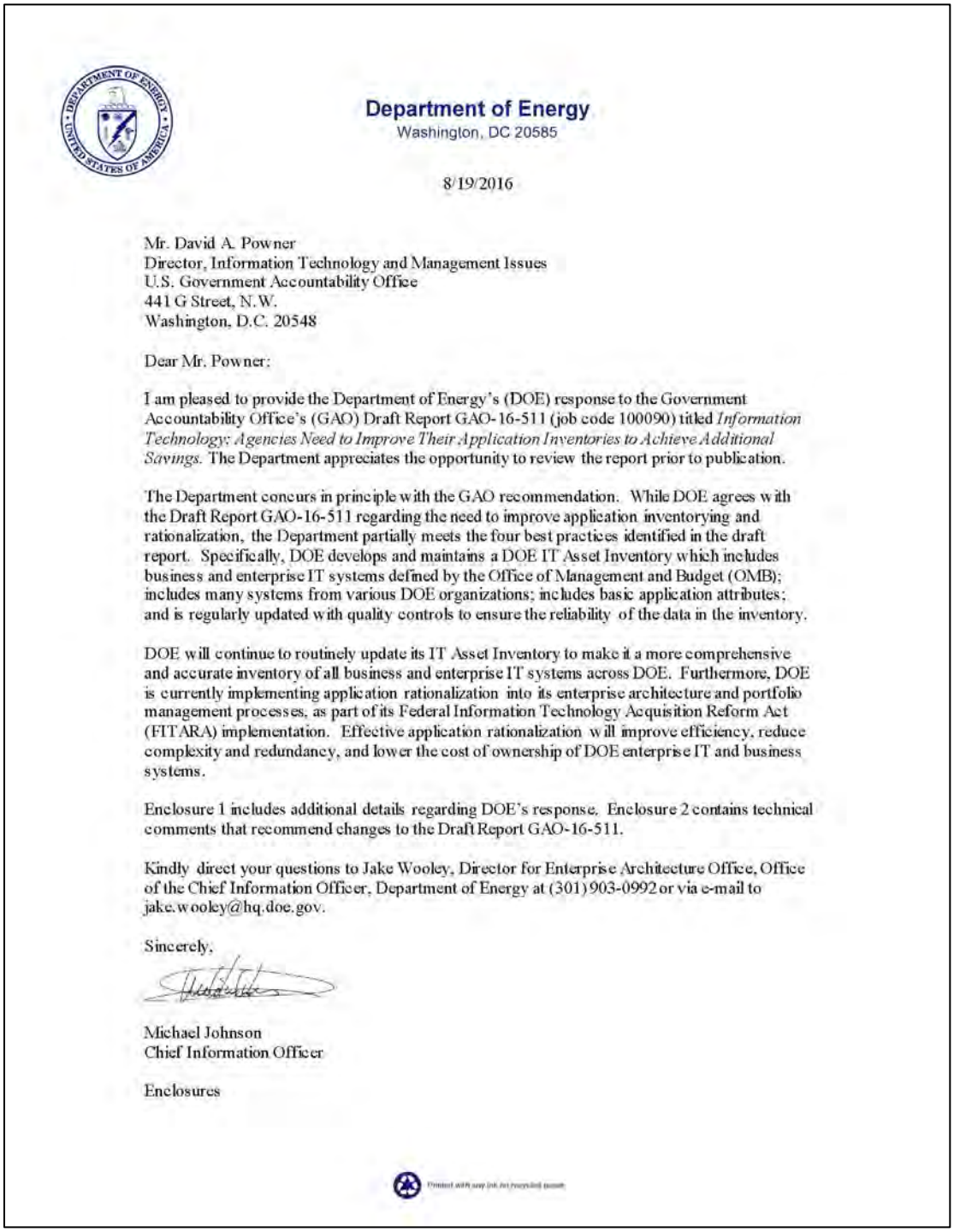
Sincerely,

For Jason Gray

400 MARYLAND AVE. S.W., WASHINGTON, DC 20202
www.ed.gov

The Department of Education's mission is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.

Appendix VI: Comments from the Department of Energy



Department of Energy
Washington, DC 20585

8/19/2016

Mr. David A. Powner
Director, Information Technology and Management Issues
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Powner:

I am pleased to provide the Department of Energy's (DOE) response to the Government Accountability Office's (GAO) Draft Report GAO-16-511 (job code 100090) titled *Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings*. The Department appreciates the opportunity to review the report prior to publication.

The Department concurs in principle with the GAO recommendation. While DOE agrees with the Draft Report GAO-16-511 regarding the need to improve application inventorying and rationalization, the Department partially meets the four best practices identified in the draft report. Specifically, DOE develops and maintains a DOE IT Asset Inventory which includes business and enterprise IT systems defined by the Office of Management and Budget (OMB); includes many systems from various DOE organizations; includes basic application attributes; and is regularly updated with quality controls to ensure the reliability of the data in the inventory.

DOE will continue to routinely update its IT Asset Inventory to make it a more comprehensive and accurate inventory of all business and enterprise IT systems across DOE. Furthermore, DOE is currently implementing application rationalization into its enterprise architecture and portfolio management processes, as part of its Federal Information Technology Acquisition Reform Act (FITARA) implementation. Effective application rationalization will improve efficiency, reduce complexity and redundancy, and lower the cost of ownership of DOE enterprise IT and business systems.

Enclosure 1 includes additional details regarding DOE's response. Enclosure 2 contains technical comments that recommend changes to the Draft Report GAO-16-511.

Kindly direct your questions to Jake Wooley, Director for Enterprise Architecture Office, Office of the Chief Information Officer, Department of Energy at (301) 903-0992 or via e-mail to jake.wooley@hq.doe.gov.

Sincerely,

Michael Johnson
Chief Information Officer

Enclosures

Enclosure 1

MANAGEMENT RESPONSE
GAO Draft Report, GAO-16-511
Agencies Need to Improve Their Application Inventories to Achieve Additional Savings

Recommendation 1:

To improve the Department's efforts to rationalize its portfolio of applications, GAO is recommending that the Secretary of Energy direct the CIO and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met.

Management Response: Concur in Principle

DOE concurs in principle with this recommendation. The DOE OCIO leads the development and maintenance of the DOE IT Asset Inventory, which includes information on business and enterprise IT systems, sub-systems, and applications from across the DOE enterprise. DOE routinely updates and reports this DOE IT Asset Inventory to the Office of Management and Budget (OMB), as requested. The most recent DOE IT Asset Inventory was reported to OMB on May 31, 2016, as part of the quarterly Integrated Data Collection (IDC) submission.

DOE is currently implementing application rationalization into its enterprise architecture and portfolio management processes, as part of its Federal Information Technology Acquisition Reform Act (FITARA) implementation. Effective application rationalization will improve efficiency, reduce complexity and redundancy, and lower the cost of ownership of its enterprise IT and business systems.

As directed by OMB's March 2016 Data Center Optimization Initiative (DCOI) memo M-16-19, DOE will initiate a program to replace manual collections and reporting of systems, software, and hardware inventory housed within data centers with automated monitoring, inventory, and management tools (e.g., data center infrastructure management) by the end of fiscal year 2018.

Estimated Completions Date: September 30th 2018

1

Appendix VII: Comments from the Department of Health and Human Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

OFFICE OF THE SECRETARY

Assistant Secretary for Legislation
Washington, DC 20201

AUG 24 2016

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

Dear Mr. Powner:

Attached are comments on the U.S. Government Accountability Office's (GAO) report entitled, "*Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings*" (GAO-16-511).

The Department appreciates the opportunity to review this report prior to publication.

Sincerely,

Jim R. Esquea

Jim R. Esquea
Assistant Secretary for Legislation

Attachment

GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S DRAFT REPORT ENTITLED: INFORMATION TECHNOLOGY: AGENCIES NEED TO IMPROVE THEIR APPLICATION INVENTORIES TO ACHIEVE ADDITIONAL SAVINGS (GAO-16-511)

The U.S. Department of Health and Human Services (HHS) appreciates the opportunity from the Government Accountability Office (GAO) to review and comment on this draft report.

Recommendation

To improve the federal agencies' efforts to rationalize their portfolio of applications, GAO is recommending that the head of HHS direct its Chief Information Officer and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met.

HHS Response

HHS concurs with this recommendation. As part of HHS' efforts to fully address the practices identified as being partially met, HHS is committed to fulfill update requirements to ensure reliability. HHS will review the feasibility of fully addressing the practices being partially met.

Appendix VIII: Comments from the Department of Homeland Security

U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

September 2, 2016

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

Re: Management's Response to Draft Report GAO-16-511, "INFORMATION TECHNOLOGY: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings"

Dear Mr. Powner:

Thank you for the opportunity to review and comment on this draft report. The U.S. Department of Homeland Security (DHS) appreciates the U.S. Government Accountability Office's (GAO) work in planning and conducting its review and issuing this report.

We are pleased to note GAO's positive recognition of the multiple DHS processes for rationalizing applications, which have helped streamline the Department's portfolio of software applications and reduce duplication and fragmentation. As the report highlights, the consolidation of learning management systems is expected to result in savings of 10-20 percent and the modernization of DHS's help desk and on-site operations has already resulted in savings of $202 million through FY 2015. DHS is committed to efficiently managing information technology resources and continuously striving to ensure that every taxpayer dollar is used wisely and to the maximium effect.

The draft report contained one recommendation with which the Department concurs. Attached find our detailed response to this recommendation.

Again, thank you for the opportunity to review and comment on this draft report. Technical comments were previously provided under separate cover. Please feel free to contact me if you have any questions. We look forward to working with you in the future.

Sincerely,

JIM H. CRUMPACKER, CIA, CFE
Director
Departmental GAO-OIG Liaison Office

Attachment

Attachment: DHS Management Response to Recommendations Contained in GAO-16-511

GAO recommended that the Secretary of Homeland Security direct the Department's CIO [Chief Information Officer] to:

Recommendation: Identify one high-cost function it could collect detailed cost, technical, and business information for and modify existing processes to collect and review this information.

Response: Concur. DHS OCIO Enterprise Business Management Office (EBMO) and Enterprise Architecture Program Management Office (EAPMO) teams are researching functional portfolios to identify a high cost function for which detailed cost, technical, and business information can be collected. After the high cost function is selected, the EBMO and Enterprise Architecture teams will begin modifying existing processes to collect and review the specified information. Estimated Completion Date: July 30, 2017.

2

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

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

CHIEF INFORMATION OFFICER

AUG 11 2016

Ms. Sabine Paul
Assistant Director
Information Technology Management Issues
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Ms. Paul:

Thank you for the opportunity to comment on the Government Accountability Office (GAO) draft report entitled, *Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings* (GAO-16-511).

The Department of Housing and Urban Development (HUD) reviewed the draft report and concurs with the recommendation for Executive Action. More definitive information with timelines will be provided once the final report has been issued.

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,

Rafael C. Diaz
Chief Information Officer

Appendix X: Comments from the Department of the Interior

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

AUG 26 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, *Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings (GAO-16-511)*. We appreciate GAO's review of the completeness of the Department's application inventory and its use of application rationalization.

The Department recommends the following changes to the draft report.

On **Page 20**, GAO stated that the Department is "…making changes to its information resource management (IRM) governance. According to the department, these changes, combined with efforts to implement the Chief Information Officer (CIO) responsibilities specified in the (Federal Information Technology Acquisition Reform Act) FITARA, should help to address the challenges to rationalizing its applications issues and allow for rationalization of all applications."

In its earlier response(s), the Department did state that the enactment of FITARA provides an opportunity for the Department to establish policies that will lead to the effective implementation of application portfolio rationalization and that these policies will be established through the implementation of FITARA and the Department's ongoing effort to reform its IRM Governance Framework. Although the Department acknowledges the need to establish application rationalization techniques through these processes, the Department did not state that the plan for improving governance will establish application rationalization as a standard technique across the Department.

Based on the above, the Department requests that GAO revise the sentence starting with 'However' as follows: "While the Department is defining and implementing criteria to assess whether or not an investment and its underlying applications are wasteful, low-value, or duplicative, the Department has not documented its plan to implement policy, which would establish application rationalization as a standard analytical technique for rationalizing the investment portfolio."

Page 23, 3rd sub bullet, GAO recommends that the Secretary of the Interior direct the Department's CIO to document plans for improving its Information Technology (IT) governance structure, including addressing application rationalization.

The Department has not determined if plans for updating the IT governance structure will include implementation of application rationalization. However, the Department does acknowledge the need to authoritatively establish department-wide processes through policies for rationalizing its portfolio of applications as a standard technique across the Department. Therefore, the Department requests GAO revise the language as follows: "The Secretary of the Interior should direct the Department's CIO to establish and implement policies for application rationalization."

Page 36 Table 11, GAO states in the explanation of Practice 2 that the Department's application inventory contains both enterprise IT and business systems from all organizational components. Consistent with other GAO findings in its evaluation, the Department's current application inventory does not include enterprise IT systems and only contains business systems from all organizational components.

The Department requests GAO revise the language as follows: "The inventory contains business systems from all organizational components."

GAO states in the explanation of Practice 4 that the Department does not regularly update its application inventory while referencing a February 2016 briefing. However, subsequent to that briefing, the Department made its annual update to the inventory, as it has been since its initial version in 2014.

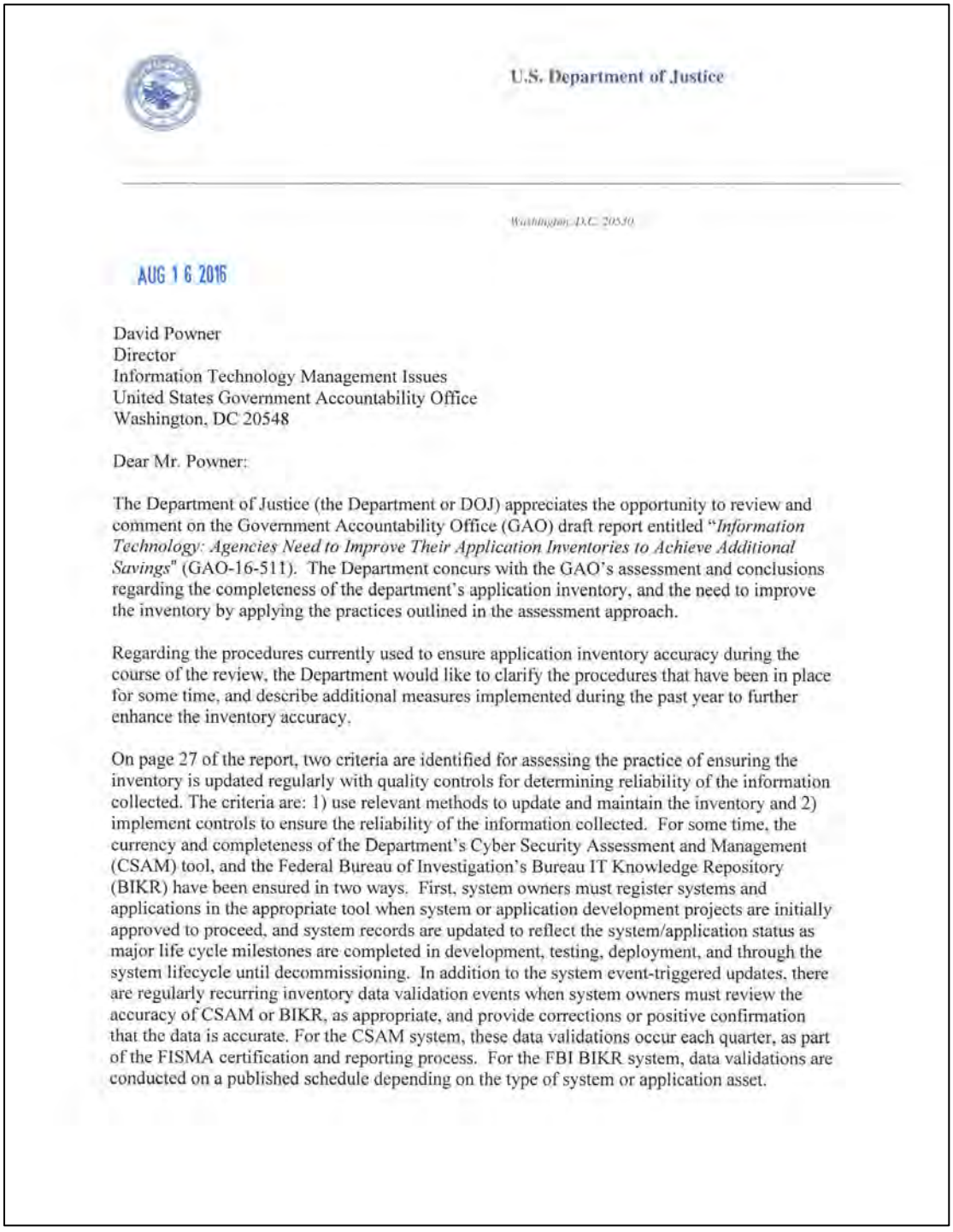
Accordingly, the Department requests that GAO revise the rating for Practice 4 to "partially met."

With these changes, the Department concurs with the recommendations to the draft report and appreciates your consideration to incorporate our comments when finalizing the report. If you have any questions or need additional information, please contact me.

Sincerely,

Kristen J. Sarri
Principal Deputy Assistant Secretary
Policy, Management and Budget

Appendix XI: Department of Justice



U.S. Department of Justice

Washington, D.C. 20530

AUG 16 2016

David Powner
Director
Information Technology Management Issues
United States Government Accountability Office
Washington, DC 20548

Dear Mr. Powner:

The Department of Justice (the Department or DOJ) appreciates the opportunity to review and comment on the Government Accountability Office (GAO) draft report entitled "*Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings*" (GAO-16-511). The Department concurs with the GAO's assessment and conclusions regarding the completeness of the department's application inventory, and the need to improve the inventory by applying the practices outlined in the assessment approach.

Regarding the procedures currently used to ensure application inventory accuracy during the course of the review, the Department would like to clarify the procedures that have been in place for some time, and describe additional measures implemented during the past year to further enhance the inventory accuracy.

On page 27 of the report, two criteria are identified for assessing the practice of ensuring the inventory is updated regularly with quality controls for determining reliability of the information collected. The criteria are: 1) use relevant methods to update and maintain the inventory and 2) implement controls to ensure the reliability of the information collected. For some time, the currency and completeness of the Department's Cyber Security Assessment and Management (CSAM) tool, and the Federal Bureau of Investigation's Bureau IT Knowledge Repository (BIKR) have been ensured in two ways. First, system owners must register systems and applications in the appropriate tool when system or application development projects are initially approved to proceed, and system records are updated to reflect the system/application status as major life cycle milestones are completed in development, testing, deployment, and through the system lifecycle until decommissioning. In addition to the system event-triggered updates, there are regularly recurring inventory data validation events when system owners must review the accuracy of CSAM or BIKR, as appropriate, and provide corrections or positive confirmation that the data is accurate. For the CSAM system, these data validations occur each quarter, as part of the FISMA certification and reporting process. For the FBI BIKR system, data validations are conducted on a published schedule depending on the type of system or application asset.

Further, in the past year, the Department has implemented a validation process that integrates information gathered by the Department's endpoint vulnerability scanning system with data contained in the CSAM inventory to ensure inventory completeness. The Department hopes that this clarification demonstrates that appropriate inventory management and quality control practices are in place. The Department would be happy to respond to any questions regarding this response.

Should you or your staff have any questions regarding this matter, please do not hesitate to contact Richard Theis, Assistant Director, Audit Liaison Group on 202-514-0469.

Sincerely,

Lee J. Lofthus
Assistant Attorney General for Administration
Justice Management Division

Appendix XII: Comments from the Department of Labor

U.S. Department of Labor

Office of the Assistant Secretary
for Administration and Management
Washington, D.C. 20210

SEP 01 2016

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

Dear Mr. Powner:

Thank you for the opportunity to review and comment on draft report GAO-16-511: *Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings.* DOL concurs with both GAO recommendations.

Recommendation: *To improve federal agencies' efforts to rationalize their portfolio of applications, GAO is recommending the Secretary of Labor direct the DOL CIO and other responsible officials to improve their application inventory by taking steps to fully address the practices GAO identified as being partially met or not met.*

DOL Response: The DOL CIO will take necessary steps to address, fully, the practices GAO identified as being partially met or not met, given funding and resources.

Recommendation: *To improve federal agencies' efforts to rationalize their portfolio of applications, GAO is recommending the Secretary of Labor direct the DOL CIO and other responsible officials to modify existing investment management processes to address applications more completely. Specifically, to consider a segmented approach to further rationalize and identify a function for which it would modify existing processes to collect and review application-specific cost, technical, and business value information.*

DOL Response: The DOL CIO will take necessary steps to address GAO's recommendation, including a segmented approach to further rationalize DOL's application inventory including business and enterprise IT systems, given funding and resources.

We appreciate GAO's efforts and the insight the report provides in regards to DOL's application inventory. Should you have any questions regarding the Department's response, please have your staff contact Mr. Kevin G. Clark, Program Manager – IT Investment Management, at Clark.Kevin.G@dol.gov.

Sincerely,

T. Michael Kerr
Assistant Secretary for
Administration and Management

Appendix XIII: Comments from the Department of State

United States Department of State
Comptroller
Washington, DC 20520

August 15, 2016

Dr. Loren Yager
Managing Director
International Affairs and Trade
Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548-0001

Dear Dr. Yager:

We appreciate the opportunity to review your draft report, "INFORMATION TECHNOLOGY: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings." GAO Job Code 100090.

The enclosed Department of State comments are provided for incorporation with this letter as an appendix to the final report.

If you have any questions concerning this response, please contact Colleen Hinton, IT Policy Analyst, Office of Business Management and Planning, Bureau of Information Resource Management at (202) 634-0320.

Sincerely,

Christopher H. Flaggs

Enclosure:
As stated.

cc: GAO – Gregory Wilshusen
IRM – Steven C. Taylor
State/OIG - Norman Brown

Department of State Comments on GAO Draft Report

INFORMATION TECHNOLOGY: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings
(GAO-16-511, GAO Code 100090)

The Department of State (State) appreciates the opportunity to comment on the draft report, "*Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings*."

Recommendation: To improve federal agencies' efforts to rationalize their portfolio of applications, GAO is recommending that the Secretary of State direct the CIO and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met.

Response: State concurs with GAO's recommendations. State continues to mature its processes to establish complete inventories by addressing both of the partially met practices GAO has identified in its report: reporting basic application attributes and regularly updating the application inventory. To support improvements to the application inventory attributes, State has provided training and issued periodic data calls to IT managers and systems owners across State to ensure the inventory is accurate and complete with basic attribute data such as ownership and business function supported. Additionally, to improve quality control processes, State is developing additional guidance on the process to review all IT assets throughout their lifecycle.

State will continue its efforts to improve its application inventory and will take these steps to fully address these practices identified by GAO as being partially met.

Appendix XIV: Comments from the Department of Veterans Affairs

DEPARTMENT OF VETERANS AFFAIRS
WASHINGTON DC 20420

August 9, 2016

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

Dear Mr. Powner:

The Department of Veterans Affairs (VA) has reviewed the Government Accountability Office's (GAO) draft report, **"INFORMATION TECHNOLOGY: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings"** (GAO-16-511). VA agrees with GAO's conclusions and concurs with GAO's recommendation to the Department.

The enclosure sets forth the action to be taken to address the GAO draft report recommendation.

VA appreciates the opportunity to comment on your draft report.

Sincerely,

Gina S. Farrisee
Deputy Chief of Staff

Enclosure

Department of Veterans Affairs (VA) Comments to Government Accountability Office (GAO) Draft Report "INFORMATION TECHNOLOGY: Agencies Need to Improve their Application Inventories to Achieve Additional Savings" (GAO-16-511)

GAO Recommendation: To improve federal agencies' efforts to rationalize their portfolio of applications, GAO is recommending that the Secretary of Veterans Affairs direct the CIO and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met.

VA Comment: Concur. As depicted on Page 40, Appendix II, Table 17 of the draft report, and shown below, VA concurs that its application inventory is fully compliant on the three criteria used by GAO to assess the content, and partially compliant on the one measure related to regularly updating application inventory.

Table 17: Department of Veterans' Affairs (VA)

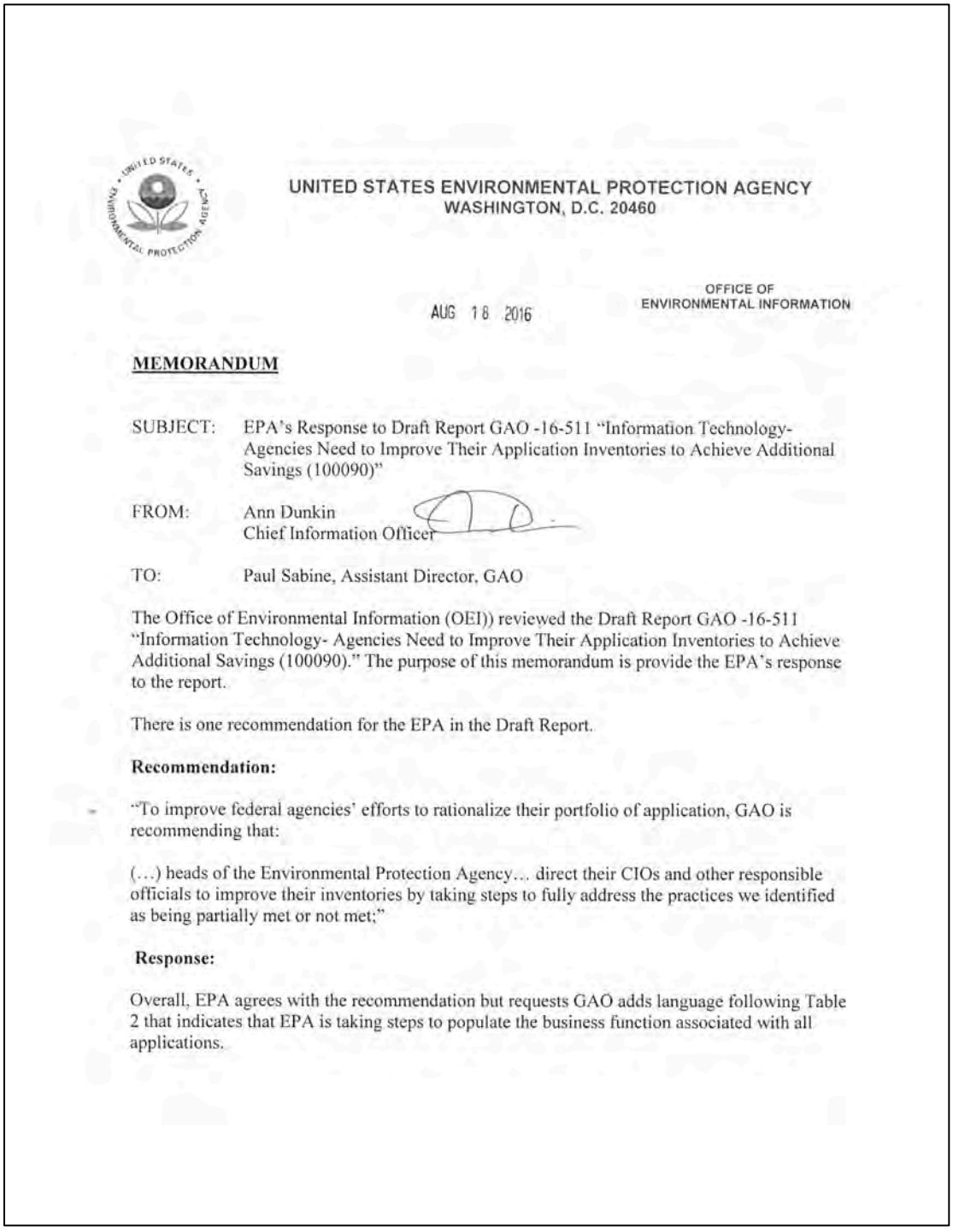
Practice	Rating	Explanation
Includes business and enterprise IT systems	●	VA provided a table of support systems contained in its Systems Inventory, which includes business and enterprise IT systems.
Includes these systems from all organizational components	●	The list provided includes IT support systems used by all VA organizations, with the exception of the Office of Inspector General—due to statutory independence—and the Office of Government Relations, which does not sponsor any IT systems.
Includes basic application attributes	●	The inventory provided includes basic attribute information, to include the system name, the parent organizations, a basic description of the applications, and the business function they support.
Agency regularly updates the application inventory	◐	The department updates the inventory continuously as changes occur. Furthermore, agency policy requires that system inventory information be updated or validated during operational assessments or any IT system reviews. The department also has quality control processes to ensure the reliability of the information collected. For example, VA officials stated that the Enterprise Architecture Management Suite environment enables reporting against information in the enterprise architecture. Also, VA reports on inventory performance metrics, which officials stated are to ensure that leadership has visibility into any dated or missing information. However, while VA officials stated that their repository of systems is viewed as complete, the information within the repository is still maturing and work is being done to automate data capture and integration with other sources.

Page 40, Appendix II, Table 17

The VA Systems Inventory (VASI) is currently maintained through a variety of subject matter expert engagements and governance processes. This will continue to mature as VA begins managing the entire lifecycle of Information Technology (IT) systems through a new set of portfolio management processes overseen by the Enterprise Program Management Office (EPMO). Portfolio management will improve many aspects of IT systems management including ensuring current and accurate data at all time in VASI.

Additionally, VASI is already integrated with the Governance Risk and Compliance RiskVision tool used by VA for tracking and assessing security boundaries. Efforts are now underway to further integrate VASI with the Enterprise Configuration Management Database as well as with the Veteran Focused Integration Process used to develop new IT capabilities. These tool integrations improve system data quality and ensure a common site picture across VA. Target Completion Date: May 2017.

Appendix XV: Comments from the Environmental Protection Agency



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
ENVIRONMENTAL INFORMATION

AUG 18 2016

MEMORANDUM

SUBJECT: EPA's Response to Draft Report GAO -16-511 "Information Technology- Agencies Need to Improve Their Application Inventories to Achieve Additional Savings (100090)"

FROM: Ann Dunkin
Chief Information Officer

TO: Paul Sabine, Assistant Director, GAO

The Office of Environmental Information (OEI)) reviewed the Draft Report GAO -16-511 "Information Technology- Agencies Need to Improve Their Application Inventories to Achieve Additional Savings (100090)." The purpose of this memorandum is provide the EPA's response to the report.

There is one recommendation for the EPA in the Draft Report.

Recommendation:

"To improve federal agencies' efforts to rationalize their portfolio of application, GAO is recommending that:

(…) heads of the Environmental Protection Agency… direct their CIOs and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially met or not met;"

Response:

Overall, EPA agrees with the recommendation but requests GAO adds language following Table 2 that indicates that EPA is taking steps to populate the business function associated with all applications.

GAO acknowledges that EPA is the only agency that "fully met the practice of regularly updating the inventory and implementing quality controls for ensuring the reliability of the inventory data." However, in Table 2, which identifies the four practices identified to determine whether an agency had a complete software application inventory, EPA is determined to have fully met three practices and partially met one. In the explanatory language following the table, GAO states that [EPA] "does not identify the business function for every application." That statement does not provide the full context of EPA's practices.

In Appendix II, GAO provides the detailed evaluation of Agencies' Application Inventories. For EPA practices (Table 18), it is noted that "**although the inventory does not identify the business function associated with all applications, EPA officials stated that they are working to have this information populated for all applications".**

EPA requests that GAO's explanatory language following Table 2 be revised to indicate that EPA is taking steps to populate the business function associated with all applications. That clarifying language would more accurately reflect EPA's current inventory practices.

cc: Bob Trent, OCFO
Mark T. Howard, OCFO
Patricia Randolph Williams, OEI
John Harman, OIM
Elena Larsen

Appendix XVI: Comments from the National Aeronautics and Space Administration

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: Office of the Chief Information Officer

David Powner
Director
Information Technology Management Issues
United States Government Accountability Office
Washington, DC 20548

Dear Mr. Powner:

The National Aeronautics and Space Administration (NASA) appreciates the opportunity to review and comment on the Government Accountability Office (GAO) draft report entitled, "Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings" (GAO-16-511), dated July 28, 2016.

In the draft report, GAO makes one recommendation to the NASA Administrator intended to enhance its portfolio of applications. Specifically, GAO recommends the following:

Recommendation 1: To improve NASA's efforts to rationalize its portfolio of applications, GAO recommends the NASA Administrator direct the Chief Information Officer (CIO) to improve NASA's inventory of applications by taking steps to fully address the practices that GAO identified as being partially met or not met.

Management's Response: Concur. As stated in the draft report, "NASA has developed a plan for a supplemental process (the annual capital investment review process) that is to allow the agency to, among other things, collect detailed data about its applications and perform rationalization." The implementation of this plan has begun as also noted in the report. Utilizing this plan, NASA will continue to evolve the current inventory to include all organizational components and formalize an annual review and update of the application inventory through the Annual Capital Investment Review (ACIR) process. Incremental improvement is planned each year.

Estimated Completion Date: December 31, 2018.

Once again, thank you for the opportunity to comment on the subject draft report. If you have any questions or require additional information, please contact Ruth McWilliams at (202) 358-5125.

Sincerely,

Renee P. Wynn
Chief Information Officer

Appendix XVII: Nuclear Regulatory Commission

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 10, 2016

Mr. Eric Winter
Assistant Director, Information Technology
Acquisition Management Issues
U.S. Government Accountability Office
Washington, DC 20548

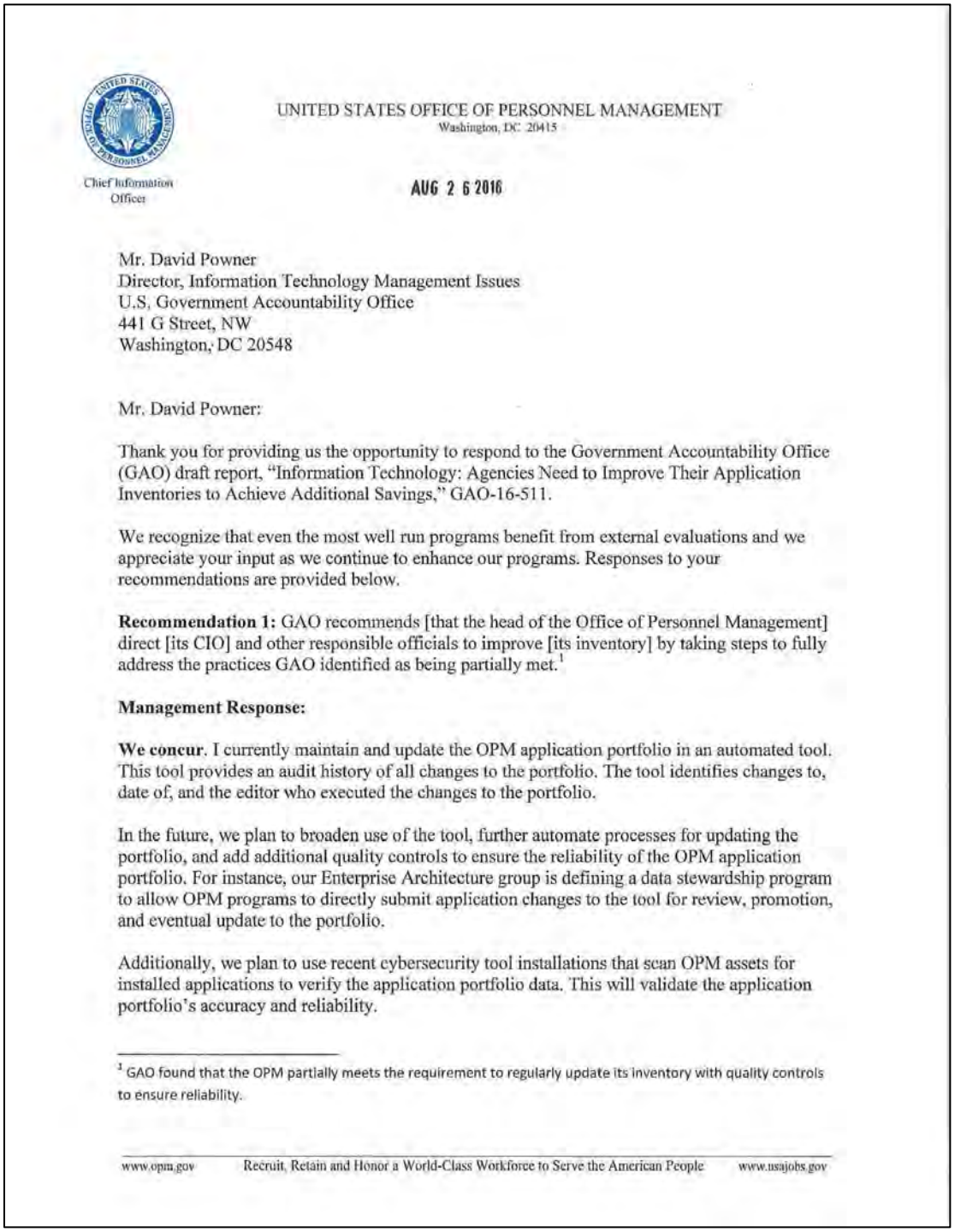
Dear Mr. Winter:

Thank you for giving the U.S. Nuclear Regulatory Commission (NRC) the opportunity to review and comment on the U.S. Government Accountability Office's draft report GAO-16-511, "Agencies Need to Improve Their Application Inventories to Achieve Additional Savings." The NRC has reviewed the draft report, is in general agreement with it, and does not have any comments.

Sincerely,

Victor M. McCree
Executive Director
for Operations

Appendix XVIII: Comments from the Office of Personnel Management



UNITED STATES OFFICE OF PERSONNEL MANAGEMENT
Washington, DC 20415

Chief Information Officer

AUG 2 6 2016

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

Mr. David Powner:

Thank you for providing us the opportunity to respond to the Government Accountability Office (GAO) draft report, "Information Technology: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings," GAO-16-511.

We recognize that even the most well run programs benefit from external evaluations and we appreciate your input as we continue to enhance our programs. Responses to your recommendations are provided below.

Recommendation 1: GAO recommends [that the head of the Office of Personnel Management] direct [its CIO] and other responsible officials to improve [its inventory] by taking steps to fully address the practices GAO identified as being partially met.[1]

Management Response:

We concur. I currently maintain and update the OPM application portfolio in an automated tool. This tool provides an audit history of all changes to the portfolio. The tool identifies changes to, date of, and the editor who executed the changes to the portfolio.

In the future, we plan to broaden use of the tool, further automate processes for updating the portfolio, and add additional quality controls to ensure the reliability of the OPM application portfolio. For instance, our Enterprise Architecture group is defining a data stewardship program to allow OPM programs to directly submit application changes to the tool for review, promotion, and eventual update to the portfolio.

Additionally, we plan to use recent cybersecurity tool installations that scan OPM assets for installed applications to verify the application portfolio data. This will validate the application portfolio's accuracy and reliability.

[1] GAO found that the OPM partially meets the requirement to regularly update its inventory with quality controls to ensure reliability.

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Mr. David Powner

I appreciate the opportunity to respond to this draft report. If you have any questions regarding our response, please contact Jason Kruse, (202) 418-3092, and Jason.Kruse@opm.gov.

Sincerely,

David A. Vargas, MSA, CPA
Associate CIO
IT Strategy & Policy

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Appendix XIX: Comments from the Social Security Administration

SOCIAL SECURITY
Office of the Commissioner

August 11, 2016

Mr. David 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, "INFORMATION TECHNOLOGY: Agencies Need to Improve Their Application Inventories to Achieve Additional Savings" (GAO-16-511).

We appreciate the report's acknowledgement that we completed our Information Technology baseline in response to the November 2013 report, *Information Technology: Additional OMB and Agency Actions Are Needed to Achieve Portfolio Savings*. We are also pleased that GAO determined that we fully met two of the four application inventory practices, "Includes Business and Enterprise IT Systems" and "Includes Basic Application Attributes." We will continue to enhance our inventory efforts by integrating all SSA-developed applications into our Enterprise Application Inventory.

If you have any questions, please contact me at (410) 965-4991. Your staff may contact Gary S. Hatcher, Senior Advisor for Records Management and Audit Liaison Staff, at (410) 965-0680.

Sincerely,

Frank Cristaudo
Executive Counselor to the Commissioner

Enclosure

SOCIAL SECURITY ADMINISTRATION · BALTIMORE, MD 21235-0001

COMMENTS ON THE GOVERNMENT ACCOUNTABILITY OFFICE (GAO) DRAFT REPORT, "INFORMATION TECHNOLOGY: AGENCIES NEED TO IMPROVE THEIR APPLICATION INVENTORIES TO ACHIEVE ADDITIONAL SAVINGS" (GAO-16-511)

Thank you for the opportunity to comment on the draft report. We have been managing an inventory of applications for many years. We started by focusing on applications developed within our systems office. As noted below, our operational components also manage an inventory of applications developed by their components. We maintain both inventories on a continuous basis. We will continue to enhance our inventory efforts by integrating all SSA-developed applications into our Enterprise Application Inventory.

We appreciate the report's acknowledgement that we completed our Information Technology baseline in response to the November 2013 report, *Information Technology: Additional OMB and Agency Actions Are Needed to Achieve Portfolio Savings*. We are also pleased that GAO determined that we fully met two of the four application inventory practices, "Includes Business and Enterprise IT Systems" and "Includes Basic Application Attributes."

We agree with the partially met rating for the "Includes Systems From All Organizational Components" practice. We have addressed inventories for our higher risk systems. We are in the process of cataloging our operational component applications. We note that a good majority of those applications are not business and enterprise IT systems as they provide specialized reporting, analytics, and office management support.

In addition, we now inventory our operational applications on a continuous basis. The regular collection of application inventory data enables us to maintain a complete inventory. We also have a process that requires our operational components to submit project proposals for central evaluation. The proposal review process analyzes the proposal in the context of our existing inventory. This process resulted in the consolidation of existing applications, the retirement of some applications, and enhanced functionality to existing applications as opposed to creating new applications.

We disagree with the partially met rating for "Is Regularly Updated with Quality Controls to ensure Reliability," practice. We do regularly update the application inventory. We believe the evidence we provided, i.e., the Architecture Review Board (ARB) Charter and ARB Process documentation describes our process for maintaining application information. We also provided a data discovery report indicating the type of information collected and used to update our enterprise architecture repository.

In summary, we have pursued a risk-based approach to maintaining our application inventory. We believe it is more effective to analyze and manage applications associated with achieving our strategic business plans. As noted above, we have addressed our higher risk systems, and as time and resources become available, we will work through our lower risk operational systems.

1

Recommendation 1

SSA should direct their CIO and other responsible officials to improve their inventories by taking steps to fully address the practices we identified as being partially or not met.

Response

We agree. As noted above we have been managing an inventory of applications for many years. We will continue to enhance our inventory efforts by integrating all developed applications into our Enterprise Application Inventory.

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Appendix XX: GAO Contact and Staff Acknowledgments

GAO Contact

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

Staff Acknowledgments

In addition to the individual named above, the following staff made key contributions to this report: Sabine Paul (Assistant Director), Chris Businsky, Rebecca Eyler, Dan Gordon, James MacAulay, Lori Martinez, Paul Middleton, and Di'Mond Spencer.