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August 2016

VA IT MANAGEMENT

Organization Is Largely Centralized; Additional Actions Could Improve Human Capital Practices and Systems Development Processes

Accessible Version

GAO-16-403

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GAO Highlights

Highlights of GAO-16-403, a report to congressional requesters

Why GAO Did This Study

VA relies extensively on IT to deliver services to millions of our nation's veterans. VA reported spending approximately $3.9 billion in 2015 and received appropriations of approximately $4.1 billion in 2016 to improve and maintain its IT resources. Even as the department has engaged in various attempts to improve its IT management capabilities, GAO has issued numerous reports that highlighted challenges in its efforts.

This study was to determine (1) how VA is organized to manage and perform key IT-related functions and the extent to which it has centralized the management of IT resources, (2) the extent to which VA has implemented effective IT human capital management, and (3) the extent to which VA has established key processes to effectively manage major system development and acquisition efforts. To conduct its study, GAO reviewed VA policies, procedures, and other documentation and compared the department's processes to best practices for human capital management and IT systems development and acquisition. GAO also interviewed VA officials.

What GAO Recommends

GAO is recommending that VA take two actions to assist the department in sustaining a workforce with the necessary knowledge, skills, and abilities to execute its mission and goals, as well as six actions to assist the department in developing comprehensive processes that reflect systems development best practices. VA generally agreed with GAO's conclusions and concurred with GAO's eight recommendations.

View GAO-16-403. For more information, contact Valerie C. Melvin at (202) 512-6304 or melvinv@gao.gov

What GAO Found

The Department of Veterans Affairs (VA) performs key information technology (IT)-related functions, such as leadership, strategic planning, systems development and acquisition, and systems operations and maintenance, largely through its centralized Office of Information & Technology (OI&T), led by the Chief Information Officer (CIO). VA's two IT governance boards are intended to play a role in other key functions, such as investment management. Nevertheless, the department faced challenges in effectively managing IT, including (1) preventing IT activities from occurring outside the control of OI&T, (2) maintaining collaboration between OI&T and business units, and (3) delivering efficient and cost-effective IT capabilities. In response to these and other challenges, the CIO initiated an effort in January 2016 to transform OI&T into a more veteran-focused organization that emphasized transparency, accountability, innovation, and teamwork. The transformation strategy calls for OI&T to stabilize and streamline core processes and platforms, mitigate weaknesses from information security and GAO assessments, and improve outcomes by institutionalizing a new set of IT management capabilities. The CIO intends to complete the transformation by the first quarter of 2017.

Key to an agency's success in effectively managing its IT systems is sustaining a workforce with the necessary knowledge, skills, and abilities to execute a range of management functions that support its mission and goals. VA took steps to implement effective IT human capital practices by documenting an IT human capital strategic plan and initiating an update based on changed priorities, analyzing workforce data, identifying skill gaps for the current year, and implementing an IT training program. However, OI&T had not consistently implemented all of these practices. Specifically, the office had not (1) tracked and reviewed historical and projected leadership retirements and (2) identified skills and competencies needed beyond the current year. Without annually tracking and reviewing data related to leadership retirements or identifying skills needed in future years, OI&T faces a risk of being unprepared to effectively respond to vacancies in key positions and not having the capabilities to deliver IT support that can contribute to improved services for veterans.

Key to successful development and acquisition of IT services is establishing documented processes that reflect best practices. Although there were gaps in some areas, VA's processes generally included best practices for project validation, project planning, requirements management, risk management, project monitoring and control, and process and product quality assurance. In addition, processes for developing and maintaining a project schedule had not fully addressed the majority of the associated best practices. Ensuring that these processes address all key practices will assist the department in effectively managing its IT system development and acquisitions.

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Abbreviations

CIO	chief information officer
CMMI®	Capability Maturity Model® Integration
DOD	Department of Defense
EPMO	Enterprise Program Management Office
HCAAF	Human Capital Assessment and Accountability Framework
IT	information technology
NCA	National Cemetery Administration
OI&T	Office of Information & Technology
OPM	Office of Personnel Management
PMAS	Project Management Accountability System
SEI	Software Engineering Institute
VA	Department of Veterans Affairs
VBA	Veterans Benefits Administration
VHA	Veterans Health Administration
VistA	Veterans Health Information Systems and Technology Architecture
VIP	Veteran-focused Integration Process

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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August 17, 2016

The Honorable Mike Coffman
Chairman
Subcommittee on Oversight and Investigations
Committee on Veterans Affairs
House of Representatives

The Honorable Doug Lamborn
House of Representatives

The Department of Veterans Affairs (VA) provides services and benefits, such as medical care and compensation, education, and burial benefits, to millions of veterans and their families each year. To accomplish this, the department relies extensively on information technology (IT) systems.

However, we have previously reported on challenges that VA has experienced in managing its IT projects and initiatives, including cost overruns, schedule slippages, and performance problems.[1] To address these challenges, the department has, over many years, engaged in initiatives aimed at realigning its IT program to provide greater authority and accountability for its resources. In doing so, its goals were to, among other things, centralize IT management under a department-level chief information officer (CIO) and standardize budgets, operations, and the development of systems using new management processes based on industry best practices.

Recognizing the important role that IT plays in supporting VA's mission, you asked us to examine the department's current IT organization. Specifically, our objectives were to determine (1) how VA is organized to manage and perform key IT-related functions and the extent to which it has centralized the management of IT resources, (2) the extent to which

[1]For example, GAO, *Electronic Health Records: VA and DOD Need to Support Cost and Schedule Claims, Develop Interoperability Plans, and Improve Collaboration,* GAO-14-302 (Washington, D.C., Feb. 27, 2014); *VA Surgical Implants: Purchase Requirements Were Not Always Followed at Selected Medical Centers and Oversight Needs Improvement*, GAO-14-146 (Washington, D.C., Jan. 13, 2014); and *Information Technology: Management Improvements Are Essential to VA's Second Effort to Replace Its Outpatient Scheduling System*, GAO-10-579 (Washington, D.C., May 27, 2010).

VA has implemented effective IT human capital management, and (3) the extent to which VA has established key processes to effectively manage major system development and acquisition efforts.

To address the first objective, we obtained and reviewed the department's documentation identifying and describing its IT organizational structure and functions. These included the IT strategic plan, governance plan, organization chart, and organizational descriptions. In addition, we reviewed memoranda; testimony from VA officials, such as current and previous secretaries and CIOs; and assessment reports that described the department's efforts to centralize the management of its IT resources. We also interviewed responsible program officials regarding the organizational structure and performance of key functions.

To address the second objective, we reviewed information describing the department's management of its IT human capital, such as human capital strategic planning documentation, skills gap analyses, and human capital performance measures. We assessed the department's actions against selected best practices that we and the Office of Personnel Management (OPM) have identified, and against practices required by VA's Office of Human Resources and Administration. These included selected practices for effective strategic human capital planning, workforce planning, and strategic training. The practices are identified in our *Key Principles for Effective Strategic Workforce Planning*;[2] OPM's final regulations to implement certain provisions of the Chief Human Capital Officers Act of 2002;[3] and VA's workforce and succession planning directive.[4] We also interviewed officials responsible for the department's IT human capital management.

For the third objective, we reviewed policies, procedures, and supporting documentation describing the department's key processes for managing major system development and acquisition efforts. We assessed the processes against selected best practices that the Software Engineering

[2]GAO, *Human Capital: Key Principles for Effective Strategic Workforce Planning*, GAO-04-39 (Washington, D.C., Dec. 11, 2003).

[3]73 Fed. Reg. 23012 (Apr. 28, 2008).

[4]VA, *VA Directive 5002: Department of Veterans Affairs Workforce and Succession Planning* (Washington, D.C., Jan. 15, 2003).

Institute (SEI) and we have identified. These included recognized practices for project planning, requirements management, risk management, project monitoring and control, project validation, quality assurance, and project schedules. These practices are identified in SEI's *Capability Maturity Model® Integration (CMMI®) for Development, Version 1.3*; SEI's *CMMI® for Acquisition, Version 1.3*;[5] and our *Schedule Assessment Guide*.[6] Further, we reviewed system development lifecycle policies, procedures, and other supporting documentation, such as templates for required project artifacts within the department's ProPath system[7] and Project Management Accountability System (PMAS).[8] A full description of our objectives, scope, and methodology can be found in appendix I.

We conducted this performance audit from February 2015 to August 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.

Background

VA's mission is to promote the health, welfare, and dignity of all veterans in recognition of their service to the nation by ensuring they receive

[5]SEI, *CMMI® for Development, Version 1.3,* CMU/SEI-2010-TR-033 (November 2010, Hanscom AFB, Mass.) and *CMMI® for Acquisition, Version 1.3*, CMU/SEI-2010-TR-032 (November 2010, Hanscom AFB, Mass.). The SEI is a federally funded research and development center operated by Carnegie Mellon University.

[6]GAO, *Schedule Assessment Guide: Best Practices for Project Schedules*, GAO-16-89G (Washington, D.C.: December 2015).

[7]ProPath is a repository for systems development artifacts, procedures, and processes.

[8]PMAS is VA's approach to IT project development and delivery and the means of holding IT project managers accountable for meeting cost, schedule, and scope. PMAS was designed to reduce project implementation risks, institute monitoring and controls, establish accountability, and create a reporting discipline. In January 2016, VA began transitioning from PMAS to the Veteran-focused Integration Process (VIP). VA plans to modify the Department's current methodology into a single, unified, and streamlined release process that will focuses on delivering high-quality and secure IT capabilities to the veteran. VA plans to complete the transition to VIP by the end of fiscal year 2016. More information about VIP can be found later in this report.

medical care, benefits, social support, and lasting memorials. It is the second largest federal department and, in addition to its central office located in Washington, D.C., has field offices throughout the United States, as well as the U.S. territories and the Philippines.

The department's three major components—the Veterans Benefits Administration (VBA), the Veterans Health Administration (VHA), and the National Cemetery Administration (NCA)—are primarily responsible for carrying out its mission. More specifically, VBA provides a variety of benefits to veterans and their families, including disability compensation, educational opportunities, assistance with home ownership, and life insurance. VHA provides health care services, including primary care and specialized care, and it performs research and development to improve veterans' needs. Lastly, NCA provides burial and memorial benefits to veterans and their families.

Collectively, the three components rely on approximately 340,000 employees to provide services and benefits. These employees work in 167 VA medical centers, approximately 1,200 community-based outpatient clinics, 300 veterans centers, 56 regional offices, and 131 national and 90 state or tribal cemeteries situated throughout the nation.

VA Relies Extensively on Information Technology

VA operates and maintains an IT infrastructure that is intended to provide the backbone necessary to meet the day-to-day operational needs of its medical centers, veteran-facing systems, benefits delivery systems, memorial services, and all other IT systems supporting the department's mission. The infrastructure is to provide for data storage, transmission, and communications requirements necessary to ensure delivery of reliable, available, and responsive support to all VA staff offices and administration customers, as well as veterans.

In this regard, the department operates approximately 240 information systems, manages 314,000 desktop computers and 30,000 laptops, and administers nearly 460,000 network user accounts for employees and contractors to facilitate providing benefits and health care to veterans. These systems are used for the determination of benefits, benefits claims

processing, patient admission to hospitals and clinics, patient care through telehealth,[9] and access to health records, among other services.

For example, VBA relies on its disability benefits claims processing system—the Veterans Benefits Management System—to collect and store information such as military service records, medical examinations, and treatment records from VA, the Department of Defense, and private medical service providers. Information technology is widely used and critically important to supporting the department in delivering health care to veterans. VHA's systems provide capabilities to establish and maintain electronic health records that health care providers and other clinical staff use to view patient information in inpatient, outpatient, and long-term care settings. Specifically, the Veterans Health Information Systems and Technology Architecture, known as VistA, consists of many computer applications and modules that collect, among other things, information about a veteran's demographics, allergies, procedures, immunizations, and medical diagnoses.

In 2014, VA issued its 6-year strategic plan, which emphasizes the agency's goal of increasing veterans' access to benefits and services, eliminating the disability claims backlog, and ending veteran homelessness. According to the plan, the department intends to improve access to benefits and services through the use of improved technology to provide veterans with access to more effective care management. The plan also calls for VA to eliminate the disability claims backlog by fully implementing an electronic claims process that is intended to reduce processing time and increase accuracy. Further, the department has an initiative under way that provides services, such as health care, housing assistance, and job training, to end veteran homelessness. To this end, VA is working with other agencies, such as the Department of Health and Human Services, to implement more coordinated data entry systems to streamline and facilitate access to appropriate housing and services.

[9]Telehealth includes telemedicine, which is the use of medical information exchanged from one site to another via electronic communications (such as video or e-mail) to improve a patient's clinical health status through, for example, provision of health care services or clinical monitoring. Telehealth can include telemental health—the provision of mental health services to patients living in remote locations or otherwise underserved areas.

VA reported spending approximately $3.9 billion to improve and maintain its IT resources in fiscal year 2015. Specifically, the department reported spending approximately $548 million on new systems development efforts, approximately $2.3 billion on maintaining existing systems, and approximately $1 billion on payroll and administration.

For fiscal year 2016, the department received appropriations of approximately $4.1 billion for IT. The department had requested approximately $505 million for new systems development efforts, approximately $2.5 billion for maintaining existing systems, and approximately $1.1 billion for payroll and administration. In addition, in its 2016 budget submission the department requested appropriations for the following purposes, among others:

- improving veteran access to benefits and services ($378.1 million);
- reducing the time it takes to process disability claims and increase accuracy ($295.1 million);
- expanding information security ($180.3 million);
- implementing the Veterans Access, Choice, and Accountability Act of 2014 (the Veterans Choice Act) ($440.6 million);
- maintaining the IT infrastructure ($1.828 billion); and
- improving VistA ($182.6 million).

Further, for fiscal year 2017, the department's budget request included nearly $4.3 billion for IT. The department requested approximately $471 million for new systems development efforts, approximately $2.5 billion for maintaining existing systems, and approximately $1.3 billion for payroll and administration. In addition, in its 2017 budget submission, the department requested appropriations to make improvements in a number of areas, including the following:

- veterans' access to health care, to include enhancing health care-related systems, standardizing immunization data, and expanding telehealth services ($186.7 million);

- veterans' access to benefits by modernizing systems supporting benefits delivery, such as the Veterans Benefits Management System and the Veterans Services Network[10] ($236.3 million);
- veterans' experiences with VA by focusing on integrated service delivery and streamlined identification processes ($171.3 million);
- VA employees' experiences by enhancing internal IT systems ($13 million); and
- information security, including implementing strong authentication, ensuring repeatable processes and procedures, adopting modern technology, and enhancing the detection of cyber vulnerabilities and protection from cyber threats ($370.1 million).

VA Has Faced Long-Standing Challenges in IT Management

Even as the department has engaged in various attempts to improve its IT management capabilities, we have issued numerous reports that highlighted challenges facing its efforts. In February 2014, we reported that about 2 years after taking actions toward developing a single interoperable electronic health record system with the Department of Defense (DOD), VA and DOD announced that they would instead work toward modernizing their separate existing health information systems and work to ensure those systems could share information.[11] However, VA proceeded with this plan without developing a cost and schedule analysis to support the assertion that pursuing a separate modernized system while enabling interoperability with DOD's system would be less expensive and could be achieved faster than developing a single system, which is contrary to best practice. We recommended that VA work with DOD to develop a cost and schedule estimate for their modernization approach, as well as their joint effort, and compare the estimates to determine which approach would cost less and take less time. VA concurred with our recommendation, but had not completed actions to address it.

In addition, we reported in May 2010 that after spending an estimated $127 million over 9 years on its outpatient scheduling system project, VA had not implemented any of the planned system's capabilities and was

[10]The Veterans Services Network is VA's processing and benefits payment system.

[11]GAO-14-302.

essentially starting over by beginning a new initiative to build or purchase another scheduling system.[12] We also noted that VA had not developed a project plan or schedule for the new initiative, stating that it intended to do so after determining whether to build or purchase the new application. We recommended that the department take six actions to improve key systems development and acquisition processes essential to the second outpatient scheduling system effort. The department generally concurred with our recommendations, but as of May 2016, had not completed actions to implement four of the six recommendations.

Key IT-Related Functions Provide a Foundation for IT Management

Effectively managing IT needs depends on federal departments and agencies, including VA, having key functions in place. Toward this end, we have identified and reported on a set of essential and complementary functions that serve as a sound foundation for IT management. These include the following:

- **Leadership:** Effective leadership, such as that of a CIO, can drive change, provide oversight, and ensure accountability for results. Congress has also recognized the importance of having a strong agency CIO. For example, as part of the Clinger-Cohen Act, Congress required executive branch agencies to establish the position of agency CIO.[13] The act also gave these officials responsibility and accountability for IT investments, including IT acquisitions, monitoring the performance of IT programs, and advising the agency head on whether to continue, modify, or terminate such programs. More recently, in December 2014, Congress passed federal information technology acquisition reform legislation (commonly referred to as FITARA), which strengthened the role that agency CIOs are to play in managing IT.[14] For instance, the law requires the head of covered

[12]GAO-10-579.

[13]Pub. L. No. 104-106, § 5125, 110 Stat. 186, 684 (Feb. 10, 1996); 40 U.S.C. § 11315 and 44 U.S.C. § 3506(a).

[14]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, § 831, 128 Stat. 3292, 3438 (Dec. 19, 2014); 40 U.S.C. § 11319. Additionally, a 2006 law enhanced the VA CIO’s responsibilities with regard to information security requirements. Department of Veterans Affairs Information Security Enhancement Act of 2006, Pub. L. No. 109-461, Title IX, 120 Stat. 3403, 3450 (2006).

agencies to ensure that the CIO has a significant role in the decision process for IT budgeting, as well as the management, governance, and oversight processes related to IT.

- **Strategic planning:** Strategic planning defines what an organization seeks to accomplish and identifies the strategies it will use to achieve desired results. A defined strategic planning process allows an agency to clearly articulate its strategic direction and to establish linkages among planning elements such as goals, objectives, and strategies. A well-defined IT strategic planning process helps ensure that an agency's IT goals are aligned with its strategic goals.[15] Also, as part of its strategic planning efforts, an organization should develop an enterprise architecture, which is an important tool to help guide the organization toward achieving the goals and objectives in its IT strategic plan.[16] In addition, the organization should implement human capital management practices to sustain a workforce with the skills necessary to execute its strategic plan.[17]
- **Systems development and acquisition:** Agencies should follow disciplined processes for developing or acquiring IT systems. These include defining the requirements that address the needs of the system users, managing project risk to identify potential problems before they occur, reliably estimating cost to help managers evaluate affordability and performance against a project's plans, and developing an integrated and reliable master schedule that defines when and how long work will occur and how each activity is related to the others, among others. Best practices in these areas have been identified by organizations such as SEI and GAO.[18]

[15]GAO, *Social Security Administration: Improved Planning and Performance Measures Are Needed to Help Ensure Successful Technology Modernization*, GAO-12-495 (Washington, D.C.: Apr. 26, 2012).

[16]GAO, *Organizational Transformation: A Framework for Assessing and Improving Enterprise Architecture Management (Version 2.0) (Supersedes* GAO-03-584G*)*, GAO-10-846G (Washington, D.C.: August 2010).

[17]Such practices have been identified by both the Office of Personnel Management and GAO. See Office of Personnel Management, *The Human Capital Assessment and Accountability Framework—Systems, Standards, and Metrics* (http://www.opm.gov/hcaaf_resource_center/) and GAO-04-39.

[18]SEI, *CMMI® for Development and Acquisition, Versions 1.3*; GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs,* GAO-09-3SP (Washington, D.C., March 2009); and GAO-16-89G.

- **Quality assurance:** Effective quality assurance supports the delivery of high-quality products by providing staff and management with appropriate visibility into, and feedback on, processes and associated work products throughout the life of a systems development or acquisition project. Quality assurance can also help ensure that planned processes are implemented as intended.[19]
- **Systems operations and maintenance:** Given the size and magnitude of the investments that executive branch agencies make in this area (nearly 60 percent of VA's reported IT spending in 2015), it is important that operations and maintenance be managed effectively to ensure that existing investments (1) continue to meet agency needs, (2) deliver value, and (3) do not duplicate or overlap with other investments.[20] To accomplish this, agencies are required by the Office of Management and Budget to perform annual operational analyses of these investments, which are intended to serve as periodic examinations of the investments' performance against, among other things, established costs, schedules, and performance goals.[21]
- **Service management:** Agencies should develop and implement a process for ensuring that IT services, such as server management and desktop support, are aligned with and actively support the business needs of the organization.[22] The Information Technology Infrastructure Library[23] identifies key practices for successful service management. These include developing a service catalog that identifies all IT services delivered by the service provider, as well as

[19]SEI, *CMMI® for Development and Acquisition, Versions 1.3*.

[20]GAO, *High-Risk Series: An Update*, GAO-15-290 (Washington, D.C., Feb. 11, 2015).

[21]Office of Management and Budget Memorandum M-10-27 (June 2010), requires agencies to establish a policy for performing operational analysis on steady state investments as a part of managing and monitoring investment baselines.

[22]Lou Hunnebeck and Colin Rudd, *ITIL: Service Design* © (London: The Stationary Office, 2011). The guide is available at: http://www.axelos.com/Publications-Library/IT-Service-Management-ITIL/.

[23]Lou Hunnebeck and Colin Rudd, *ITIL: Service Design* © (London: The Stationary Office, 2011).

establishing service-level agreements between the IT service provider and its customer on the expected service-level targets.[24]

- **IT investment management:** IT projects can significantly improve an organization's performance, but they can also become costly, risky, and unproductive. Agencies can maximize the value of these investments and minimize the risks of acquisitions by having an effective and efficient IT investment management and governance process, as described in GAO's guide to effective IT investment management.[25] Emphasizing the importance of investment management, the Clinger-Cohen Act requires executive branch agencies to establish a process for selecting, managing, and evaluating IT investments in order to maximize the value and assess and manage the risks of the acquisitions.[26]
- **Information security and privacy:** Effective security for federal IT systems and data is essential to prevent data tampering, disruptions in critical operations, fraud, and inappropriate disclosure of sensitive information, including personal information entrusted to the government by members of the American public. Recognizing the importance of information security and privacy, Congress enacted the Federal Information Security Modernization Act of 2014 (FISMA 2014),[27] which requires executive branch agencies to develop, document, and implement an agency-wide information security

[24]Examples of service-level targets include the hours that customers can expect the service to be available (e.g., 8:00 a.m. to 6:00 p.m., Monday through Friday), availability of a service during the agreed service hours (e.g., 99.5 percent), and maximum number of failures or incidents that can be tolerated within an agreed time period.

[25]GAO, *Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity (Supersedes AIMD-10.1.23)*, GAO-04-394G (Washington, D.C.: March 2004).

[26]40 U.S.C. § 11312.

[27]Pub. L. No. 113-283, 128 Stat. 3073 (Dec. 18, 2014).

program. [28] Additionally, in order to help agencies develop such a program, the National Institute of Standards and Technology has developed guidance for information security and privacy.

VA Manages and Performs Key IT-Related Functions through a Largely Centralized Organization, Which Is Taking Steps to Address Challenges

Since 2007, VA has been operating a centralized IT organization in which most key functions intended for effective management of IT are performed by the department's Office of Information & Technology (OI&T) and led by the department-level CIO. Two department-level IT governance boards also have responsibility to assist in performing certain functions. However, the department has faced challenges to effectively managing IT using a centralized approach. These include ensuring that (1) all projects are managed and controlled by OI&T, (2) effective communication occurs between OI&T and the VA business units, and (3) new IT capabilities are delivered efficiently and cost-effectively. To address these and other challenges, the CIO recently announced a transformation initiative aimed at improving OI&T's accountability for, and focus on, achieving a more transparent and veteran-centric organization.

VA Has Largely Centralized Its Management of IT-Related Functions within OI&T

OI&T has responsibility for managing the majority of VA's IT-related functions, under a largely centralized structure that the department attempted for nearly two decades to establish. The department's efforts toward achieving a centralized management structure were strengthened when the Military Quality of Life and Veterans Affairs Appropriations Act, 2006[29] established a new appropriation account for the department's IT systems. In addition, in order to obligate or expend amounts for IT systems development, modernization, and enhancement, the Consolidated Appropriations Act of 2016[30] required that the Secretary or

[28]The Federal Information Security Modernization Act of 2014 (FISMA 2014), Pub. L. No. 113-283, 128 Stat. 3073 (Dec. 18, 2014) partially 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). As used in this report, FISMA refers to the new requirements in FISMA 2014, FISMA 2002 requirements relevant here that were incorporated and continued in FISMA 2014 and to other relevant FISMA 2002 requirements that were unchanged by FISMA 2014 and continue in full force and effect.

[29]Pub. L. No. 109-114, 119 Stat. 2372, 2392 (2005).

[30]Consolidated Appropriations Act, 2016, Pub. L. No. 114-113, Div. J, Title II, 129 Stat. 2242, 2689-2690 (Dec. 18, 2015).

CIO submit to the Committees on Appropriations of both Houses of Congress a certification of the amounts to be obligated and expended for each development project.

Subsequent to the 2006 appropriations act, the Secretary of Veterans Affairs assigned control over the IT appropriation to a department-level CIO.[31] In addition, the Secretary approved a centralized organization structure for IT-related functions in February 2007. By April 2007, all of the department's personnel that had been involved in IT operations, maintenance, and development, with the exception of those in the Office of Inspector General, were permanently assigned to OI&T. (See appendix II for a summary of key events in the history of VA's IT centralization efforts.)

The CIO serves as the head of OI&T and, accordingly, is responsible for providing effective leadership over the department's IT activities. The CIO reports directly to the Office of the Secretary of Veterans Affairs through the Deputy Secretary and advises the Secretary regarding the execution of the IT appropriation. In addition, the CIO is expected to serve as the principle advisor to top management officials, such as the Under Secretaries of each of the three administrations, on matters relating to information and technology management in the department. This official also is tasked with reviewing and approving IT investments, as well as overseeing the performance of IT programs and evaluating them to determine whether to continue, modify, or terminate a program or project.

[31]According to VA's FITARA implementation plan, not all IT-related activities are included in the IT appropriation. For example, although medical devices connect to VA's networks, they are not considered IT devices and are therefore not included in the IT appropriation. The plan also states that devices and their related services, rather than solution development, typically fall outside the scope of the IT appropriation. To mitigate this risk, the CIO is in the process of developing a policy that would require that all IT-related activities, including the purchase of medical and other devices that need to be connected to VA's networks, be approved by the CIO regardless of funding source. As of May 2016, the policy and supporting processes were undergoing review and VA did not have an estimated date for completing them.

Under the CIO's leadership, seven organizational units within OI&T had responsibility for performing and managing the other specific IT-related functions through March 2016.[32]

- **Architecture, Strategy, and Design:** This office was responsible for the department's *IT strategic planning*. Specifically, it was tasked with providing a framework of strategies and processes to ensure IT programs and projects are designed and executed to satisfy current and future department needs.

  Further, the office was tasked with performing other functions, such as the development and maintenance of an integrated technical, business, systems, and data architecture; development of systems design, engineering, and integration standards; and the examination of existing IT requirements and solutions for efficiency and potential redundancy.

- **Product Development:** *Systems development* was managed by this office. Among other things, the office was responsible for developing and testing software products, including new products and upgrades to existing legacy systems, based on defined requirements from its customers (which are the three administrations and other staff offices).

  In addition to systems development, the office had responsibility for monitoring the progress of all IT projects and reporting that progress to the department's CIO and other senior leadership. This office was also tasked with developing and maintaining policies and guidance for implementing, and ensuring that responsible staff are trained in using, the department's project management and accountability system, referred to as PMAS. (This management tool is discussed in greater detail later in the report.)

- **IT Resource Management:** *Acquisition* processes and strategies were facilitated by the IT Resource Management office. Toward this end, the office was tasked with providing acquisition program management oversight and disseminating acquisition policy and procedures, among other things.

[32]In addition to these seven offices, the Department of Defense/VA Interagency Program Office also resides in OI&T. This office is supposed to function as the single point of accountability for ensuring that electronic health records systems or capabilities allow for full interoperability of health care-related information between DOD and VA.

In addition, the IT Budget and Finance office within IT Resource Management was tasked with planning, executing, and overseeing the department's technology budget, as well as ensuring that the appropriation funds are used appropriately. According to a director within the IT Budget and Finance office, this office was responsible for performing these functions for the fiscal year 2015 and 2016 IT budgets. The director also stated that the CIO, through this office, oversaw 100 percent of the IT appropriation. Further, in fiscal year 2016 the IT Budget and Finance office was charged with creating certification letters signed by the CIO and submitted to the Committees on Appropriations detailing the systems development, modernization, and enhancement projects VA had planned for the IT appropriation. To date, the CIO has certified projects for fiscal year 2016 in October 2015, February 2016, and April 2016.

- **Office of Quality, Performance, and Oversight:** This office was tasked with managing *quality assurance* activities. It was intended to act as an independent party to determine if OI&T's governance processes are adequate and functioning as anticipated. The office was also responsible for facilitating the reporting and understanding of performance measures and metrics related to IT program activities and strategic objectives. Further, it was charged with providing independent systems integration testing and other services to help ensure the integrity of the department's systems and compliance with applicable guidance, such that provided through PMAS.

  In addition, the office was responsible for providing organizational development and training for IT, to include coverage of information security, privacy, and rules of behavior. It also was responsible for establishing IT human capital policies and conducting workforce planning.

- **Office of Service Delivery and Engineering:** All *operations and maintenance* activities associated with the department's IT environment, including those in medical centers and regional offices, were directed by the Office of Service Delivery and Engineering. This office also was tasked with overseeing and managing VA's data centers, network, and telecommunications; monitoring production for all information systems; delivering operations services (including deployment, maintenance, monitoring, and support) to all of the department's geographic locations; and engineering and designing all of the IT system platforms and infrastructure.

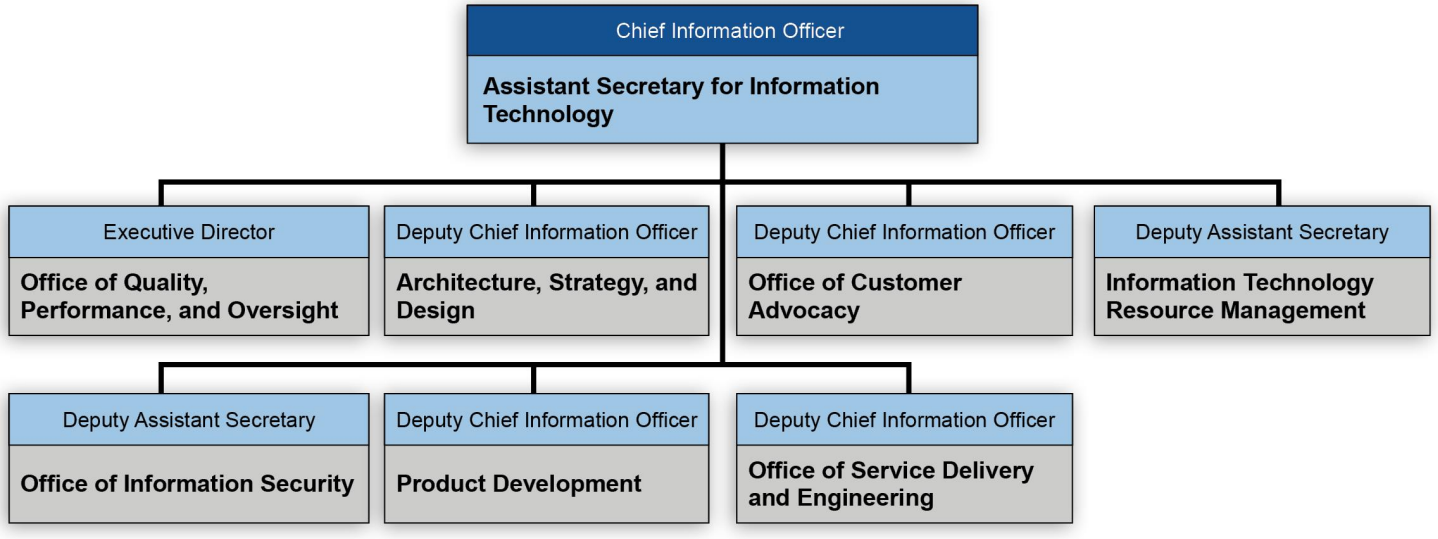
- **Office of Information Security:** The department's *information security and privacy* infrastructure was managed within this office. In this regard, the office was responsible for, among other things,

ensuring the confidentiality, integrity, and availability of the department's information and information systems, as well as cybersecurity, risk management, records management, incident response, critical infrastructure protection, and business continuity. The office also was charged with developing, implementing, and overseeing the policies, procedures, training, communication, and operations related to improving how the department and its partners safeguard the personally identifiable information of veterans and VA employees.

- **Office of Customer Advocacy:** This office was in charge of *service management*. In this regard, it was responsible for working with VHA, VBA, NCA, and the department's staff offices to ensure that OI&T provides the services they need. The office also had responsibility for collecting and analyzing customer satisfaction metrics, and for responding to IT support requests at the department, business office, and employee levels.

Figure 1 depicts the seven organizational units within OI&T that had responsibility for performing and managing IT-related functions through March 2016.

Figure 1: Department of Veterans Affairs (VA) Office of Information & Technology Organization through March 2016



Source: GAO analysis of VA data. | GAO-16-403

OI&T reported that its organizational units performed key IT-related functions with the support of nearly 7,300 federal employees and approximately 7,800 contractor staff. Nearly 600 of the federal employees were located in Washington, D.C., at the VA Headquarters, while the vast majority of the employees were assigned to other facilities, such as medical centers and regional offices.

Table 1 identifies each OI&T organizational unit and the number of employees and approximate number of contractors[33] that supported VA's IT program.

Table 1: Department of Veterans Affairs Office of Information & Technology (OI&T) Organizational Units and Number of Supporting Employees and Contractor Staff

OI&T organizational unit[a]	Number of employees	Number of contractor staff
Assistant Secretary (Chief Information Officer)/Principal Deputy Assistant Secretary	4	0
Architecture, Strategy & Design	102	236
Product Development	989	4014
IT Resource Management	76	31
Office of Quality Performance & Oversight	203	131
Service Delivery & Engineering	5377	3310
Information Security	521	110
Office of Customer Advocacy	21	19
Totals	**7293**	**7851**

Source: GAO analysis of Department of Veterans Affairs Data. | GAO-16-403

Note: The data for employees are as of January 2016 and the data for contractors are as of February 2016.

[a]The number of employees and contractors for the Interagency Program Office was not included because it does not perform the key functions described in this report.

In addition to these organizational resources, OI&T developed PMAS to serve as a mechanism for overseeing the performance of IT programs and ensuring accountability for results. PMAS was intended to provide information to facilitate oversight through a dashboard that captures

[33]Contractor support services for OI&T vary widely and include project management, systems development, remediation of security vulnerabilities, maintenance of infrastructure, desktop support, and inventory control, among many others.

project data, such as descriptions of the projects, baseline milestone dates, actual milestone dates, contract information, and project status information. The CIO's responsibilities with regard to PMAS include authorizing new projects and project increments in the system; approving the funding needed for the projects; monitoring a project's status via reporting, review, and assessment; and addressing any significant issues with the projects.

Further, according to the CIO and OI&T documented procedures, TechStat reviews[34] are required for every project that fails to deliver on its committed delivery date. TechStat reviews are the mechanism that the CIO, along with other senior leaders, used to determine whether a project should continue, be modified, or be terminated.

Governance Boards Are to Assist the CIO with IT-Related Functions

In VA's organization structure, the IT investment governance boards are intended to play a role in *strategic planning* and *IT investment management*, as they are responsible for providing the CIO with recommendations on the IT investments they feel would best meet the strategic and business objectives of the department. These two boards are intended to provide executive oversight for IT initiative planning and management.

- **IT Planning, Programming, Budgeting, and Execution Board:** The board is tasked with recommending (1) the prioritization of all IT funding requests, including what should and should not be funded during the year; (2) execution of the IT appropriation; and (3) decisions as to whether to fund IT-related projects outside of the IT appropriation. The IT Chief Financial Officer, who also serves as the Deputy Assistant Secretary for the IT Resource Management office within OI&T, serves as the board's chairperson. The board includes voting members from VA's three administrations, as well as non-voting members from the OI&T organizational units, among others. In March 2016, the CIO stated in congressional testimony that the roles of this board will be assumed by a newly established Enterprise Program Management Office (EPMO).

[34]A TechStat review is a forum at which senior leaders are presented the root cause for a project's missed committed increment deliverable date. TechStat reviews also include a discussion of risks, mitigation strategies, and impact on other dependent projects.

- **IT Leadership Board:** This board is tasked with reviewing and validating portfolio recommendations from the Planning, Programming, Budgeting, and Execution Board, as well as making decisions on any issues that cannot be resolved by that board. According to the department's FITARA implementation plan, the IT Leadership Board has been tasked with approving the IT budget and then submitting it to the VA Executive Board—the department's highest-level decision-making board chaired by the Secretary—for approval. The CIO serves as the IT Leadership Board's chairperson and its members include the Under Secretaries for VA's three administrations and all VA staff offices.

VA Is Taking Action to Address Challenges to Effectively Managing IT

Although VA centralized its key functions in order to maintain better control over resources, OI&T has faced challenges to fully implementing and managing IT under a centralized organizational structure. In particular, independent assessments of the department's efforts in 2013 and 2015 showed that the office has had difficulty in preventing IT activities from occurring outside the control of OI&T. It has also been challenged in effectively collaborating with the department's various business units and in efficiently and cost-effectively delivering new IT capabilities.

- **IT activities have occurred outside the control of OI&T.** In September 2013, the VA Inspector General reported that the department's Office of Acquisition, Logistics, and Construction had used $13 million in supply funds, rather than approved IT funds, to develop a suite of electronic contracting applications to support the office's procurement process.[35] Further, the report noted that the Office of Acquisition, Logistics, and Construction had not used the department's IT project management system, PMAS, to develop the contracting system, although doing so was mandated by the Secretary in June 2009 for all IT development projects department-wide.

  According to the report, the office followed its own project management process that was similar to PMAS. However, in doing

[35]OIG, *Department of Veterans Affairs: Review of Alleged System Duplication in the Virtual Office of Acquisition Software Development Project*, 12-02708-301 (Washington, D.C.: Sept. 18, 2013).

so, the system development effort was not subjected to OI&T's risk management, monitoring, oversight and control, and reporting processes within PMAS. According to the report, officials in the Office of Acquisition, Logistics, and Construction incorrectly believed that VA allowed for a PMAS exception because they had used supply funds, and not IT funds, for the development. The Inspector General recommended that the Office of Acquisition, Logistics, and Construction implement controls to ensure the systems development project and all future IT development efforts fall within the control and oversight of the PMAS process. The office concurred with the recommendation.

More recently, in March 2015, the Inspector General reported that VHA had improperly obligated $92.5 million and spent $73.8 million in medical support and compliance funds, rather than IT funds, to develop its health care claims processing system through the VHA Financial Services Center.[36] According to the report, the former VHA Deputy Chief Business Officer stated that funds and development services provided through the Financial Services Center were used in hopes of achieving a faster delivery of the claims processing system. The Inspector General reported that, by doing so, VHA had avoided competing with other VA projects for IT systems appropriations. Thus, the Inspector General recommended that the Under Secretary for Health obtain the appropriate funding to support the development of the claims processing system. The interim Under Secretary for Health concurred with the recommendation and agreed to establish oversight mechanisms and issue guidance to ensure that VHA uses the appropriate funds.

- **Collaboration between OI&T and business units was not always effective.** In September 2015, challenges with collaboration between OI&T and VA business units were highlighted by an independent assessment of VA's health care delivery systems and management

[36]OIG, *Department of Veterans Affairs: Review of Alleged Misuse of VA Funds To Develop the Health Care Claims Processing System*, 14-00730-126 (Washington, D.C.: Mar. 2, 2015).

processes, including health IT processes.[37] Several clinicians interviewed for that assessment stated that collaboration between systems developers and clinicians seemed to have disappeared after the centralization, resulting in uncoordinated execution of health IT strategies and limited development of new and improved capabilities for existing IT systems. The assessment noted that although the goals of OI&T and VHA did not conflict at the strategic level, the organizations often did not agree on priorities for executing the strategic plans. The assessment team recommended that VA and VHA transform IT strategy, planning, and execution by, among other things, establishing service-level agreements and refining the planning and budgeting process to ensure that business needs are effectively identified, prioritized, funded, and used to drive health IT investments. The team recommended that VA also develop a governance policy to ensure the strategic plans are executed well and in a timely manner.

Similarly, staff within the Office of Finance informed us of their dissatisfaction because OI&T controls the budget and the priorities for systems development efforts and IT change management. These staff stated that OI&T's priorities do not always align with the needs of the administrations or other staff offices, thus potentially delaying the delivery of needed services.

- **PMAS limited VA's efforts to efficiently and cost-effectively deliver new IT capabilities.** The September 2015 independent assessment also stated that overly demanding processes for system development, as defined by OI&T's PMAS, impeded cost-effective delivery of new health IT capabilities and limited VA's ability to measure the value of its investments. The assessment report further stated that the PMAS process was schedule driven and risk averse, leading many project managers to limit the amount of functionality in each release, thereby increasing the total time for any useful capability to be released. In addition, assessment interviewees

[37]The MITRE Corporation, *Independent Assessment of the Health Care Delivery Systems and Management Processes of the Department of Veterans Affairs, Volume 1: Integrated Report* (Washington, D.C.: Sept. 1, 2015). This assessment was conducted in response to a requirement in the Veterans Access, Choice, and Accountability Act of 2014, Pub. L. No. 113-146, § 201, 128 Stat. 1754, 1769 (Aug. 7, 2014). For this assessment, MITRE interviewed 185 individuals that represented "planners" of IT visions and strategies; "builders" of information systems, technology, and architecture; and "users" of health IT systems.

indicated that documentation required by PMAS consumed a significant percentage of development time. Accordingly, the assessment team recommended that VA establish product-focused teams to ensure delivery of needed capabilities to users and that the department's system development process be modified from focusing on documentation and schedule to focusing more on functionality delivered.

CIO Transformation Strategy Aims to Address Challenges

Recognizing challenges in IT management, the CIO initiated an effort in January 2016 to transform the focus and functions of OI&T. In doing so, the CIO stressed the Secretary's goal of achieving a more veteran-focused organization that places greater emphasis on transparency, accountability, innovation, and teamwork. The CIO's transformation strategy calls for OI&T to focus on stabilizing and streamlining core processes and platforms, mitigating weaknesses highlighted in information security and GAO assessments, and improving outcomes by institutionalizing a new set of IT management capabilities.

According to the CIO, one of the most significant challenges the department faces is securing its assets, networks, systems, and data. To address this challenge, in September 2015, as part of the CIO's effort to transform OI&T, VA documented a long-term cybersecurity strategy. This strategy identified five goals for successfully building a comprehensive cybersecurity capability: (1) protecting veterans' information and VA data by ensuring privacy concerns are addressed and ensuring secure technology and data systems; (2) providing secure and resilient information systems technology, business applications, publicly accessible platforms, and shared data networks; (3) protecting VA infrastructure and assets, including the boundary environments that provide potential access and entry into VA; (4) enabling effective operations by improving governance and organizational alignment at enterprise, operational, and tactical levels (points of service interactions); and (5) recruiting and retaining a talented cybersecurity workforce covering multiple disciplines within cybersecurity.

As another part of this transformation, the CIO began transitioning the oversight and accountability of IT projects from PMAS to a new project management process called the Veteran-focused Integration Process (VIP) in January 2016, in an effort to better streamline systems development and speed up the delivery of new IT capabilities. According to the VIP guide, all systems development projects that touch the VA network or use money from the IT appropriation will be required to follow VIP. The CIO intends for VIP to facilitate an expanded use of the Agile

system development methodology[38] resulting in, for example, the delivery of system functionality on a more frequent, 3-month delivery cycle, whereas PMAS delivered functionality in 6-month cycles. In addition, VIP is intended to streamline IT project management by reducing the number of artifacts (i.e., documentation) that must be developed (from 58 to 8) and the number of critical decision points (from 5 to 2).[39] According to the CIO's transformation strategy, under the new VIP process, OI&T will also be required to consider security and architecture standards early in project planning phases, whereas PMAS required this later in the development process. According to the CIO, the department intends to have all IT projects managed under VIP by September 30, 2016.

In addition to implementing VIP, the CIO also intends to establish five new functions within OI&T as part of the transformation:

- **Enterprise Program Management Office.** This office began initial operations in April 2016 and is intended to serve as OI&T's portfolio management and project tracking organization. According to the strategy, the goals of the new organization are to align IT portfolios with agency strategic objectives; enhance visibility and governance; analyze and report on portfolio performance metrics; ensure the overall health of the IT portfolio; and optimize resources for projects, people, and timelines. EPMO includes six functional areas: (1) *Intake and Analysis of Alternatives*, responsible for working with the VA administrations and other staff offices to develop requirements to meet the needs of veterans, provide analysis of alternative approaches to meeting those requirements, and integrate information security; (2) *IT Portfolios*, responsible for consolidating programs and projects under five IT portfolios (Health, Benefits, Cemeteries, Corporate, and Enterprise services); (3) *Project Special Forces*, responsible for mitigating issues that put projects at risk of failure;

[38]Agile development is a modular and iterative approach that calls for producing usable software in small increments, sometimes referred to as sprints, rather than producing a complete product in longer sequential phases.

[39]PMAS included five decision points for ensuring (1) the project is ready for the planning stage, (2) the project is ready to begin development, (3) a project is ready for deployment, (4) a project is ready to be closed because it has completed the delivery of business capabilities, and (5) a project has completed all closeout activities. By contrast, VIP includes two critical points—(1) determining whether the project will proceed into development and (2) determining whether the product is prepared for release.

(4) *Lean Systems Engineering*, responsible for metrics gathering and analysis, development of process tools, human resources, and training; (5) *Transition Release and Support*, responsible for managing OI&T's integrated calendar supporting VIP; and (6) *Application Management*, responsible for IT implementation efforts, including testing, design, and data management.

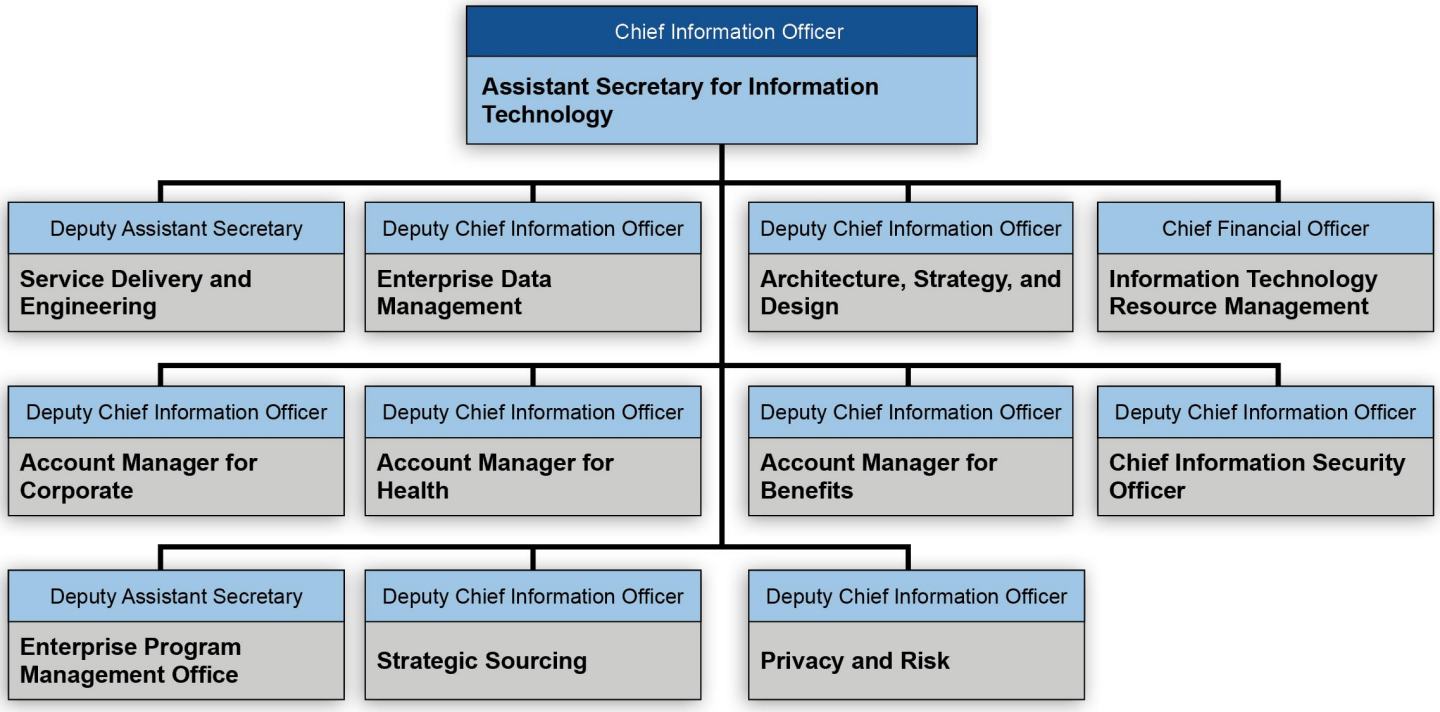
The EPMO is expected to replace the Product Development office and the Planning, Programming, Budgeting, and Execution board. As of July 2016, VA had not provided information about whether and how the transformation will affect the IT Leadership Board.

- **Account Management.** The account management function, led by three account managers, is to be responsible for managing the IT needs of OI&T's business partners—the VA's major components. Account managers are to interface directly with the VA administrations and staff offices to understand their needs, help identify and define the solutions to meet those needs, and represent their customers' interests by reporting directly to the CIO. In this regard, account managers are to submit their customers' IT requirements to the EPMO, ensure that their business needs are understood by OI&T, and ensure that business solutions are designed to meet their customers' specifications. This function is also tasked with advocating for their customers in the budget process. OI&T intends this new function to address the challenge of effectively collaborating with business units. As of May 2016, the three account managers were in place.
- **Quality and Compliance.** This function is to be responsible for establishing effective policy governance and standards and ensuring adherence to the policies and standards. In addition, the quality and compliance function is expected to be charged with identifying, monitoring, and measuring risks across the OI&T organization.
- **Data Management Organization.** The organization is being established to improve both service delivery and the veteran experience by engaging with data stewards to ensure the accuracy and security of the information collected by VA. The organization is intended to institute a data governance strategy; engage with business owners to ensure accuracy and security of collected data; analyze data sources to form an enterprise data architecture; and establish metrics for data efficiency, access, and value. OI&T also intends for the organization to identify trends in the data collected on each veteran that could improve their health care by providing predictive care and anticipating needs.

- **Strategic Sourcing.** This function is expected to be responsible for establishing an approach to fulfilling the agency's requirements with vendors that provide solutions to those requirements, managing vendor selection, tracking vendor performance and contract deliverables, and sharing insights on new technologies and capabilities to improve the workforce knowledge base.

Figure 2 depicts the OI&T organization as of April 2016, which includes previously existing components and functions, as well as the new functions described above. OI&T was still in the process of fully defining the roles and responsibilities of the organizational units as of July 2016.

Figure 2: Department of Veterans Affairs (VA) Office of Information & Technology Organization as of April 2016



Source: GAO analysis of VA data. | GAO-16-403

In addition to these new functions, the strategy calls for a transformation of the services that OI&T provides in field offices, to include requiring service-level agreements for all VA organizations and using those agreements to define the support that is needed, migrating data and applications to the cloud, and developing a strategy for consolidating data

centers. According to the CIO, the transformation strategy is expected to be completed by the first quarter of fiscal year 2017, although the vast majority of the plan, including establishing the five new functions, is to be executed by the end of fiscal year 2016.

VA Generally Implemented IT Human Capital Management Best Practices but Has Not Projected Leadership Retirements or Fully Identified Skill Gaps

Key to an agency's success in effectively managing its IT systems is sustaining a workforce with the necessary knowledge, skills, and abilities to execute a range of management functions that support the agency's mission and goals. Achieving such a workforce depends on effective human capital management, which includes developing a human capital strategic plan; analyzing the workforce; analyzing the gaps between current skills and future needs, and developing strategies for filling the gaps; and training and developing the workforce. Taking such steps is consistent with activities outlined in human capital management practices that we and the Office of Personnel Management have developed.[40]

OI&T took steps toward implementing effective IT human capital practices by documenting an IT human capital strategic plan and initiating an update based on changed priorities, regularly analyzing workforce data, identifying skill gaps for the current fiscal year, and implementing an IT training program. However, OI&T did not implement other human capital practices that are essential for analyzing the workforce and identifying IT skill gaps. Specifically, the office had not (1) tracked and reviewed historical and projected leadership retirements, and (2) identified the gaps in future skill areas.

OI&T Developed a Human Capital Strategic Plan

Strategic human capital planning that is linked to an agency's strategic goals can be used as a tool to identify the workforce needed for the future and to develop strategies for shaping the workforce. Since 2001, we have identified strategic human capital management as a government-wide high-risk area.[41]

[40]GAO-04-39; GAO, *Human Capital: A Guide for Assessing Strategic Training and Development Efforts in the Federal Government*, GAO-04-546G (Washington, D.C.: March 2004); and 5 C.F.R. § 250.203(a).

[41]GAO, *High-Risk Series: An Update*, GAO-01-263 (Washington, D.C.: Jan. 1, 2001), and GAO-15-290.

OPM regulations[42] require agencies to develop a human capital strategic plan that identifies goals and objectives that are consistent with the agency's strategic plans and annual performance goals. These goals and objectives are to address each of the five systems for comprehensive human capital management that are outlined in OPM's *Human Capital Assessment and Accountability Framework (HCAAF)*.[43] In addition, OPM's regulations require agencies to include in their human capital strategic plans performance measures and milestones that assess the agency's progress in meeting the identified goals and objectives.[44]

In October 2012, the VA Inspector General reported that OI&T had not developed a human capital strategic plan and recommended that the office do so.[45] In response to the recommendation, OI&T developed a 6-year human capital strategic plan in September 2013.[46] This plan outlined four human capital strategic goals:

- maximize employee talent through recruitment, outreach, hiring and retention;
- sustain a productive, diverse workforce and achieve results by valuing and recognizing performance in an environment in which all employees are encouraged to contribute;
- ensure OI&T supports a culture of leadership and continuous learning; and
- ensure the human capital strategic plan is aligned with other VA strategic plans and integrated into workforce planning.

[42]5 C.F.R. § 250.203(a).

[43]OPM's Human Capital Assessment and Accountability Framework details five human capital systems that, together, provide a consistent, comprehensive representation of human capital management for the federal government. The five human capital systems are (1) strategic alignment, (2) leadership and knowledge management, (3) results-oriented performance culture, (4) talent management, and (5) accountability.

[44]5 C.F.R. § 250.203(a).

[45]Office of the Inspector General, *Department of Veterans Affairs: Audit of Office of Information Technology's Strategic Human Capital Management*, 11-00324-20 (Washington, D.C.: Oct. 29, 2012).

[46]Department of Veterans Affairs, *Office of Information & Technology Human Capital Strategic Plan 2014-2020* (September 30, 2013).

In addition to outlining the human capital strategic goals, this plan also identified objectives and strategies for achieving them. For example, the objectives included improving the processes for hiring new employees; building a diverse OI&T workforce; eliminating competency gaps in key leadership positions; and developing an office-wide integrated workforce analysis capability. Strategies that are linked to the goals and objectives include implementing a plan to streamline and improve employee orientation, increasing the percentage of minorities and veterans in the OI&T workforce, identifying and defining the competencies that OI&T leaders must develop to ensure staff in leadership positions have the right skills needed to meet organizational goals, and implementing a workforce planning process. See appendix III for a summary of the goals, objectives, and strategies outlined in OI&T's strategic human capital plan.

The human capital strategic plan also was aligned with specific strategies that were identified in VA's 6-year Strategic Plan, as well as the strategic goals within the department's Office of Human Resources and Administration Strategic Plan for fiscal year 2014-2020.[47] For example, the department's strategic plan includes strategies for the development of leadership, and OI&T's plan also includes the same. Specifically, as stated earlier, one of the goals within OI&T's plan is to ensure the office supports a culture of leadership and continuous learning. Strategies for this IT human capital strategic goal include identifying and defining the competencies that OI&T leaders must develop and retain.

The plan also was aligned with a Human Resources and Administration strategic goal—to advocate for veteran employment within the department. In addition, the plan identified strategies to recruit, hire, and promote qualified veterans.

Further, OI&T's human capital strategic goals are linked to each of the systems for comprehensive human capital management outlined in OPM's framework. For example, one of the goals is to maximize employee talent through recruitment, outreach, hiring, and retention, which links to the talent management system in the framework. In addition, the plan identifies performance measures that the office is to use

[47]The Office of Human Resources and Administration leads the development and implementation of human capital management strategies, policies, and practices for VA.

to monitor its progress in achieving each of the human capital goals. These performance measures include, among others, improved leadership abilities, and improvements in the number of hires and percentages for minorities, employees with disabilities, and veterans.

As of March 2016, OI&T was in the process of updating the human capital strategic plan as part of the CIO's transformation strategy for OI&T. According to the office's human capital management director, the revised plan is expected to be in place by the end of December 2016. By developing a human capital strategic plan and ensuring that the plan is updated to reflect the changing mission requirements of the office, OI&T should be better positioned to provide the necessary strategic direction for meeting its workforce needs and goals.

OI&T Regularly Analyzed Workforce Data but Was Not Tracking Leadership Retirements

Performing workforce analysis is a key component in strategic human capital planning because it assists agencies in developing strategies for acquiring, training, and retaining staff. According to OPM, workforce analysis allows agencies to identify trends impacting their workforce. The analysis also provides a basis for developing actions to address workforce trends that may impact an agency's future mission capabilities. OPM also stresses the importance of ensuring the continuity of leadership within an agency, and suggests that agencies perform ongoing workforce analysis to identify current and future workforce and leadership needs. Among other things, for relevant agency mission requirements, OPM requires a workforce analysis that includes a forecast of future leadership requirements and changes due to retirements.[48] Similarly, VA's workforce planning policy requires each staff office, including OI&T, to annually analyze historical workforce data and develop workforce projections that, at a minimum, include employee counts, retirements and other losses, new hires, workforce diversity, and leadership retirements.[49] The workforce analysis also is to include a determination of gaps in the workforce and strategies to close those gaps.

OI&T conducted a workforce analysis in May 2013 that identified for the office the number of employees, retirements and projected eligible

[48]5 C.F.R. § 250.203(a).

[49]VA Directive 5002, *Workforce and Succession Planning* (January 15, 2003).

retirements through fiscal year 2018, employee turnover and hiring rates, and workforce diversity percentages. Further, OI&T has analyzed most of the required workforce information on a monthly basis. Specifically, the analyses we reviewed for October 2015 to January 2016 included workforce data and projections related to employee counts, losses, new hires, and workforce diversity. According to the OI&T Director of Human Capital Management, the office used these data to examine trends, increase awareness of staffing related issues or opportunities, and identify workforce gaps, among other things.

Further, the department's Integrated Human Resources Management Council[50] was tasked with analyzing workforce data, such as retirement rates, on a quarterly basis as part of an overall VA effort to review performance metrics related to human resource strategic goals. The Integrated Human Resources Management Council's review results included workforce gaps and strategies to close them. For example, in fiscal year 2015 VA had not met its target for hiring veterans. One of the strategies the council identified for increasing the number of veterans hired was to collaborate with stakeholders to identify and implement innovative and targeted recruitment opportunities.

Nevertheless, even as it has taken these actions, OI&T was not analyzing historical leadership retirement data; nor was it developing leadership retirement projections as required by the department's workforce and succession policy.[51] Leadership positions include senior executives as well as other staff at the General Schedule levels 13 through 15. According to the OI&T Director of Human Capital Management, the office collects data on all employee losses, including retirements. Further the OI&T human capital strategic plan included projected eligible retirements. However, historic data on leadership retirements were not analyzed and a

[50]The Integrated Human Resources Management Council is an advisory council that is to assist the Deputy Assistant Secretary of Human Resource Management in implementing reviews, called HRstat, and provide the Human Resources and Administration Chief Human Capital Officer and organizational leaders with advice on strategic policy for human resources programs and initiatives. The council consists of a chairperson and appointed senior human resources representatives from the administrations and staff offices, which includes OI&T. HRstat reviews are expected to use metrics chosen by the agency to drive performance and enhance mission accomplishment.

[51]VA Directive 5002, *Workforce and Succession Planning* (January 15, 2003).

forecast of future leadership retirements was not developed, as called for by VA's workforce planning policy.

The OI&T Director of Human Capital Management stated that, although the office has the capability to analyze leadership retirements, there is no specific reason why it has not done so. Without tracking and forecasting leadership retirements, OI&T faces a risk of being unprepared to identify and effectively respond to vacancies in key leadership positions, which in turn can contribute to ineffective IT management.

OI&T Identified Skill Gaps but Has Not Determined Its Needs beyond the Current Year

Determining core skills (e.g., problem solving),[52] leadership skills (e.g., developing others), and technical skills (e.g., configuration management) is essential for an organization such as OI&T to successfully achieve its missions and goals. This is especially important as changes in national security, technology, budget constraints, and other factors change the environment within which organizations operate. The identified skills should be linked to the agency's mission and long-term goals in order to identify the workforce needed for the future and develop strategies for shaping this workforce. Agencies should then identify the gaps in current and future skills needed to achieve results, and develop strategies for filling the gaps.[53]

OI&T had conducted annual gap analyses to identify its skill needs, and it had developed strategies for filling the gaps. Specifically, the IT Workforce Development group within the Office of Quality, Performance, and Oversight began conducting the analyses in June 2013, and the analyses were conducted annually thereafter. On an annual basis, the analyses identified each skill area where a gap existed, along with the percentage of staff that was determined to be below the targeted proficiency level for a particular role and career level (e.g., entry, intermediate, and senior).

In addition, the analyses identified the top 10 technical skill gaps within OI&T for each year and compared the gaps from the previous year to those in the current year. This comparison showed either an increase,

[52]Core skills are applicable to all employees department-wide.

[53]GAO-04-39.

decrease, or no change in the percentage of staff below the targeted proficiency level for a particular skill area. For example, in March 2016, IT Workforce Development reported that the gap in staff proficiency in 9 of the top 10 technical skill areas within OI&T had decreased from the previous year and that the gap in staff proficiency in 1 skill area had remained the same. Table 2 shows the comparison of the skills gaps for the 2015 and 2016 analyses.

Table 2: Department of Veterans Affairs Office of Information & Technology's Top 10 Technical Skill Gaps Identified in 2015 and 2016 Analyses

Skill area	Percentage of staff below proficiency in 2015	Percentage of staff below proficiency in 2016
Emerging technologies	12%	10%
Project management	8%	7%
Technology application	7%	6%
IT architecture	8%	6%
Configuration management	6%	6%
Information systems / network security	7%	6%
Information management	6%	5%
Infrastructure design	9%	8%
Requirements analysis	13%	10%
508 accessibility[a]	16%	15%

Source: March 2016 OI&T Skills Gap Analysis Report. | GAO-16-403

[a]Section 508 of the Rehabilitation Act of 1973 requires federal agencies and departments to take specified actions to ensure accessibility and called for the promulgation of standards related to technology accessibility for people with disabilities.

After the initial analysis was conducted in June 2013, the office identified training that was either available or being developed to address each skill gap. For example, in its March 2016 analysis report, the IT Workforce Development group noted that 48 new courses were being developed based on gaps identified in the March 2015 analysis. This training covered the areas of emerging technologies, project management, communications, interpersonal skills, analytical reasoning, and conflict management. As of July 2015, OI&T had provided approximately 470 on-the-job training opportunities. According to the IT Workforce Development group, on-the-job training is used to increase options for staff to demonstrate advanced-level proficiency, including in many of the skill gap areas identified. For example, the group developed an opportunity for senior staff to guide junior staff in the area of project management. The group also provided staff the opportunity to learn from subject matter

experts in the area of infrastructure design. As of April 2016, employees had taken advantage of approximately 160 of these opportunities.

The IT Workforce Development group also recommended in its 2016 gap analysis that several other actions be taken by OI&T to address the identified skill gaps. For example, the group recommended that OI&T continue to develop learning plans that focus on advance levels of proficiency; develop training on VIP, including training on Agile program management; and prioritize training for leadership-related competencies, among others.

Nevertheless, while OI&T conducted annual skill gap analyses and developed training courses and recommended other actions for addressing skill gaps, the office has not identified the gaps in skill areas that could be needed in future years. Specifically, the analyses focused on gaps in the time periods when they were conducted; however, the analyses did not identify the skills or the gaps in the skills that may have been needed in future years in order to implement the goals and objectives identified in the department's long-term IT strategic plan or for planned IT initiatives.

According to a program manager in the IT Workforce Development group, the annual skill gap analyses were based on current staffing levels and on what each organization within OI&T wanted to achieve through the current fiscal year, but not on what skills would be needed for future years. However, by only focusing on the current year and not including future years in its skill gaps analysis, OI&T may not have been aware of gaps in skills that would be needed to successfully accomplish other goals, such as the completion of a multi-year IT development project, or longer-term goals, such as the department's future IT operating environment as described in the office's 5-year IT strategic plan. By including the IT skills needed for future-years in its gap analyses, OI&T could have increased assurance that its staff has the capabilities to deliver long-term IT support that contributes to improved services for veterans.

OI&T Took Steps to Implement a Training Program

Training programs are an integral part of a learning environment that can enhance an agency's ability to attract and retain employees with the core, leadership, and technical skills needed to achieve results. The essential aim of these programs is to assist the agency in achieving its mission and goals by improving individual and, ultimately, organizational performance. Training programs involve establishing learning priorities; identifying

training initiatives; ensuring delivery of learning opportunities; and evaluating the program and demonstrating how training efforts contribute to improved performance and results.[54]

OI&T took several steps to implement a training program. These included establishing an advisory board, developing competency models and individual development plans, and providing training to its employees. Specifically, the office established a Training Advisory Board which was tasked with identifying and validating training needs in OI&T. The board, which was established in November 2014, is headed by the OI&T Chief Learning Officer and has senior management representatives from each organizational unit. According to its charter, the advisory board discusses and determines the priority of the training needs of each of the organizational units. In addition, the charter states that the board is intended to ensure that available training is aligned with VA's mission, strategic planning, and OI&T priorities. The board's most recent meetings were held in October 2015 and April 2016. During the meetings, the board discussed the training needs for OI&T's organizations, the development of training courses, and upcoming learning opportunities.

The IT Workforce Development group used competency models and individual development plans to identify training initiatives that could address the learning needs of OI&T's employees. According to an official in the IT Workforce Development group, employees were aligned with competency models based on their job responsibilities. These competency models identified training needs for professional development. Additionally, the IT Workforce Development official stated that OI&T used individual development plans to reinforce the required knowledge, skills, and abilities necessary for employees to progress into new positions at higher skill levels. The individual development plan is essentially a to-do list that is generated based on identified gaps in the employee's skills. The plan identifies the employee's competency model, training needs, and the due dates for the learning opportunities identified to meet their training needs.

Further, OI&T has taken steps to ensure the delivery of learning opportunities. Specifically, in fiscal year 2015, the office provided over

[54]GAO-04-546G.

700 training courses. For example, it provided training on information security awareness, which over 15,000 employees and contractors completed, and on risk assessment, which was completed by 284 employees and contractors. The courses also covered a wide range of other IT-related subjects, such as project management, enterprise architecture, and cybersecurity. The training courses were delivered through several methods, such as webinars, on-the-job training, classrooms, and virtual classrooms. The IT Workforce Development group used event announcements and the delivery of course schedules to each organizational unit to help ensure employees were made aware of the provided opportunities.

Lastly, OI&T took steps to evaluate its training program. Specifically, in April 2015, the office performed an assessment that identified weaknesses in its training program, such as the need to supplement competency modeling efforts with learning opportunities that focus on IT strategic business priorities for overall organizational development. The assessment also identified the need to provide learning opportunities that address emerging trends and technologies at all leadership levels.

Further, the assessment included strategies to improve employee, leadership, and organizational development. For example, one strategy to improve employee development was to survey employees to identify challenges in job responsibilities and the least understood emerging technologies, and then to use that information to provide theme-based development opportunities to address the identified needs. Additionally, OI&T gauged the satisfaction of the training attendees by providing course evaluations, which assessed the relevance of the training to job responsibilities and the effectiveness of the instructor. For example, in February 2016, 90 percent of course attendees indicated that they were satisfied with the courses; 83 percent indicated that the content of the courses were relevant to their jobs; and 95 percent indicated that the instructor was effective in conveying practical knowledge about the subject matter.

By taking these steps to implement a training program, OI&T is better positioned to ensure that it has the ability to train and develop an IT workforce to effectively support the department’s mission and goals.

VA Documented Processes to Manage IT System Development and Acquisitions, but Gaps Existed

Instituting disciplined, repeatable practices for IT development and acquisition is key to ensuring that investments in IT cost-effectively deliver the capabilities needed to support an organization's mission. SEI and GAO have identified best practices that are essential to the development and acquisition of products and services for IT projects. These include practices related to project planning, requirements management, risk management, project monitoring and control, product validation, and process and product quality assurance,[55] as well as developing and maintaining a reliable, high-quality project schedule.[56] According to SEI, when an organization's processes are documented, it allows the organization to more consistently apply these best practices.[57] Further, documented processes are important for sustaining institutionalized best practices regardless of future leadership changes.[58] Of 123 best practices that we selected to evaluate, VA's documented processes reflected 97 practices, partially reflected 12 practices, and did not reflect 14 practices.

Most Project Planning Best Practices Were Addressed in OI&T's Documented Processes

Project planning involves establishing and maintaining estimates of project parameters, developing a project plan, and obtaining commitment to the plan from those who are responsible for implementing and supporting it.[59] For example, establishing project estimates involves developing a work breakdown structure that details project tasks, responsibilities, and schedules; specifying estimates of work products and task attributes for the project; and estimating the project's effort and costs for work products and tasks based on estimation rationale.

In addition, developing a project plan includes identifying major milestones, schedule assumptions, constraints, and task dependencies; and creating and maintaining a project plan that ties together the budget, schedule, milestones, and stakeholder identification and interaction.

[55]SEI, *CMMI® for Development and Acquisition, Versions 1.3*.

[56]GAO-16-89G.

[57]SEI, *CMMI® for Development and Acquisition, Versions 1.3*.

[58]GAO, *Veterans Affairs: Continued Focus on Critical Success Factors Is Essential to Achieving Information Technology Realignment*, GAO-07-844 (Washington, D.C.: June 15, 2007).

[59]SEI, *CMMI® for Development and Acquisition, Versions 1.3.*

Further, obtaining commitment to the plan includes identifying agreements regarding interfaces between project elements and other projects; documenting commitments with an appropriate level of signatories; and making adjustments to the project plan to reconcile variances in estimated and available resources.

OI&T's project planning processes reflected 13 of 15 selected best practices. Of the 15 practices, the processes we examined included criteria that addressed 4 of 5 practices for establishing project estimates. These included developing a work breakdown structure that specifies project tasks, responsibilities, and schedules; identifying products to be acquired externally; providing estimates of work products and task attributes; and planning project lifecycle phases.

One practice—to estimate the project's effort and costs for work products and tasks based on estimation rationale—was partially reflected in the documented processes. In this regard, VA's project scheduling tool contained processes that called for project managers to estimate project effort. However, the processes did not address how the managers were to calculate the estimated effort to be expended to complete a project.

Further, the processes included criteria related to all 7 selected practices for developing a project plan. These included identifying major milestones, defining and quantifying resources needed for the project, and creating and maintaining a project plan that ties together the budget, schedule, milestones, and stakeholder identification and interaction.

Finally, the processes reflected 2 of 3 selected practices for obtaining commitment to the plan. In particular, they included identifying commitments regarding interfaces between project elements and other projects, and for documenting commitments with an appropriate level of signatories. However, the processes did not address making adjustments to the project plan to reconcile variances in estimated and available resources.

Until OI&T incorporates all the recommended project planning best practices in its process documentation, the office increases the risk that its project managers could inconsistently calculate estimates of the effort needed across projects and fail to adjust project plans based on resource availability, thus potentially affecting the timely completion of projects. Table 3 summarizes the extent to which these best practices were documented in OI&T's project planning processes.

Table 3: Project Planning Criteria Incorporated in the Office of Information & Technology's Documented Processes

	Criteria	GAO assessment
Establish estimates	Develop a work breakdown structure so detailed project tasks, responsibilities, and schedule can be specified	The program office documented processes that satisfied all of the elements of the best practice
	Identify products that will be acquired externally	The program office documented processes that satisfied all of the elements of the best practice
	Provide estimates of work products and task attributes for the project	The program office documented processes that satisfied all of the elements of the best practice
	Plan the lifecycle phases of the project - planning, development, operations, and close-out	The program office documented processes that satisfied all of the elements of the best practice
	Estimate the project's effort and costs for work products and tasks based on estimation rationale	The program office documented processes that satisfied some but not all elements of the best practice
Develop a project plan	Identify major milestones	The program office documented processes that satisfied all of the elements of the best practice
	Identify schedule assumptions, constraints, and task dependencies	The program office documented processes that satisfied all of the elements of the best practice
	Establish and maintain the budget and schedule	The program office documented processes that satisfied all of the elements of the best practice
	Establish a mechanism to archive data and access archived data	The program office documented processes that satisfied all of the elements of the best practice
	Define project resources (e.g., labor and equipment) and quantities needed for the project	The program office documented processes that satisfied all of the elements of the best practice
	Develop a stakeholder involvement plan, including a list of relevant stakeholders and roles and responsibilities of the stakeholders	The program office documented processes that satisfied all of the elements of the best practice
	Create and maintain a project plan that ties together the budget, schedule, milestones, and stakeholder identification and interaction	The program office documented processes that satisfied all of the elements of the best practice
Obtain commitment to the plan	Identify commitments regarding interfaces between project elements and other projects so the commitments can be monitored	The program office documented processes that satisfied all of the elements of the best practice
	Document commitments with an appropriate level of signatories	The program office documented processes that satisfied all of the elements of the best practice
	Make adjustments to the project plan to reconcile differences between estimated resources and available resources	The program office did not document processes that satisfied the elements of the best practice

Source: SEI (criteria) and GAO (analysis of agency-provided data). | GAO-16-403

OI&T's Documented Processes Addressed Almost All Requirements Management Best Practices

Best practices recommend that project teams manage requirements of the project's products and components, and ensure alignment between those requirements and the project plans and work products. Managing requirements can be accomplished by understanding and obtaining commitment to requirements, and ensuring that project work and associated requirements align with each other.[60] Examples of these best practices include analyzing requirements to ensure that established criteria for managing requirements are met; documenting all requirements and requirements changes; maintaining bidirectional requirements traceability from a requirement to its derived (i.e., lower-level) requirements and allocation to work products and back; and identifying changes to be made to plans and work products based on modifications to the requirements baseline.

OI&T had documented processes that reflected 10 of 11 selected best practices for managing project requirements. For example, the processes included assessing the impact of requirements on existing commitments, negotiating and documenting changes to commitments, and maintaining a requirements change history with the rationale for the changes. However, the documentation did not address one of the practices. Specifically, it did not include identifying changes that should be made to plans and work products resulting from changes to the requirements baseline.

Until the office incorporates in its documented processes the best practice for identifying changes to be made based on modifications to a project's requirements baseline, OI&T's staff will not be best positioned to implement the associated changes and maintain consistent processes across IT projects. Table 4 summarizes the extent to which these best practices were reflected in OI&T's requirements management processes.

Table 4: Requirements Management Criteria Incorporated in the Office of Information & Technology's Documented Processes

Criteria	GAO assessment
Manage requirements	
Establish criteria for the evaluation and acceptance of requirements	The program office documented processes that satisfied all of the elements of the best practice

[60]SEI, *CMMI® for Development and Acquisition, Versions 1.3.*

Criteria	GAO assessment
Analyze requirements to ensure that established criteria are met	The program office documented processes that satisfied all of the elements of the best practice
Reach an understanding of requirements with requirements providers so that project participants can commit to them	The program office documented processes that satisfied all of the elements of the best practice
Assess the impact of requirements on existing commitments	The program office documented processes that satisfied all of the elements of the best practice
Negotiate and document changes to commitments	The program office documented processes that satisfied all of the elements of the best practice
Document all requirements and requirements changes	The program office documented processes that satisfied all of the elements of the best practice
Maintain a requirements change history, including the rationale for changes	The program office documented processes that satisfied all of the elements of the best practice
Evaluate the impact of requirement changes from the standpoint of relevant stakeholders	The program office documented processes that satisfied all of the elements of the best practice
Maintain bidirectional requirements traceability from a requirement to its derived requirements and allocation to work products (and back)	The program office documented processes that satisfied all of the elements of the best practice
Review project plans, activities, and work products for consistency with requirements and changes made to them	The program office documented processes that satisfied all of the elements of the best practice
Identify any changes that should be made to plans and work products resulting from changes to the requirements baseline	The program office did not document processes that satisfied the elements of the best practice.

Source: SEI (criteria) and GAO (analysis of agency-provided data). | GAO-16-403

Majority of Risk Management Best Practices Were Documented in OI&T's Processes

Risk management best practices call for the identification of potential problems before they occur so that risk-handling activities can be planned throughout the life of the project to mitigate adverse impacts on achieving objectives. These practices involve preparing for risk management, identifying and analyzing risks, and mitigating identified risks.[61] For example, preparing for risk management involves determining risk sources and categories, and developing risk mitigation techniques. In addition, identifying and analyzing risks includes determining those that are associated with cost, schedule, and performance; and reviewing the

[61]SEI, *CMMI® for Development and Acquisition, Versions 1.3.*

work breakdown structure[62] and project plan to help ensure that all aspects of the work effort have been considered. Further, mitigating risks includes determining the levels and thresholds in which a risk becomes unacceptable and triggers the execution of a risk mitigation plan or contingency plan; establishing a schedule for each risk handling activity, with a start date and anticipated completion date; determining the costs and benefits of implementing the risk mitigation plan for each risk; and collecting performance measures on risk handling activities.

OI&T established processes that reflected 26 of 28 selected best practices for risk management. Of the 28 best practices, the office's processes addressed all 9 practices related to preparing for risk management. For example, they defined criteria for evaluating and quantifying risk likelihood and severity, established thresholds for risk categories, and defined a time period for risk monitoring or reassessment.

In addition, the documented processes included criteria related to all 9 practices for identifying and analyzing risks. For example, the processes reflected best practices for documenting the context, conditions, and potential consequences of each risk; categorizing and grouping risks according to defined risk categories; and prioritizing risks for mitigation.

With regard to mitigating risks, the documentation reflected 8 of 10 selected best practices. For example, it included identifying the person or group responsible for addressing risks, developing contingency plans for critical risks, and monitoring risk status. However, it did not address one practice for determining the costs and benefits of implementing the risk mitigation plan for each risk. Further, one practice—to collect performance measures on risk handling activities—was partially reflected in the processes. In this regard, VA's processes called for the creation and distribution of monthly performance reports, but they did not address risk mitigation activities.

[62]A work breakdown structure defines in detail the work necessary to accomplish a program's objectives. A work breakdown structure also reflects the requirements to be accomplished to develop a program, and it provides a basis for identifying resources and activities necessary to produce deliverables. Further, a well-structured work breakdown structure helps promote accountability by identifying work products that are independent of one another. It also provides the framework for developing a schedule plan that can easily track technical accomplishments, allowing quick identification of cost and schedule variances.

Although VA included 26 of 28 best practices related to risk management in its processes, it is not positioned to fully ensure that the costs and benefits of executing risk mitigation plans will be consistently determined and that performance measures for risk mitigation efforts are collected. Table 5 summarizes the extent to which these best practices were documented in OI&T's risk management processes.

Table 5: Risk Management Criteria Incorporated in the Office of Information & Technology's Documented Processes

	Criteria	GAO assessment
Prepare for risk management	Determine risk sources (i.e., risk source lists could include uncertain requirements, unavailable technology, cost or funding issues)	The program office documented processes that satisfied all of the elements of the best practice
	Determine risk categories (i.e., risk category lists could include lifecycle phase, budget risks, schedule risks, resource risks)	The program office documented processes that satisfied all of the elements of the best practice
	Define criteria for evaluating and quantifying risk likelihood and severity levels	The program office documented processes that satisfied all of the elements of the best practice
	Define thresholds for each risk category (whether risk is acceptable or unacceptable, triggers for involving management)	The program office documented processes that satisfied all of the elements of the best practice
	Scope of the risk management effort	The program office documented processes that satisfied all of the elements of the best practice
	Methods and tools to be used for risk identification, risk analysis, risk mitigation, risk monitoring, and communication	The program office documented processes that satisfied all of the elements of the best practice
	Parameters used for taking action on identified risks, including likelihood, consequence, and thresholds	The program office documented processes that satisfied all of the elements of the best practice
	Develop risk mitigation techniques	The program office documented processes that satisfied all of the elements of the best practice
	Define time period for monitoring or reassessing risks	The program office documented processes that satisfied all of the elements of the best practice
Identify and analyze risks	Identify the risks associated with cost, schedule, and performance	The program office documented processes that satisfied all of the elements of the best practice
	Review environmental elements that can affect the project	The program office documented processes that satisfied all of the elements of the best practice
	Review work breakdown structure as part of identifying risks to help ensure that all aspects of the work effort have been considered	The program office documented processes that satisfied all of the elements of the best practice
	Review project plan as part of identifying risks to help ensure that all aspects of the project have been considered	The program office documented processes that satisfied all of the elements of the best practice

	Criteria	GAO assessment
	Document the context, conditions, and potential consequences of each risk (i.e., time frame of the risk, circumstances related to the risk)	The program office documented processes that satisfied all of the elements of the best practice
	Identify the relevant stakeholders associated with each risk	The program office documented processes that satisfied all of the elements of the best practice
	Evaluate identified risks using defined risk parameters (i.e., likelihood, severity, impact, thresholds)	The program office documented processes that satisfied all of the elements of the best practice
	Categorize and group risks according to defined risk categories	The program office documented processes that satisfied all of the elements of the best practice
	Prioritize risks for mitigation	The program office documented processes that satisfied all of the elements of the best practice
Mitigate risks	Determine the levels and thresholds that define when a risk becomes unacceptable and triggers the execution of a risk mitigation plan or contingency plan	The program office documented processes that satisfied all of the elements of the best practice
	Identify the person or group responsible for addressing each risk	The program office documented processes that satisfied all of the elements of the best practice
	Develop an overall risk mitigation plan for the project to orchestrate the implementation of individual risk mitigation and contingency plans	The program office documented processes that satisfied all of the elements of the best practice
	Develop contingency plans for critical risks in the event that the risks occur	The program office documented processes that satisfied all of the elements of the best practice
	Monitor risk status	The program office documented processes that satisfied all of the elements of the best practice
	Provide a method for tracking open risk handling action items to closure	The program office documented processes that satisfied all of the elements of the best practice
	Risk handling options when monitored risks are categorized as high and medium	The program office documented processes that satisfied all of the elements of the best practice
	Establish a schedule or period of performance for each risk handling activity that includes a start date and anticipated completion date	The program office documented processes that satisfied all of the elements of the best practice
	Determine the costs and benefits of implementing the risk mitigation plan for each risk	The program office did not document processes that satisfied the elements of the best practice
	Collect performance measures on risk handling activities	The program office documented processes that satisfied some but not all elements of the best practice

Source: SEI (criteria) and GAO (analysis of agency-provided data). | GAO-16-403

OI&T's Documented Processes Addressed Some but Not All Project Monitoring and Control Best Practices

The purpose of project monitoring and control is to provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan. Toward this end, a project's documented plan is considered the basis for monitoring activities and corrective actions taken when performance deviates significantly from the plan.[63] Examples of monitoring the project against the project plan include tracking progress against the schedule, monitoring project costs and the effort expended for project completion, documenting the results of data management activity reviews, and identifying and documenting significant issues and deviations from the project plan. In addition, managing corrective actions to address identified issues involves determining and documenting the appropriate actions needed to address the issues and monitoring corrective actions for completion.

OI&T's documented processes reflected 18 of 28 selected best practices related to project monitoring and control. Of the 28 practices, the processes reflected 12 of 22 selected practices for monitoring the project against the project plan and all 6 selected practices related to managing correction actions. For monitoring the project against the project plan, the processes included tracking change requests and problem reports to closure, documenting the results of milestone reviews, and reviewing the project plan, project status, and risks at selected milestones. In addition, for managing corrective actions, the processes included gathering issues that require corrective action for analysis, analyzing the results of corrective actions to determine effectiveness, and determining and documenting lessons learned as a result of taking appropriate corrective actions.

However, three of the selected practices were partially reflected in the processes for monitoring the project against the project plan. Specifically, documentation on monitoring project costs and the effort expended for project completion included criteria for monitoring project costs; however, it did not call for tracking expended effort. With regard to monitoring resources provided and used, the processes call for VA to monitor projects to ensure that staff and resources are provided, but they did not clearly require monitoring for the utilization of those staff and resources.

[63]SEI, *CMMI® for Development and Acquisition, Versions 1.3*.

Similarly, OI&T partially documented its processes for reviewing the results of collecting and analyzing project performance measures, such as customer service satisfaction metrics. In particular, the processes had been developed to ensure the agreed-upon functionality was delivered to customers. However, the customers' level of satisfaction based on the functionality requested and received for the project was not addressed.

In addition, the processes did not address seven of the selected practices. These practices were associated with monitoring the knowledge and skills of project staff, periodically reviewing data management activities against the project plan, identifying and documenting significant data management issues and their impacts, documenting results of data management activity reviews, periodically reviewing stakeholder involvement in projects, documenting the results of stakeholder involvement status reviews, and tracking action items to closure.

Until OI&T completely documents its processes for monitoring and controlling projects, staff responsible for executing these steps may not be fully aware of a project's progress toward achieving the milestones defined in the project plan. Table 6 summarizes the extent to which these best practices were addressed in OI&T's project monitoring and control processes.

Table 6: Project Monitoring and Control Criteria Incorporated in the Office of Information & Technology's Documented Processes

	Criteria	GAO assessment
Monitor the project against the project plan	Monitor progress against the schedule	The program office documented processes that satisfied all of the elements of the best practice.
	Monitor the project's costs and expended effort	The program office documented processes that satisfied some but not all elements of the best practice.
	Monitor resources provided and used	The program office documented processes that satisfied some but not all elements of the best practice.
	Monitor the knowledge and skills of project staff	The program office did not document processes that satisfied the elements of the best practice.
	Document significant deviations in project planning parameters	The program office documented processes that satisfied all of the elements of the best practice.
	Periodically review data management activities against their description in the project plan	The program office did not document processes that satisfied the elements of the best practice.
	Identify and document significant data management issues and their impacts	The program office did not document processes that satisfied the elements of the best practice.

	Criteria	GAO assessment
	Document results of data management activity reviews	The program office did not document processes that satisfied the elements of the best practice.
	Periodically review the status of stakeholder involvement to ensure that stakeholders are involved regularly	The program office did not document processes that satisfied the elements of the best practice.
	Identify and document significant issues and their impacts (e.g., essential stakeholders that do not have access to the project data needed to fulfill their roles)	The program office documented processes that satisfied all of the elements of the best practice.
	Document the results of stakeholder involvement status reviews	The program office did not document processes that satisfied the elements of the best practice.
	Regularly communicate status on assigned activities and work products to relevant stakeholders	The program office documented processes that satisfied all of the elements of the best practice.
	Review the results of collecting and analyzing measures of the project performance (e.g., customer service satisfaction survey)	The program office documented processes that satisfied some but not all elements of the best practice.
	Identify and document significant issues and deviations from the project plan	The program office documented processes that satisfied all of the elements of the best practice.
	Document change requests and problems identified in work products and processes	The program office documented processes that satisfied all of the elements of the best practice.
	Track change requests and problem reports to closure	The program office documented processes that satisfied all of the elements of the best practice.
	Document the results of milestone reviews	The program office documented processes that satisfied all of the elements of the best practice.
	Conduct milestone reviews with relevant stakeholders at meaningful points in the project's schedule, such as the completion of selected phases	The program office documented processes that satisfied all of the elements of the best practice.
	Review the project plan, project status, and risks of the project at selected milestones	The program office documented processes that satisfied all of the elements of the best practice.
	Identify and document significant issues and their impacts after milestone reviews	The program office documented processes that satisfied all of the elements of the best practice.
	Document results of the milestone review, action items, and decisions	The program office documented processes that satisfied all of the elements of the best practice.
	Track milestone review action items to closure	The program office did not document processes that satisfied the elements of the best practice.
Manage corrective actions	Gather issues that require corrective action for analysis (i.e., data access, collection, privacy, or security issues, or issues that were discovered during technical reviews, verification, and validation, etc.)	The program office documented processes that satisfied all of the elements of the best practice.
	Determine and document the appropriate actions needed to address identified issues	The program office documented processes that satisfied all of the elements of the best practice.

Criteria	GAO assessment
Review and reach consensus with relevant stakeholders on the actions to be taken	The program office documented processes that satisfied all of the elements of the best practice.
Monitor corrective actions for completion	The program office documented processes that satisfied all of the elements of the best practice.
Analyze results of corrective actions to determine effectiveness	The program office documented processes that satisfied all of the elements of the best practice.
Determine and document lessons learned as a result of taking corrective actions	The program office documented processes that satisfied all of the elements of the best practice.

Source: SEI (criteria) and GAO (analysis of agency-provided data). | GAO-16-403

Validation Best Practices Were Reflected in OI&T's Documented Processes

Best practices for product validation call for project teams to demonstrate that a product or component fulfills its intended use when placed in its intended environment. The methods employed to accomplish validation can be applied to work products as well as to the product components. Key practices, as identified by SEI, include preparing for validation by identifying and selecting products, and validating the product or product components.[64] For example, preparing for validation includes identifying the product, product component, and/or features to be validated throughout the life of the project and identifying requirements for the validation environment and passing them to the requirements development process. Further, validating the product or its components involves ensuring that activities (i.e., those that validate IT hardware and services) are performed throughout the project lifecycle and that deviations from validation procedures are documented.

Of the 17 selected best practices for product validation, OI&T's documented processes reflected all 10 practices related to preparing for validation, and all 7 practices for carrying out the validation of the product or its components. For example, the office's processes addressed best practices for identifying test equipment and tools, ensuring the validation method was selected early in the development process, identifying and documenting validation failure causes as needed, comparing actual validation test results to expected results, and analyzing validation data for defects.

[64]SEI, *CMMI® for Development and Acquisition, Versions 1.3*.

By incorporating the selected validation best practices into its processes, OI&T has increased assurance that staff responsible for performing validation of the department's IT products or their components will be positioned to consistently apply key processes to ensure that products perform as expected when placed in the intended environment. Table 7 summarizes the extent to which these best practices were addressed in OI&T's validation processes.

Table 7: Validation Criteria Incorporated in the Office of Information & Technology's Documented Processes

	Criteria	GAO assessment
Prepare for validation	Identify the product, product component, and/or features to be validated throughout the life of the project	The program office documented processes that satisfied the elements of the best practice.
	Obtain requirements and constraints for performing validation	The program office documented processes that satisfied the elements of the best practice.
	Select the evaluation methods for product or product component validation	The program office documented processes that satisfied the elements of the best practice.
	Review the validation selection, constraints, and methods with relevant stakeholders and obtain agreement	The program office documented processes that satisfied the elements of the best practice.
	Identify requirements for the validation environment and pass them to the requirements development process	The program office documented processes that satisfied the elements of the best practice.
	Identify test equipment and tools	The program office documented processes that satisfied the elements of the best practice.
	The method for validation was selected early on in the development process	The program office documented processes that satisfied the elements of the best practice.
	Review the product requirements to ensure that issues affecting validation of the product or product component are identified and resolved	The program office documented processes that satisfied the elements of the best practice.
	Document the environment, operational scenario, procedures, inputs, outputs, and criteria for the validation of the selected product or product component	The program office documented processes that satisfied the elements of the best practice.
	Assess the design as it matures in the context of the validation environment to identify validation issues (i.e. ensure any changes in the design of the system does not affect the validation process)	The program office documented processes that satisfied the elements of the best practice.
Validate product or product components	Validation activities are performed throughout the project lifecycle	The program office documented processes that satisfied the elements of the best practice.
	Deviations from documented validation procedures are documented	The program office documented processes that satisfied the elements of the best practice.
	Validation results and traceability matrix/requirements matrix is documented	The program office documented processes that satisfied the elements of the best practice.
	Compare actual results to expected results	The program office documented processes that satisfied the elements of the best practice.

Criteria	GAO assessment
Identify and document causes for validation failure, if necessary	The program office documented processes that satisfied the elements of the best practice.
Analyze validation data for defects	The program office documented processes that satisfied the elements of the best practice.
Provide information on how defects can be resolved (including validation methods, criteria, and validation environment) and initiate corrective action	The program office documented processes that satisfied the elements of the best practice.

Source: SEI (criteria) and GAO (analysis of agency-provided data). | GAO-16-403

Process and Product Quality Assurance Best Practices Were Mostly Reflected in OI&T's Documentation

Best practices for process and product quality assurance are intended to support the delivery of high-quality products by providing project staff and management with appropriate visibility and feedback on processes and associated work products throughout the life of the project. Toward this end, process and product quality assurance involves objectively evaluating processes and work products, and providing objective insight to staff and managers.[65] Examples of objectively evaluating processes and work products include establishing and maintaining clearly stated criteria, based on business needs, for assessing processes and work products; identifying lessons learned that could improve processes; and documenting a description of the quality assurance reporting chain and defining how it will ensure objectivity. In addition, examples of providing objective insight include escalating noncompliance issues that cannot be resolved in the project to the appropriate level of management; tracking noncompliance issues to resolution; recording process and product quality assurance activities in sufficient detail so that the status and results are known; and periodically reviewing open noncompliance issues and trends with management designated to receive and act on them.

OI&T had documented processes that addressed 12 of 14 selected best practices related to process and product quality assurance. Specifically, the processes reflected 4 of 5 practices for objectively evaluating processes and work products. These included practices related to establishing and maintaining clearly stated criteria, based on business needs, for evaluating processes and work products; identifying each noncompliance found during the evaluation; identifying lessons learned; and evaluating selected work products at selected times.

[65]SEI, *CMMI® for Development and Acquisition, Versions 1.3*.

One practice—to document a description of the quality assurance reporting chain and define how it will ensure objectivity— was partially addressed in the processes. In this regard, while a quality assurance standard described how each review would ensure objectivity, the description of the reporting chain was not included.

In addition, the office's processes reflected 8 of 9 selected practices for providing objective insight. These included documenting noncompliance issues that cannot be resolved in the project, analyzing noncompliance issues to determine if quality trends can be identified and addressed; and ensuring that relevant stakeholders are aware of results of evaluations and quality trends in a timely manner. However, they did not address the periodic review of open noncompliance issues and trends with appropriate management.

By not fully documenting best practices related to quality assurance in its processes, OI&T has less assurance that staff will appropriately report quality assurance issues and periodically review open issues and trends so that the relevant manager can act on them. Table 8 summarizes the extent to which these best practices were reflected in OI&T's process and product quality assurance processes.

Table 8: Process and Product Quality Assurance Criteria Incorporated in the Office of Information & Technology's Documented Processes

	Criteria	GAO assessment
Objectively evaluate processes and work products	Establish and maintain clearly stated criteria, based on business needs, for evaluations of processes and work products (i.e., What will be evaluated? When or how often will a process be evaluated? How will the evaluation be conducted? Who will be involved in the evaluation?)	The program office documented processes that satisfied all of the elements of the best practice.
	Identify each noncompliance found during the evaluation	The program office documented processes that satisfied all of the elements of the best practice.
	Identify lessons learned that could improve processes	The program office documented processes that satisfied all of the elements of the best practice.
	Evaluate selected work products at selected times (i.e. before delivery, during delivery, incrementally, during unit testing, etc.)	The program office did not document processes that satisfied the elements of the best practice.
	Document a description of the quality assurance reporting chain and define how it will ensure objectivity	The program office documented processes that satisfied some but not all elements of the best practice.

	Criteria	GAO assessment
Provide objective insight	Resolve each noncompliance with the appropriate members of the staff, if possible	The program office documented processes that satisfied all of the elements of the best practice.
	Document noncompliance issues when they cannot be resolved in the project	The program office documented processes that satisfied all of the elements of the best practice.
	Escalate noncompliance issues that cannot be resolved in the project to the appropriate level of management designated to receive and act on noncompliance issues	The program office documented processes that satisfied all of the elements of the best practice.
	Analyze noncompliance issues to see if there are quality trends that can be identified and addressed	The program office documented processes that satisfied all of the elements of the best practice.
	Ensure that relevant stakeholders are aware of results of evaluations and quality trends in a timely manner	The program office documented processes that satisfied all of the elements of the best practice.
	Track noncompliance issues to resolution	The program office documented processes that satisfied all of the elements of the best practice.
	Record process and product quality assurance activities in sufficient detail so that the status and results are known	The program office documented processes that satisfied all of the elements of the best practice.
	Revise the status and history of quality assurance activities as necessary	The program office documented processes that satisfied all of the elements of the best practice.
	Periodically review open noncompliance issues and trends with the manager designated to receive and act on noncompliance issues	The program office did not document processes that satisfied the elements of the best practice.

Source: SEI (criteria) and GAO (analysis of agency-provided data). | GAO-16-403

Most Project Schedule Best Practices Were Partially Addressed or Not Addressed in OI&T's Process Documentation

The success of a project depends, in part, on having an integrated and reliable master schedule that defines when and how long work will occur, and how each activity is related to the others. A project's schedule provides not only a road map for systematic project execution, but also the means by which to gauge progress, identify and resolve potential problems, and promote accountability at all levels of the program.[66] VA's guide for IT project management deems project schedules as essential to

[66]GAO-16-89G.

a project's success and notes that failure to meet project schedule dates may trigger additional project reviews by senior leaders, which could lead to a project's shutdown.

Further, our Schedule Assessment Guide defines 10 best practices related to 4 characteristics that are important to developing high-quality, reliable schedule estimates—comprehensive, controlled, well-constructed, and credible.[67] Table 9 describes the characteristics of high-quality, reliable schedule estimates and their associated best practices that guided our analysis.

Table 9: Four Characteristics of a High-Quality, Reliable Schedule Estimate and Associated Best Practices

Characteristic	Description	Best practice
Comprehensive	A comprehensive schedule includes all activities for both the government and its contractors necessary to accomplish a project's objectives as defined in the project's work breakdown structure. The schedule includes the labor, materials, and overhead needed to do the work and depicts when those resources are needed and when they will be available. It realistically reflects how long each activity will take and allows for discrete progress measurement.	• Capturing all activities • Assigning resources to all activities • Establishing the durations of all activities
Controlled	A schedule is controlled if it is updated periodically by trained schedulers using actual progress and logic to realistically forecast dates for program activities. It is compared against a designated baseline schedule to measure, monitor, and report the project's progress. The baseline schedule is accompanied by a baseline document that explains the overall approach to the project, defines ground rules and assumptions, and describes the unique features of the schedule. The baseline schedule and current schedule are subject to a configuration management control process.	• Updating the schedule with actual progress and logic • Maintaining a baseline schedule
Well-constructed	A schedule is well-constructed if all its activities are logically sequenced with the most straightforward logic possible. Unusual or complicated logic techniques are used judiciously and justified in the schedule documentation. The schedule's critical path represents a true model of the activities that drive the project's earliest completion date, and total float[a] accurately depicts schedule flexibility.	• Sequencing all activities • Confirming that the critical path is valid • Ensuring reasonable total float
Credible	A schedule that is credible is horizontally traceable—that is, it reflects the order of events necessary to achieve aggregated products or outcomes. It is also vertically traceable: activities in varying levels of the schedule map to one another and key dates presented to management in periodic briefings are in sync with the schedule. Data about risks and opportunities are used to predict a level of confidence in meeting the project's completion date. The level of necessary schedule contingency and high-priority risks and opportunities are identified by conducting a robust schedule risk analysis.	• Verifying that the schedule is traceable horizontally and vertically • Conducting a schedule risk analysis

[67] GAO-16-89G.

Source: GAO-16-89G. | GAO-16-403

[a]Total float is the amount of time by which a predecessor work activity can slip before the delay affects the project's estimated finish date.

Almost all of OI&T's processes for developing project schedules either partially addressed or did not address the 10 best practices. Specifically, the documentation for developing comprehensive, controlled, well-constructed, credible project schedules reflected 1 best practice, partially reflected 6 best practices, and did not reflect 3 best practices.

Without documented processes for developing schedules that reflect best practices, OI&T is at increased risk that schedules created for its projects will not be reliable and, therefore, will not be useful tools for measuring program performance against approved project plans. Table 10 summarizes the results of our assessment of whether OI&T's documented processes reflected the 4 characteristics of a high-quality, reliable schedule estimate, their associated best practices, and examples of our rationale for the assessment.

Table 10: Project Scheduling Characteristics and Their Associated Best Practices Addressed in the Office of Information & Technology's (OI&T) Documented Processes

Characteristic	GAO assessment of the characteristic	Best practice	GAO assessment of the best practice	Examples of rationale for the assessment
Comprehensive	The program office documented processes that satisfied some but not all elements of the best practice.	Capturing all activities	The program office documented processes that satisfied some but not all elements of the best practice.	While OI&T's processes required the identification of necessary contractor deliverables and core schedule elements for projects, its processes did not explicitly require project schedules to include all government and contractor activities. If the project schedule does not fully and accurately reflect all activities, it will not be an appropriate basis for analyzing or measuring technical work accomplished and may result in unreliable completion dates, time extension requests, and delays.
		Assigning resources to all activities	The program office documented processes that satisfied all of the elements of the best practice	OI&T's processes required that activities have assigned resources and provide steps for updating resources, including specific activities that are resource dependent, resource default settings, and consequences for not using the recommended processes.

Characteristic	GAO assessment of the characteristic	Best practice	GAO assessment of the best practice	Examples of rationale for the assessment
		Establishing the durations of all activities	The program office documented processes that satisfied some but not all elements of the best practice.	While OI&T's processes required activity durations to be verified to ensure the proper duration, they did not include guidance for what should be considered in the verification and by whom. Further, OI&T's processes did not include guidance on the preferred business unit, such as working days, or on the use of calendars. Ensuring realistic calendars will provide for more accurate dates and may reveal opportunities to advance the work.
Controlled	The program office documented processes that satisfied some but not all elements of the best practice.	Updating the schedule with actual progress and logic	The program office documented processes that satisfied some but not all elements of the best practice.	Although OI&T's processes addressed updating the schedule, they did not include how often schedules should be updated, if someone responsible for updating the schedule should be trained in the critical path method, whether the schedule structure should be examined after every update, and whether a schedule narrative is required with each schedule update. Without an accurately updated schedule, management may lack the ability to determine which activities have been completed, are in progress, are late, and are planned to start on time. In addition, the schedule may not be useful as a tool to monitor a project's progress.
		Maintaining a baseline schedule	The program office documented processes that satisfied some but not all elements of the best practice.	While OI&T's processes included information on how to create a baseline schedule, they did not include information on the change control process for baseline schedules and whether trend analysis on float, missed dates, and contingency is performed. By not controlling and fully documenting changes to the baseline, a project's performance cannot be accurately measured against the original plan. Further, undocumented or unapproved baseline changes may affect performance measurement, and potentially result in inconsistent reporting of schedule variances, inconsistent versions of the schedule, and unreliable schedule data.
Well-constructed	The program office documented processes that satisfied some but not all elements of the best practice.	Sequencing all activities	The program office documented processes that satisfied some but not all elements of the best practice.	While OI&T's processes included some requirements for sequencing activities, most of the sequencing best practices were not included. For example, although OI&T established processes for assigning predecessors and successors, they instruct project teams to use mandatory constraints to serve as the predecessor and successor of level-of-effort activities. Using mandatory constraints prevents both the acceleration and delay of activities, and it is contrary to best practices. Further, the processes did not require constraints and other logic anomalies to be justified in schedule documentation. When activities are not correctly sequenced, the integrated master schedule may not be able to promote efficiency and accuracy or control the program by comparing actual to planned progress as intended.

Characteristic	GAO assessment of the characteristic	Best practice	GAO assessment of the best practice	Examples of rationale for the assessment
		Confirming that the critical path is valid	The program office documented processes that satisfied some but not all elements of the best practice.	OI&T's processes offered minimal guidance for confirming that the critical path is valid. Although the processes included requirements that the critical path is not to include level-of-effort activities and that the path should be free of date constraints, they did not state that the longest path and the path represented by critical activities should be the same. When the critical path is not the longest path, the longest path is preferred because it represents the activities that drive the sequence of start dates, which directly affect the estimated finish date. Without confirming a valid critical path, management may not focus on activities that could have detrimental effects on key project milestones and deliverables if they slip.
		Ensuring reasonable total float	The program office did not document processes that satisfied the elements of the best practice.	OI&T's processes did not include a requirement to develop, track, and ensure the validity of the project's total float.[a] Incorrect float estimates may result in an invalid critical path and an inaccurate assessment of project completion dates, and therefore may falsely depict the project's status.
Credible	The program office did not document processes that satisfied the elements of the best practice.	Verifying that the schedule is traceable horizontally and vertically	The program office did not document processes that satisfied the elements of the best practice.	OI&T's processes did not include requirements that the schedule be traceable horizontally and vertically. Unless the schedule is vertically traceable, lower-level schedules will not be consistent with upper-level schedule milestones, affecting the integrity of the entire schedule and the ability of different teams to work to the same schedule expectations. Further, without horizontal and vertical traceability, there is no valid critical path or assurance of reasonable float.
		Conducting a schedule risk analysis	The program office did not document processes that satisfied the elements of the best practice.	OI&T's processes did not include a requirement to conduct a schedule risk analysis. Without this analysis, the project team cannot sufficiently understand the level of confidence in meeting the project's completion date or identifying schedule contingency.

Source: GAO analysis of agency-provided data. | GAO-16-403

[a]Total float is the amount of time by which a predecessor work activity can slip before the delay affects the project's estimated finish date.

VA Officials Asserted That Inclusion of Missing Best Practices in Documented Processes Was Not Necessary

In discussing OI&T process documentation, officials in the Product Development and Service Delivery and Engineering offices, including an Assistant Deputy CIO within Product Development, stated that the department's documented IT processes did not include all of the selected best practices because they were considered basic, fundamental skills that a properly trained project planner should possess. The officials

added that their inclusion would be overly burdensome and counterproductive when working in an Agile environment.

However, the selected best practices do not apply to a particular development approach; rather, they were designed to provide value across different approaches, including Agile. In addition, documented processes are key to the consistent implementation of best practices that can withstand future leadership changes. Without incorporating these best practices into its processes, VA is at risk of missing critical steps that could help ensure that its processes are implemented as intended and are consistently applied across IT projects.

Conclusions

While VA has largely centralized the performance of key IT-related functions in OI&T, led by the CIO, it has faced challenges in fully implementing and managing IT under this organizational structure. In particular, the office has had difficulty in preventing IT activities from occurring outside the control of OI&T and PMAS. It has also been challenged in effectively collaborating with the department's various business units and in efficiently and cost-effectively delivering new IT capabilities. The OI&T transformation effort recently initiated by the CIO, and projected to be completed by the first quarter of 2017, is intended to address these and other challenges.

OI&T has also taken steps to implement human capital management best practices by developing and documenting and beginning to update a human capital strategic plan that aligns with VA's strategic plans, creating action plans for implementing OI&T human capital goals and objectives, reviewing its workforce quarterly, identifying skill gaps, and implementing a training program. However, without annually tracking and reviewing data related to leadership retirements or identifying skills needed in future years, VA will be hindered in ensuring that it has the leadership and staff with skills needed to support the successful delivery of IT capabilities.

Further, opportunities exist for VA to strengthen its processes for system development and acquisition by including key system development best practices. VA's documented processes for managing IT system development and acquisition generally reflected best practices in the key areas we reviewed. However, there were gaps in most of these areas. Ensuring that these processes address all key practices will assist the department in effectively managing its IT system development and acquisitions.

Recommendations for Executive Action

To assist VA in sustaining an IT workforce with the necessary knowledge, skills, and abilities to execute its mission and goals, we recommend that the Secretary of Veterans Affairs direct the Chief Information Officer to

- track and review OI&T historical workforce data and projections related to leadership retirements, and
- identify IT skills needed beyond the current fiscal year to assist in identifying future skills gaps.

To assist VA in establishing comprehensive and documented processes that reflect system development and acquisition best practices, we recommend that the Secretary of Veterans Affairs direct the Chief Information Officer to revise OI&T's documented processes related to

- project planning, to include (1) estimating the level of effort that will need to be expended for work products and tasks, and (2) making adjustments to the project plan to reconcile differences between estimated and available resources;
- requirements management, to include identifying changes to be made to plans and work products as a result of requirements baseline changes;
- risk management, to include (1) determining costs and benefits of implementing the risk mitigation plan for each risk and (2) collecting performance measures on risk handling activities;
- project monitoring and control, to include the 10 best practices that were missing from the guidance;
- process and product quality assurance, to include (1) documenting a description of the quality assurance reporting chain and defining how objectivity will be ensured, and (2) periodically reviewing open noncompliance issues and trends with management that is designated to receive and act on them; and
- project scheduling, to include the 9 best practices that were missing from the guidance and revise the documented processes where the guidance was contrary to best practices.

Agency Comments and Our Evaluation

In written comments on a draft of our report (reprinted in appendix IV), VA generally agreed with our conclusions and concurred with our eight recommendations. Further, the department provided, and requested that we include in our report, information describing OI&T's new organizational

structure and its cyber security initiative. We have incorporated this information in relevant sections of the report.

VA's comments described steps that it had taken or planned to implement our recommendations. For example, the department asserted that it had taken steps that fully addressed our recommendation that it track and review OI&T historical workforce data and projections related to leadership retirements. In our follow up on the department's implementation of our recommendations, we will evaluate whether the actions noted are fully responsive to this recommendation.

The department also discussed planned actions for addressing our recommendation related to identifying future IT skills. Specifically, VA stated that it plans to, among other actions, include in the next skills gap analysis, long-term recommendations at the organizational level that show the types of skills each organization needs to increase and which proficiency level targets need the most emphasis.

Further, in response to our recommendations that it revise OI&T's documented processes related to project planning and requirements management, VA stated that it plans to document changes to these processes as the department transitions from PMAS to VIP. In addition, with respect to the majority of the remaining deficiencies in VA's documented processes—related to risk management, project monitoring and control, quality assurance, and project scheduling—the department stated that our recommendations are to be addressed through the implementation of VIP, Agile processes, and other systems development process tools.

According to VA, its actions in response to our recommendations are expected to be completed by the end of fiscal year 2017. If the department ensures that these and other activities it identified are appropriately documented and effectively implemented, then VA should be better positioned to sustain an IT workforce with the necessary knowledge, skills, and abilities to execute its mission and goals, and to ensure critical systems development and acquisition processes are implemented as intended and are consistently applied across IT projects.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the Secretary of Veterans

Affairs and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

Should you or your staffs have questions on matters discussed in this report, please contact me at (202) 512-6304. I can also be reached by e-mail at melvinv@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 V.

Valerie C. Melvin
Director, Information Management and
Technology Resources Issues

Appendix I: Objectives, Scope, and Methodology

The objectives of this study were to determine (1) how the Department of Veterans Affairs (VA) is organized to manage and perform key information technology (IT)-related functions and the extent to which it has centralized the management of IT resources, (2) the extent to which VA has implemented effective IT human capital management, and (3) the extent to which VA has established key processes to effectively manage major system development and acquisition efforts.

To address the first objective, we obtained and reviewed the department's documentation identifying and describing its IT organizational structure and functions. These included the IT strategic plan, governance plan, organizational descriptions contained within the VA's Functional Organization Manual, the IT organization chart, and VA's project management framework user guides. In addition, we reviewed memoranda, testimony from VA officials, and assessment reports[1] that described the department's efforts to centralize the management of its IT resources and the challenges it faces in doing so. In addition, we obtained and reviewed the Chief Information Officer's (CIO) IT transformation strategy intended to address the challenges in maintaining a centralized program. We also interviewed responsible program officials regarding the organizational structure and performance of key IT-related functions.

To address the second objective, we reviewed information describing the department's management of its IT human capital, such as human capital strategic planning documentation, skills gap analyses, and human capital performance measures. We compared the department's actions to agency-level human capital management best practices that are also applicable to major agency components such as the Office of Information & Technology (OI&T). These best practices are those that we and the Office of Personnel Management (OPM) have identified. We also compared VA's actions against those required by VA's Office of Human Resources and Administration. These included practices for effective

[1]MITRE, *Assessment of The Department of Veterans Affairs Information and Technology Centralization* (Oct. 3, 2008); IBM Center for The Business of Government, *Transforming Information Technology at the Department of Veterans Affairs* (2009); IBM, *Single Leadership Authority Structure for the VA Information Technology Management System* (Sept. 25, 2006); Gartner, *OneVA IT Organizational Alignment Assessment Project* (May 16, 2005); and Gartner, *US Department of Veterans Affairs Federated Information Technology System Model* (Feb. 17, 2006).

strategic human capital planning, workforce planning, and strategic training. The practices are identified in our Key Principles for Effective Strategic Workforce Planning; [2] OPM's final regulations to implement certain provisions of the Chief Human Capital Officers Act of 2002; [3] and VA's Workforce and Succession Planning directive. [4] We also interviewed officials responsible for the department's IT human capital management.

For the third objective, we reviewed policies, procedures, and supporting documentation describing the department's key processes for managing major IT system development and acquisition efforts. We assessed the processes against key best practices that the Software Engineering Institute (SEI) and we have identified. The practices we selected are fundamental to effective IT system development and acquisition. These included recognized practices for project planning, requirements management, risk management, project monitoring and control, project validation, quality assurance, and project schedules. These practices are identified in SEI's Capability Maturity Model® Integration (CMMI®) for Development, Version 1.3;[5] SEI's CMMI® for Acquisition, Version 1.3;[6] and our Schedule Assessment Guide.[7] Further, we reviewed systems development lifecycle policies, procedures, and other supporting documentation such as templates for required project artifacts within the department's ProPath system[8] and Project Management Accountability

[2]GAO, *Human Capital: Key Principles for Effective Strategic Workforce Planning*, GAO-04-39 (Washington, D.C., Dec. 11, 2003).

[3]73 Fed. Reg. 23012 (Apr. 28, 2008).

[4]VA, *VA Directive 5002: Department of Veterans Affairs Workforce and Succession Planning* (Washington, D.C., Jan. 15, 2003).

[5]SEI, *CMMI® for Development, Version 1.3*, CMU/SEI-2010-TR-033 (November 2010, Hanscom AFB, Mass.). The SEI is a federally funded research and development center operated by Carnegie Mellon University.

[6]SEI, *CMMI® for Acquisition, Version 1.3*, CMU/SEI-2010-TR-032 (November 2010, Hanscom AFB, Mass.).

[7]GAO, *Schedule Assessment Guide: Best Practices for Project Schedules*, GAO-16-89G (Washington, D.C.: December 2015).

[8]ProPath is a repository for systems development artifacts, procedures, and processes.

System (PMAS).[9] The scope of our review did not include assessment of VA's implementation of these processes.

Our methodology to determine the extent to which VA included systems development and scheduling best practices developed by SEI and us in its procedures and guidance included three levels of compliance: (1) the program office provided evidence that satisfied the elements of the best practice, (2) the program office provided evidence that satisfied some but not all of the elements of the best practice, and (3) the program office provided no evidence that satisfied the elements of the best practice.

We conducted this performance audit from February 2015 to August 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.

[9]PMAS is VA's approach to IT project development and delivery and the means of holding IT project managers accountable for meeting cost, schedule, and scope. PMAS was designed to reduce project implementation risks, institute monitoring and controls, establish accountability, and create a reporting discipline. In January 2016, VA began transitioning from PMAS to the Veteran-focused Integration Process (VIP). VA plans to modify the Department's current methodology into a single, unified, and streamlined release process that will focus on delivering high-quality and secure IT capabilities to the veteran. VA plans to complete the transition to VIP by the end of fiscal year 2016.

Appendix II: Timeline of VA's Efforts to Organize the Management of IT Functions

The Department of Veterans Affairs (VA) has had a long history of organizing its information technology (IT) functions. The information contained in table 11 describes key events in the department's efforts.

Table 11: Timeline of Department of Veterans Affairs Efforts to Organize its IT Functions

Month/Year	Event	Description
July 1990	IT resources decentralized	VA's IT resources were moved from a centralized model to a decentralized model where key IT functions were performed and managed by its components—Veterans Benefits Administration, Veterans Health Administration, and National Cemetery Administration.
July 1998	Chief Information Officer (CIO) position established	The VA Secretary established the position of Assistant Secretary for Information and Technology to serve as the department-level CIO, focus on information and technology management, and provide the missing emphasis on information and technology issues.
August 2001	CIO position filled	The CIO position was filled in August 2001, but IT resources continued to be managed by each administration's CIO, rather than by the department-level CIO in the Office of Information & Technology.
August 2002	Secretary announces IT realignment	The VA Secretary announced the need to reorganize IT management and financing. The realignment was intended to centralize IT functions, programs, workforce personnel, and funding into the office of the department-level CIO—the Office of Information & Technology (OI&T). In particular, the CIOs in each of the three administrations were to be designated deputy CIOs and were to report directly to the department-level CIO by October 2002. (Previously, as component-level CIOs, these officials had reported only to their respective administrations' undersecretaries.) In addition, the Secretary stated that the department-level CIO would assume executive authority over VA's IT funding by October 2002.
May 2003	Secretary approves centralization plan	Under the approved centralization plan, deputy CIOs would remain in their respective administrations, but were to take technical direction from the department-level CIO.
February 2005	Contractor assessment recommends centralization of VA's IT program	VA's CIO directed a team of external consultants to conduct an assessment of the department's IT program. The purpose of the assessment was to ensure that all personnel were appropriately aligned to efficiently deliver program management, operational support, and systems design and development. The results of the assessment showed that similar activities, such as application development, infrastructure development, and asset management, were being performed across multiple OI&T groups, as well as other organizations led by the deputy CIOs within each of the three administrations. Further, the assessment concluded that the existing IT organization could not deliver sustained value for veterans due to the excessive duplication of effort.

Month/Year	Event	Description
October 2005	Secretary approves federated IT system concept	Under this concept, IT operational services and information security, as well as the associated budget, were intended to be centralized within OI&T and overseen by the department-level CIO, while IT systems development responsibilities and the associated budget were to remain with the administrations and other individual business units. The Secretary's plan was to eventually bring systems development under OI&T. In addition, the CIO would retain oversight responsibilities for all IT projects within VA.
November 2005	Military Quality of Life and Veterans Affairs Appropriations Act, 2006	This act established a new appropriation account for the department's IT systems, including development, acquisition, operation, and maintenance.
March 2006	Secretary approves federated system plan and assigns operations and maintenance staff to OI&T	IT professionals performing operations and maintenance functions across the department were assigned to OI&T as a result of the approved federated system plan.
September 2006	Contractor assisting in implementing federated system recommends VA centralize all IT functions	VA's contractor for assisting the department in applying best business processes to the federated structure recommended that VA consolidate all IT leadership authorities, including systems development, under the department-level CIO. The contractor pointed to three primary reasons for doing so: IT and health care industry trends that demanded increased levels of interoperability and the adoption of standards; an August 22, 2006, presidential executive order that emphasized adherence to interoperability standards, and standard measurements of quality, as well as transparency of cost and pricing data; and VA's increasing awareness of the benefits associated with transitioning from the current multiple leadership structure under the federated model to a single IT leadership authority.
October 2006	Secretary approves realignment of all IT resources under OI&T	The Secretary approved an Executive Decision Memo from the CIO stating that it was in the best interest of VA to formally transition from the federated structure to a fully centralized organization structure.
April 2007	Systems development staff assigned to OI&T	The Deputy Secretary directed that all identified VA personnel dedicated to the IT development organizations of the Veterans Benefits Administration, Veterans Health Administration, National Cemetery Administration, staff offices, and other VA organizations, with the exception of the Office of Inspector General, be assigned to OI&T.

Source: GAO analysis of VA data. | GAO-16-403

Appendix III: Summary of VA's Office of Information & Technology Human Capital Goals, Objectives, and Strategies

The Department of Veterans Affairs (VA) Office of Information & Technology (OI&T) developed a 6-year human capital strategic plan in September 2013. The information contained in table 12 describes the goals, objectives, and strategies outlined in OI&T's strategic human capital plan.

Table 12: Department of Veterans Affairs Office of Information & Technology (OI&T) Human Capital Goals, Objectives, and Strategies

Goal 1: Maximize employee talent through recruitment, outreach, hiring, and retention	
Objectives	**Strategies**
Improve the applicant and new hire experience and ensure that the people hired actually have the skills needed to perform the job; make more accurate projections about what types and how many of certain occupations the organization needs for the future.	Develop and deploy an integrated workforce plan and database which will enable the agency to hire and retain the right talent, at the right time, in the right place.
	Conduct a formal review of the orientation process and develop and implement a plan to streamline and improve employee orientation and on-boarding.
Implement a comprehensive recruitment program that ensures stakeholders are trained in operating procedures that contribute to the success of hiring the required skills for mission critical positions.	Ensure leaders and selected officials are fully engaged in the recruitment and hiring efforts, and understand how to select the right employee for the right job.
	Develop and implement a training program tailored specifically for the stakeholders.
	Encourage open feedback to ensure employees can speak freely on issues and that they are assured of defined direction of authority on policies and procedures.
Identify critical positions that ensure continued operations in support of VA services.	Appoint a point-of-contact in each office to coordinate and oversee the development and maintenance of workforce planning (living document) information.
	Develop "tailored" formal OI&T workforce planning training for managers, supervisors, and points-of-contact to include training for workforce planning documentation.
Acquire a better understanding of why employees leave OI&T and what can be done to retain skilled and productive employees.	Encourage open feedback between supervisors (at all levels) and departing employees so supervisors understand why employees are departing OI&T.
	Encourage all employees to participate in the exit survey prior to their departure.

Goal 2: Sustain a productive, diverse workforce and achieve results by valuing and recognizing performance in an environment in which all employees are encouraged to contribute	
Objectives	**Strategies**
Build and improve the OI&T future workforce performance management culture to influence a variety of workforce management decisions and employee perceptions.	Utilize strategic planning methods and workforce analysis to align and recruit critical positions that add value to the OI&T mission.

Objectives	Strategies
	Provide training that increases mission awareness and diversity sensitivity, and results in an improvement in productivity and impacts the organizational bottom line.
	Improve employee engagement, job satisfaction, and organizational performance.
	Develop a robust awards and recognition program.
Build a diverse OI&T workforce that embraces the diversity of the population of veterans and organizations that we service.	Use innovate recruitment strategies and outreach efforts to expand the pool of qualified diverse candidates for vacancies.
	Promote the use of training opportunities that enhance the understanding of conflict resolution and Equal Employment Opportunity policies and procedures. Encourage diversity and inclusion in the workforce and the workplace.
	Promote minorities, Pathways, and veterans outreach programs and internal advancement strategies to enhance the recruiting, hiring, and promoting of qualified minorities and veterans.
	Increase the percentage of the workforce identified as minorities, veterans, or having a targeted disability.
Eliminate competency gaps in mission critical occupations.	Identify major competency gaps and develop training to eliminate gaps.
	Provide training that will improve job proficiency, increase awareness, and have a positive impact on the organization's mission.
	Implement goal-based, individual performance plans.
	Develop a mechanism to identify emerging competencies as well as legacy competencies.

Goal 3: Ensure OI&T supports a culture of leadership and continuous learning

Objectives	Strategies
Eliminate competency gaps in key leadership positions.	Identify and implement tools and processes to identify and define the competencies that OI&T leaders must develop and retain to ensure OI&T leadership has the right skills it needs to meet organizational goals.
	Perform recurring training needs assessment and continuously design training to improve organizational and individual performance.
Train, develop, and retain OI&T employees to fill future key leadership vacancies.	Develop leadership succession plans, including leadership gap analyses.
	Evaluate the training and development program to determine how well it meets short- and long-range program needs, and develop an action plan to address any needs.
	Establish or leverage a leadership curriculum for all supervisors and managers to invest in the continuous development of leadership (e.g., the IT Workforce Development group's Basic Elements for Supervisory Training curriculum).
	Leverage internal and external learning opportunities for all employees, using a variety of learning tools and processes that provide opportunity for continuous learning.

Goal 4: Ensure the Human Capital Strategic Plan is aligned with other VA strategic plans and integrated workforce planning

Objectives	Strategies
Expand the human capital efforts into a comprehensive program that includes human capital planning, collaboration with other staff, and accountability for human capital operations.	Ensure that a robust human capital planning program is implemented encompassing input from all pillars.
	Ensure leadership buy-in in for the human capital management program.
	Transition human capital management from a management-by-budget to a management-by-position program.
	Develop strategy to communicate with all Human Resource Service Stations that provide support to OI&T employees.
Develop an OI&T-wide integrated workforce analysis capability (e.g., ability to analyze workforce demographics and key hiring and turnover metrics), that enables data driven strategic and operational human capital management decision-making.	Implement a workforce planning process to proactively identify needed skills, staffing requirements, and strategies to meet organizational goals.
	Coordinate with the Austin-Human Resource Center and other supporting human resource centers on achieving transactional excellence (e.g., excellence in processing personnel actions, recruiting, hiring, and staffing actions).

Source: VA, Office of Information & Technology Human Capital Strategic Plan 2014-2020, September 30, 2013. | GAO-16-403

Appendix IV: Comments from the Department of Veterans Affairs

DEPARTMENT OF VETERANS AFFAIRS
Washington DC 20420

July 15, 2016

Ms. Valerie Melvin
Director, Information Management and
Technology Resources Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Melvin:

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VA would like to request that GAO include the Office of Information and Technology's (OI&T) Organizational Structure, as well as a general discussion on OI&T's transformation cyber security initiative, the Enterprise Cybersecurity strategy and project plan. The organization chart and information on the Enterprise Cybersecurity Strategy Plan are enclosed. The enclosure sets forth the action to be taken to address the GAO draft report recommendations.

Sincerely,

Gina S. Farrisee
Deputy Chief of Staff

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VA Comment: Concur. The Department of Veterans Affairs' (VA) Information Technology Workforce Development (ITWD) continues to revise and evolve policy and practices regarding workforce planning, and the Office of Information & Technology (OI&T) actively assists the Department by developing unified plans that support VA's mission and strategy as it evolves. OI&T has tracked gains and losses, to include leadership, since the inception of OI&T and will continue to do so. The tracked data can be segmented into any group of employee population for all grades, as well as indicates supervisory status. VA requests closure of this recommendation.

Recommendation 2: identify IT skills needed beyond the current fiscal year to assist in identifying future skill gaps.

VA Comment: Concur. ITWD collects and analyzes competency assessment data in the first quarter of each fiscal year (FY). The data are used in requirements gathering meetings with OI&T leaders. During these conversations, organizational skill gaps and needs are discussed in detail. The results of these conversations are next steps for developing learning engagements in the current FY and recommendations for potential learning interventions beyond the current FY. OI&T plans to continue this process going forward. The Chief Learning Officer (CLO) will manage ITWD's efforts and serve as the primary point of contact for discussions with OI&T leadership.

OI&T is undergoing a major transformation. The CLO has directed ITWD to conduct a full review of the current competency model staff alignments to ensure that the organization's changes are supported by staff competency model alignments. This validation will result in OI&T staff receiving the most impactful learning options when creating their electronic Individual Development Plan. These learning opportunities will help facilitate OI&T's transformation by focusing staff learning on building skills that are identified as gaps across the organization to further accelerate the OI&T Enterprise strategy implementation.

OI&T established a November 30, 2016, deadline for all OI&T staff to complete a competency self-assessment in the VA Talent Management System (TMS) and have that assessment validated by their supervisor. No later than January 30, 2017, ITWD will produce reports tailored to each OI&T functional unit that details skill gaps and

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GAO Recommendation: To assist VA in establishing comprehensive and documented processes that reflect system development and acquisition best practices, GAO recommends that the Secretary of Veterans Affairs direct the Chief Information Officer to:

Recommendation 3: revise OI&T's documented processes related to project planning, to include (1) estimating the level of effort that will need to be expended for work products and tasks, and (2) making adjustments to the project plan to reconcile differences between estimated and available resources.

VA Comment: Concur. OI&T is documenting changes to processes related to project planning as it transitions from Project Management Accountability Systems (PMAS) to Veteran-focused Integration Project (VIP) and implements the Enterprise Program Management Office (EPMO). This major change incorporates a centralized intake process for all IT project requests, utilizing the VIP Request (VIPR) portal and starting the process of capturing high-level Business epic. As a part of the VIPR process, the IT Account Managers, Business Owner, and Portfolio Directors collaborate on the requests to approve and prioritize. The efforts accepted through this process must have an elaborated business requirements and funding. This will lead to better requirements elaboration and prioritization, increasing significantly the accuracy of estimates related to level of effort. Furthermore, using short Agile sprints, the project team can adjust the project plan frequently to reconcile differences between estimated and available resources, with the approval and oversight by the Portfolio Director. These changes will be incorporated into a future version of the VIP Guide. Target Completion Date: End of FY 2017

Recommendation 4: revise OI&T's documented processes related to requirements management, to include identifying changes to be made to plans and work products as a result of requirements baseline changes.

VA Comment: Concur. OI&T is currently revising documentation related to requirements management, as part of the transition to VIP and the EPMO. VIP policy and processes incorporate the increased use of the Agile methodology, and the EPMO organization supports this transition by providing Agile mentors and training. With Agile methodology, requirements and solutions evolve through collaboration between self-

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GAO Recommendation 5: revise OI&T's documented processes related to risk management, to include (1) determining costs and benefits of implementing the risk mitigation plan for each risk and (2) collecting performance measures on risk handling activities.

VA Comment: Concur. The IBM Rational Tool Suite will be used to manage project/product risks and issues. This allows a standard Risk and Issue process to be used, and provides standard reporting for all product teams using Rational Team Concert and VIP. The tool suite will allow requirements to be linked to risks, which will provide traceability. By recording project risks and issues, as well as effective responses that have been implemented to mitigate them, teams can track and report steps taken to mitigate risks. While risks are not versioned in the tool suite, an audit trail shows the history of changes made to each risk. This information, along with combining tracked changes made to requirements, tasks and risks, provides detailed data and tracking of the risks. Under VIP, project risks requiring leadership assistance are raised to the Chief Information Officer (CIO), and discussed with other senior leaders at the weekly CIOStat meetings. In addition, the Office of Privacy and Risk will establish risk mitigation strategies for the OI&T enterprise. Target Completion Date: End of FY 2017

Recommendation 6: revise OI&T's documented processes related to project monitoring and control, to include the 10 best practices that were missing from the guidance.

VA Comment: Concur. The implementation of VIP and Agile processes within OI&T will address the majority of best practices related to project monitoring and control that GAO felt were missing from OI&T's documented processes. GAO recommended that OI&T periodically review the status of stakeholder involvement to ensure that stakeholders are involved regularly; and document the results of stakeholder involvement status reviews. Both of these will be addressed through the implementation of Agile methodologies, which requires stakeholders to be involved in the daily scrum meetings, user acceptance testing, and acceptance of deliverables. Data management activities, issues, and impacts will be managed using VIP, Agile, and IBM Rational Tools.

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Recommendation 7: revise OI&T's documented processes related to process and product quality assurance, to include (1) documenting a description of the quality assurance reporting chain and defining how objectivity will be ensured, and (2) periodically reviewing open noncompliance issues and trends with management that is designated to receive and act on them.

VA Comment: Concur. The implementation of VIP, Agile processes, and Rational Toolset within OI&T will address process and product quality assurance. As a part of VIP, the Product Owner is engaged from intake through project completion, which will ensure that the quality of the product is maintained throughout the life cycle. The process of periodically reviewing open non-compliance issues and trends with management that is designated to receive and act on them will be accomplished through the CIOStat meetings held with OI&T senior leadership. The Rational Quality Manager tool is used to automate routine testing activities to identify non-compliance issues and trends. In addition, the newly formed Office of Quality and Compliance will begin monitoring in key compliance areas during the 4th Quarter FY 2016. Target Completion Date: End of FY 2017

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Target Completion Date: End of FY 2017

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Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact

Valerie C. Melvin, (202) 512-6304 or melvinv@gao.gov

Staff Acknowledgments

In addition to the contact named above, Mark Bird (Assistant Director), Nicole Jarvis (Analyst in Charge), Christopher Businsky, Juana Collymore, Sharhonda Deloach, Jason Lee, Lee McCracken, and Christy Tyson made key contributions to this report.

Appendix VI: Accessible Data

Agency Comment Letter

Text of Appendix IV: Comments from the Department of Veterans Affairs

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Washington DC 20420

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