



*The Internal Revenue Service Is Not in
Compliance With Federal Requirements
for Software Asset Management*

September 18, 2017

Reference Number: 2017-20-062

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HIGHLIGHTS

THE INTERNAL REVENUE SERVICE IS NOT IN COMPLIANCE WITH FEDERAL REQUIREMENTS FOR SOFTWARE ASSET MANAGEMENT

Highlights

**Final Report issued on
September 18, 2017**

Highlights of Reference Number: 2017-20-062
to the Internal Revenue Service Chief
Information Officer.

IMPACT ON TAXPAYERS

Efficient and cost-effective management of the IRS's software assets is crucial to ensure that information technology services continue to support the IRS's business operations and to help provide services to taxpayers efficiently.

WHY TIGTA DD THE AUDIT

This audit was initiated to determine the IRS's progress in addressing the 14 recommendations included in three prior TIGTA audits related to software license management. Also, recent laws and regulations direct Federal agencies to establish a comprehensive software license policy that includes establishing an inventory of software license spending, tracking and maintaining software licenses, and establishing goals and objectives of the software license management program.

WHAT TIGTA FOUND

The IRS made some progress in addressing TIGTA's prior audit recommendations, but our review determined that the IRS prematurely closed 11 corrective actions. The actions completed did not adequately address the recommendations and should not have been closed. Specifically, the IRS has not developed policy and guidance or roles and responsibilities for managing software asset licenses as defined by the Information Technology Infrastructure Library; implemented a specialized software license tool(s) designed to discover, track, and manage software license deployment and

usage; or developed standard operating procedures for using the tool(s).

While the IRS is in the early stages of establishing a framework for and is using ad-hoc procedures to make progress in the area of Software Asset Management (SAM), the IRS has not maintained standard pricing and terms and conditions for software acquisitions, compiled a reliable baseline inventory of software licenses, or documented cost savings and cost avoidance attributable to improved software license management in accordance with recent laws and regulations.

WHAT TIGTA RECOMMENDED

TIGTA recommended that the Chief Information Officer establish executive governance for SAM within the IRS; establish a SAM framework using Federal requirements and industry best practices; and assess current SAM practices to identify gaps within the IRS's management of software licenses and take necessary corrective actions to resolve issues using the SAM framework.

The IRS agreed with the recommendations. The IRS plans to complete the establishment of governance for SAM; establish a SAM framework using Federal requirements and industry best practices as guidelines; identify gaps within the IRS's management of software licenses and take necessary corrective actions to resolve issues by using a SAM framework; and continue with implementation of tools to improve and automate SAM inventory, utilization, and reporting functions. However, the IRS stated that it will implement the recommendations dependent upon availability of current technological, budgetary, and operational constraints.



TREASURY INSPECTOR GENERAL
FOR TAX ADMINISTRATION

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

September 18, 2017

MEMORANDUM FOR CHIEF INFORMATION OFFICER

FROM: Michael E. McKenney
Deputy Inspector General for Audit

SUBJECT: Final Audit Report – The Internal Revenue Service Is Not in
Compliance With Federal Requirements for Software Asset
Management (Audit #201720017)

This report presents the results of our review to determine if the Internal Revenue Service adequately addressed the Treasury Inspector General for Tax Administration's prior recommendations and implemented Federal laws and policies for managing software assets. This audit is included in our Fiscal Year 2017 Annual Audit Plan and addresses the major management challenge of Achieving Program Efficiencies and Cost Savings.

Management's complete response to the draft report is included as Appendix VII.

Copies of this report are also being sent to the IRS managers affected by the report recommendations. If you have any questions, please contact me or Danny R. Verneuille, Assistant Inspector General for Audit (Security and Information Technology Services).



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Abbreviations

COTS	Commercial Off-the-Shelf
ESGB	Enterprise Software Governance Board
IRM	Internal Revenue Manual
IRS	Internal Revenue Service
IT	Information Technology
ITIL®	Information Technology Infrastructure Library
MEGABYTE Act of 2016	Making Electronic Government Accountable by Yielding Tangible Efficiencies Act of 2016
OMB	Office of Management and Budget
SAM	Software Asset Management
SOP	Standard Operating Procedure
TIGTA	Treasury Inspector General for Tax Administration



The Internal Revenue Service Is Not in Compliance With Federal Requirements for Software Asset Management

Background

Between June 2013 and September 2014, the Treasury Inspector General for Tax Administration (TIGTA) issued three audit reports¹ to the Internal Revenue Service (IRS) related to software asset management (SAM).² Those reports covered the Mainframe (Tier 1), Server (Tier 2), and Desktop and Laptop (Tier 3) environments. Each of the reports identified that the IRS was not adequately performing software license management. As such, we made recommendations in each audit report to the IRS Chief Technology Officer³ concerning the need for a software license inventory system covering all tiers of computer equipment.

In May 2014, the Government Accountability Office reported⁴ that the Office of Management and Budget (OMB) and 22 of the 24 major Federal agencies reviewed did not have adequate policies for managing software licenses. To address these issues, on June 2, 2016, the OMB issued Memorandum M-16-12, *Improving the Acquisition and Management of Common Information Technology: Software Licensing* (OMB M-16-12).

Additionally, on July 29, 2016, the President signed into public law the Making Electronic Government Accountable by Yielding Tangible Efficiencies Act of 2016 (MEGABYTE Act of 2016).⁵ The MEGABYTE Act of 2016 requires each Federal executive agency, which includes the Department of the Treasury, to develop a comprehensive software licensing policy that includes identifying clear roles and responsibilities and central oversight authority within the Federal executive agency for managing software licenses.

This review was performed at the IRS Information Technology (IT) organization's Strategy and Planning, Enterprise Services, and User and Network Services offices at the New Carrollton Federal Building in Lanham, Maryland, and Denver, Colorado, during the period November 2016 through April 2017. We conducted this performance audit 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 objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

¹ TIGTA, Ref. No. 2013-20-025, *Desktop and Laptop Software License Management Is Not Being Adequately Performed* (June 2013); TIGTA, Ref. No. 2014-20-002, *The Internal Revenue Service Should Improve Mainframe Software Asset Management and Reduce Costs* (Feb. 2014); and TIGTA, Ref. No. 2014-20-042, *The Internal Revenue Service Should Improve Server Software Asset Management and Reduce Costs* (Sept. 2014).

² See Appendix VI for a glossary of terms.

³ In June 2016, the Chief Technology Officer/Chief Information Officer left the IRS. As of July 2016, the IRS announced a new Chief Information Officer and no longer uses the title of Chief Technology Officer.

⁴ Government Accountability Office, GAO-14-413, *Federal Software Licenses: Better Management Needed to Achieve Significant Savings Government-Wide* (May 22, 2014).

⁵ Pub. L. No. 114-210, 130 Stat. 824, 40 U.S.C.



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Detailed information on our audit objective, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.



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Results of Review

**The IRS Is Making Progress Towards Closing Prior Audit
Recommendations; However, Corrective Actions Were Inappropriately
Closed**

TIGTA provided 14 recommendations in three audit reports regarding software license management issued to the IRS between June 2013 and September 2014. While we conducted separate reviews of the Tier 1, Tier 2, and Tier 3 environments, the recommendations were similar for each environment. We determined that the IRS IT organization's management had not identified and implemented automated software license tools for the enterprise-wide management of software licenses and that the Internal Revenue Manual (IRM) section⁶ covering the software license management program was under development. In addition, the IRS was unable to provide us with the essential license records for properly managing licenses. We reported \$109.4 million in the inefficient use of resources and \$50,000 for funds put to better use.

Recommendations from prior TIGTA audit reports regarding software licenses

For each tier, we made recommendations⁷ to improve IRS SAM. The recommendations included:

- Develop an enterprise-wide organizational structure to manage software assets and licenses.
- Develop policy and guidance in the IRM for managing software assets and licenses using the Information Technology Infrastructure Library (ITIL[®]) and best practices.
- Develop roles and responsibilities in the IRM for software asset and license management.
- Develop detailed standard operating procedures (SOP) for using software license tools for managing software licenses.
- Implement a specialized software license tool designed to discover, track, and manage software license deployment and usage. The implementation of the tool should include the development of an enterprise-wide, centralized, systematic, and repeatable method to

⁶ IRM 2.149, *IT Asset Management* (Sept. 23, 2015); this section replaces IRM 2.14.1, *Asset Management, Information Technology (IT) Asset Management*.

⁷ See Appendix V for specific recommendations.



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manage and track deployment of licenses that can be uniformly used by all organizational entities for managing licenses.

- Develop an enterprise-wide inventory of software licensing data and maintain the inventory with a specialized software license tool designed to discover, track, and manage software license deployment and usage.
- Maintain data in the inventory that the IRS can use to more effectively review software license agreements, purchases, deployment, usage, and other related aspects of licensing to identify additional savings in software spending.

Executive Order 13103⁸ requires and ITIL best practices recommend the development of software license management policies, procedures, roles, and responsibilities. The ITIL and other industry best practices recommend a centralized enterprise-wide management structure for SAM. In September 2010, the IRS Chief Technology Officer outlined a goal to have the IT organization implement the ITIL best practices over the next several years.

The National Institute of Standards and Technology Special Publication 800-53 Revision 4, *Security and Privacy Controls for Federal Information Systems and Organizations*,⁹ and Treasury Directive Publication 85-01, *Treasury IT Security Program*,¹⁰ require and the ITIL and industry best practices recommend implementing enterprise-wide software asset discovery, network scanning, license management, and license metering tools.

The ITIL book *Best Practices Software Asset Management* was developed to assist with understanding what SAM is and to explain what is required to perform it effectively and efficiently. The book outlines roles and responsibilities necessary for SAM and states:

If SAM processes are to prove successful within an organization, it is important that roles and responsibilities are clearly defined and agreed and that the scope of ownership of each of the processes is also defined and agreed. These roles and responsibilities should therefore be adapted to fit the individual requirements of each organization in accordance with its size, nature, structure, culture and geographical distribution.

Corrective actions to address prior audit recommendations

In October 2016, the IRS reported that it had taken the necessary steps to address several of the previously reported recommendations and closed 11 of 14 corrective actions. However, our review of the 11 closed corrective actions determined that none of the completed actions

⁸ Executive Order 13103, *Computer Software Piracy* (Sept. 30, 1998).

⁹ Dated April 2013.

¹⁰ Dated November 3, 2006.



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adequately addressed the recommendations and should not have been closed.¹¹ Our assessment of the closed corrective actions follows:

- Develop an enterprise-wide organizational structure to manage software assets and licenses (two recommendations)¹² – The IRS responded by stating that it would revise the IRM to clarify structure, including roles and responsibilities being developed by the Enterprise Software Governance Board (ESGB). However, the IRS did not develop an organizational structure to manage software assets and licenses.

On December 19, 2013, the IRS established the ESGB. It was chartered by the Infrastructure Executive Steering Committee (established in 2008) to govern the IRS's enterprise software assets throughout their acquisition lifecycle, including retirement. The ESGB was co-chaired by the Associate Chief Information Officer, Strategy and Planning, and the Associate Chief Information Officer, Enterprise Services. The board also included representatives from each of the following IRS IT organizations: Affordable Care Act, Applications Development, Enterprise Operations, Cybersecurity, Procurement, and User and Network Services.

The ESGB was decommissioned on December 14, 2015, in support of the IRS Program Governance Office directive that tasked IRS organizations to consolidate and integrate into three main Executive Steering Committees. As such, the ESGB no longer holds meetings; however, when an issue is identified, that information is sent to the ex-ESGB voting members, via e-mail, for a vote. The ex-ESGB voting members review and approve ad hoc SAM funding issues. Because the ESGB no longer exists, the governance of an enterprise-wide SAM organizational structure does not exist. IRS information technology governance documentation received from the IRS shows that until full integration of the three Executive Steering Committees is achieved, the Infrastructure Executive Steering Committee has no oversight of the SAM program.

Currently, the Information Technology Infrastructure Strategy Team (formerly an ESGB working group) provides oversight and risk/issue escalation for all existing and proposed software acquisitions and their corresponding assets in the IRS information technology investment portfolio.

- Develop policy and guidance in the IRM for managing software asset licenses using the ITIL and industry best practices (two recommendations)¹³ – The IRS developed IRM 2.149, *IT Asset Management Policy*, September 23, 2015, to replace IRM 2.14.1, *Asset Management, Information Technology (IT) Asset Management*. However, IRM 2.149 does not establish policy and guidance for IRS management as defined by the ITIL. The IRM establishes that the Chief Technology Officer or other delegated

¹¹ See Appendix V for specific recommendations.

¹² See Appendix V, rows 8 and 14.

¹³ See Appendix V, rows 1 and 7.



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executive shall ensure that necessary budget, labor, tools, and appropriate training are available to implement asset management policies and procedures. The IRS has not provided this level of guidance in the documents prepared for the closure of the prior audit recommendations. Until the IRS can fully implement the corrective actions stated in its responses to TIGTA and ensure that these actions are consistent with industry standards, these recommendations should not have been closed.

- Develop roles and responsibilities in the IRM for software asset and license management (two recommendations)¹⁴ – The IRS did not include specific roles and responsibilities. IRS personnel stated that they did not have access to ITIL documentation that could have been used in developing the IRM.
- Develop detailed SOPs for using software license tools for managing software licenses (two recommendations)¹⁵ – The IRS developed an SOP for using an automated tool for inventory as well as several user guides but cannot complete this recommendation until it determines all tools necessary for SAM. An SOP was created for IBM's Big Fix[®] software product. However, Big Fix will only be used for software inventory. IRS IT organization's management have not identified any one tool that will monitor and track software license usage or track costs enterprise-wide. Management indicated that Tier 1 is currently monitored by IBM's Tivoli[®] Asset Discovery for z/OS, and the Big Fix software product is being implemented in Tiers 2 and 3. However, these software products can only provide inventory information. They cannot provide sufficient license entitlement information, which is necessary for effective SAM.
- Implement a specialized software license tool, develop an enterprise-wide inventory of software licensing data, and maintain the data in the inventory (six recommendations)¹⁶ – The IRS closed three recommendations from the Tier 1 report. However, the IRS left the same recommendations open from the Tier 3 report stating, "Based on experience, there is not a single tool that can discover, track, and manage software license deployment and usage and that the IRS is already working to identify and implement a standard enterprise toolkit, which may include multiple tools, to accomplish the recommendation." A tool has not been implemented; therefore, the IRS should not have closed the three recommendations in the Tier 1 report. Also, these three recommendations in the Tier 3 report have been extended four times from the original closing dates.

IT organization management stated that there is not one commercial off-the-shelf (COTS) product that will monitor all types of software asset licenses. Big Fix has out-of-the-box functionalities for software metering and a software license compliance feature to determine if the software is over- or under-licensed. Management stated that the Big Fix software license

¹⁴ See Appendix V, rows 2 and 9.

¹⁵ See Appendix V, rows 3 and 10.

¹⁶ See Appendix V, rows 4, 5, 6, 11, 12, and 13.



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compliance feature will not cover the metering processes that the IRS requires. Therefore, the IRS is currently looking to purchase another COTS product that will better suit these requirements. Management stated that they are considering a tool that would be able to gather the license entitlement information. The IRS has not established a time frame for the selection or implementation of a tool.

The IRS continues to be unable to report a complete and accurate inventory with associated costs. Until the IRS implements an effective SAM program to manage software licenses, it will continue to incur increased risks in managing software licenses. These risks include: 1) not complying with license agreements that could result in legal problems and financial liability; 2) not using licenses in the most cost-effective manner; and 3) not effectively using license data to reduce software purchase and software maintenance costs.

While TIGTA's normal practice would be to make specific recommendations for the IRS to reopen the 11 recommendations that were not fully addressed and inappropriately closed by the IRS corrective actions, we agreed to allow those recommendations to remain closed because the recommendations from this report fully address the updated enterprise-wide requirements of SAM as outlined in OMB M-16-12 and the MEGABYTE Act of 2016. In addition, the current SAM requirements include or expand upon our initial recommendations.

While the IRS Is in the Early Stages of Establishing a Software Asset Management Framework, It Is Not in Compliance With Federal Requirements for Software Asset Management

On June 2, 2016, OMB M-16-12 established the development of Governmentwide software license agreements for mandatory Federal executive agency use. Federal executive agencies must develop plans to address how they will move from existing agreements to the mandated Governmentwide software license agreements. Further, Federal executive agencies must justify and obtain approval from the Enterprise Software Category Team, led by the OMB, the Department of Defense, and the General Services Administration, to pursue new agreements that overlap or conflict with mandated Governmentwide software license agreements. OMB M-16-12 also mandates that each Federal executive agency:

- Post and maintain standard pricing and terms and conditions for acquisition agreements on the Acquisition Gateway within 90 calendar days after OMB M-16-12 was issued.
- Compile a baseline inventory of the Federal executive agency's commercial and COTS software licenses purchased, deployed, and in use using commercially available information technology by September 30, 2016. Report to the OMB Integrated Data Collection all cost savings and cost avoidance attributable to improved software license management beginning November 30, 2016, and each quarter thereafter.

In addition to requiring each Federal executive agency to establish a comprehensive software licensing policy, the MEGABYTE Act of 2016 requires each Federal executive agency to:



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- Establish a comprehensive inventory of software license spending, track and maintain software licenses, analyze software usage, provide training relevant to software license management, and establish goals and objectives of the software license management program of the Federal executive agency.
- Beginning in Fiscal Year 2017 and in each of the following five fiscal years, submit a report from the Chief Information Officer of the Federal executive agency on the financial savings or cost avoidance that resulted from improved software license management to the OMB.

The MEGABYTE Act of 2016 and OMB M-16-12 reporting requirements fall on the Department of the Treasury as the Federal executive agency. IRS IT organization's management clarified the IRS's responsibility in meeting the reporting requirements of the MEGABYTE Act of 2016 and stated, "the perspective is that to the extent the MEGABYTE Act applies to the IRS, it would be through providing our input to/or following direction from the Department of the Treasury."

However, the IRS budget accounts for 86 percent of the Department of the Treasury's budget of \$14.3 billion.¹⁷ When considering the size of the IRS's budget in relation to the Department of the Treasury as a whole, it is imperative that the IRS be able to implement the intent of the MEGABYTE Act of 2016 and OMB M-16-12 to ensure that the Department of the Treasury is able to provide a complete and accurate accounting of its information technology assets.

In January 2014, Deloitte Development Limited Liability Company¹⁸ created a SAM Framework¹⁹ in conjunction with the ITIL SAM guide²⁰ and the International Organization for Standards 19770-1.²¹ The Deloitte framework is used to assess current SAM competencies across three areas – Govern, Manage, and Operate – to identify gaps and formulate recommendations for a target state.

The IRS has not met the conditions set forth in OMB M-16-12 or the MEGABYTE Act of 2016. For example, the IRS has not posted and maintained standard pricing and terms and conditions for acquisition agreements on the Acquisition Gateway, compiled a baseline inventory of COTS software licenses, or reported to OMB Integrated Data Collection all cost savings and cost avoidance attributable to improved software license management. However, the IRS is in the early stages of developing a program and is currently using ad hoc procedures to make progress

¹⁷ Department of the Treasury, *The Budget in Brief* (Fiscal Year 2016).

¹⁸ Deloitte Development Limited Liability Company provides research-based people strategies to leaders and their organizations. The company also provides research and tools, benchmarking, advisory support, professional development, and networking solutions.

¹⁹ See Appendix IV for Deloitte's Software Asset Management Framework.

²⁰ ITIL V3 *Guide to Software Asset Management* (Aug. 2009).

²¹ ISO/IEC 19770-1: 2012 *Information technology—Software asset management—Part 1: Processes and tiered assessment of conformance* (June 2012).



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in each of the main areas of “Govern, Manage, and Operate” towards establishing a SAM framework.

- **Govern**: Ownership of the IRS’s software inventory is not centralized to cover its Tier 1, 2, and 3 environments. The IRS’s software inventory is managed by two different organizations. The IT organization’s Strategy and Planning function is currently in charge of Tiers 1 and 2 software. Tier 3 software is managed by the User and Network Services function. These groups do coordinate with each other; however, there should be a centralized management structure, such as a governance board, that is in charge of directing these two functions.

The IRS has developed enterprise-wide and local SAM policies and procedures. However, these policies do not clearly assign roles and responsibilities or centralize oversight authority within the IRS for SAM. Further, the IRS has defined the scope of asset management within the IRM. However, it has not established the vision and goals of SAM or metrics necessary for measuring progress in achieving the vision and goals.

- **Manage**: IT organization management are currently using ad hoc procedures to perform SAM and understand that they need to establish a reliable, comprehensive inventory of software license spending; a method for tracking and maintaining software licenses; and the ability to analyze software usage.

The IRS does not currently obtain entitlement information from the contractor during the acquisition phase of the software lifecycle. Obtaining entitlement information from the contractor during the procurement process would allow SAM personnel to accurately record and track the information.

While the availability of SAM-specific training is limited, the User and Network Services function indicated that personnel have been receiving training in SAM when possible. The Strategy and Planning function stated that it had not provided SAM training to its personnel.

- **Operate**: The IRS is using SAM tools currently available to it, such as Big Fix and Tivoli, to determine software inventory. The IRS is actively pursuing a technological solution that will provide it with the ability to perform software discovery, metering, and entitlement analysis. However, at this time, the IRS is unable to establish a reliable and comprehensive software inventory and perform other aspects of SAM such as discovery, metering, and entitlement analysis.

The ESGB was established on December 19, 2013, and decommissioned on December 14, 2015. As such, SAM funding decisions are now being made on an ad hoc basis by ex-members of this board. As identified in the sections of this report related to our prior recommendations, the IRS does not have a tool for SAM because one does not exist. Further, on February 22, 2017, the Department of the Treasury replied to an inquiry from TIGTA about the status of meeting the obligations of the MEGABYTE Act of 2016 and OMB M-16-12 by stating:



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The Federal government is in the initial phase of gathering requirements to implement a process to assist agencies to gather the information requested by the MEGABYTE Act of 2016 and OMB Memo M-16-12.”

The General Service Administration is leading this effort and Treasury is a participant. The group has started looking at different vendor tools to determine the best fit. They are in the Vendor Management Phase. The long and short of it all is that, like most government agencies and Treasury bureaus, there exists no tool or process to complete the MEGABYTE requirement at this time. Treasury continues to work with the General Service Administration to establish rules and a process to get this accomplished.”

Implementing an effective SAM process would reduce information technology costs and limit operational, financial, and legal risks related to the ownership and use of software. Further, the IRS would be able to address the intent of the MEGABYTE Act of 2016 and OMB M-12-16 and provide the Department of the Treasury with the necessary information to fulfill its obligations in following laws and guidance.

During the audit, Strategy and Planning function personnel began working on a template to obtain contractors' information during the acquisition phase of the software lifecycle. This template is being shared with the IRS Office of Procurement and will help ensure that entitlement information is accurately recorded and provided to SAM personnel.

Recommendations

The Chief Information Officer should:

Recommendation 1: Establish executive governance for SAM within the IRS which acts as a centralized group to ensure that effective and knowledgeable decisions are being made timely by authorized personnel.

Management's Response: The IRS agreed with this recommendation. The IRS plans to complete the establishment of governance for SAM, dependent upon availability of appropriate funding.

Recommendation 2: Establish a SAM framework using Federal requirements and industry best practices as guidelines.

Management's Response: The IRS agreed with this recommendation. The IRS plans to establish a SAM framework using Federal requirements and industry best practices as guidelines, dependent upon availability of appropriate funding. The framework(s) should address SAM capabilities across all computing tiers and related functions as informed by related efforts under the General Services Administration and the Department of the Treasury as noted within the report.



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Recommendation 3: Assess current SAM practices to identify gaps within the IRS's management of software licenses and take necessary corrective actions to resolve issues using the SAM framework. This should include establishing centralized management for SAM, developing a centralized inventory, and implementing a tool(s) necessary to perform other aspects of SAM such as discovery, metering, and entitlement analysis.

Management's Response: The IRS agreed with this recommendation. The IRS plans to identify gaps within IRS's management of software licenses and take necessary corrective actions to resolve issues by using the SAM framework. The IRS also plans to continue with implementation of tools to improve and automate SAM inventory, utilization, and reporting functions. The degree of success and rate of completion will remain constrained by the capabilities/limitations of commercially available SAM tools. Completion of the actions is also dependent upon availability of funding and other factors, such as ongoing changes in commercial software license terms, metrics, and practices over which the IRS has no control.



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Appendix I

Detailed Objective, Scope, and Methodology

Our overall objective was to determine if the IRS adequately addressed TIGTA's prior recommendations and implemented Federal laws and policies for managing software assets. To accomplish our objective, we:

- I. Researched, identified, and reviewed Government criteria and requirements and nongovernment best practices for software license management.
 - A. Identified Government criteria and requirements from sources such as laws, the OMB, the National Institute of Standards and Technology, and the IRS (including OMB M-16-12 and the MEGABYTE Act of 2016).
 - B. Identified nongovernmental best practices from recognized organizations.
 - C. Reviewed, analyzed, and summarized the criteria and requirements found that were relevant to the IRS's management of software licenses.
- II. Determined if the IRS addressed TIGTA recommendations from three prior software license audit reports issued between June 2013 and September 2014.
 - A. Obtained and reviewed the IRS's enterprise-level policy and procedures for SAM to determine consistency with the criteria, requirements, and best practices.
 - B. Obtained and reviewed IRS policies, procedures, and roles and responsibilities for SAM to determine consistency with the criteria, requirements, and best practices.
 - C. Determined if the IRS has a centralized inventory of its software assets including license data.
- III. Determined if the IRS implemented OMB M-16-12 and the MEGABYTE Act of 2016.
 - A. Determined if the IRS posted and maintained standard pricing and terms and conditions for acquisition agreements on the Acquisition Gateway within 90 calendar days after OMB M-16-12 was issued.
 - B. Determined if the IRS compiled a baseline inventory of commercial and COTS software licenses purchased, deployed, and in use using commercially available information technology by September, 30, 2016.
 - C. Determined if the IRS, beginning November 30, 2016, and each quarter thereafter, reports to the OMB Integrated Data Collection all cost savings and cost avoidance attributable to improved software license management.



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- D. Determined if the IRS provided training relevant to software license management.
- E. Determined if the IRS established goals and objectives for the software license management program.

Internal controls methodology

Internal controls relate to management's plans, methods, and procedures used to meet their mission, goals, and objectives. Internal controls include the processes and procedures for planning, organizing, directing, and controlling program operations. They include the systems for measuring, reporting, and monitoring program performance. We determined that the following internal controls were relevant to our audit objective: the IT organization's policies, procedures, and processes for managing and tracking software licenses. We evaluated these controls by interviewing IT organization management and identifying Federal requirements and industry best practices for managing and tracking software licenses. We also reviewed the IT organization's management plans and actions taken to address prior TIGTA audit recommendations.



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Appendix II

Major Contributors to This Report

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Appendix III

Report Distribution List

Commissioner
Office of the Commissioner – Attn: Chief of Staff
Deputy Commissioner for Operations Support
Deputy Chief Information Officer for Operations
Associate Chief Information Officer, Enterprise Operations
Associate Chief Information Officer, Strategy and Planning
Associate Chief Information Officer, User and Network Services
Director, Office of Audit Coordination



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Appendix IV

Deloitte's Software Asset Management Framework

Framework Foundation Areas	Definition
Govern	Strategy – Defining the scope and objectives and outlining the activities and initiatives necessary to achieve the vision and goals.
	Organization and Governance – Defining roles and responsibilities to govern, manage, and execute SAM processes.
	Policies and Standards – Defining SAM methodology, standards, and practices.
Manage	Operations Management – Facilitating standardized SAM processes including design, management, reporting on software (to enable stakeholders), and driving training and awareness.
	Baseline Inventory and Software Reporting – Creating on-demand access to software inventory and internal compliance activities for license compliance reconciliation.
Operate	SAM Technologies – Evaluating, implementing, and managing of SAM tool solutions.
	SAM Lifecycle – Integrating SAM lifecycle which includes: forecast and request, analyze and procure, install and maintain, monitor and track, and decommission and reuse.

Source: Deloitte Presentation "Software Asset Management High Risk, High Reward" (January 2014).



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Appendix V

*The IRS's Corrective Actions Do Not Adequately
Address Prior Audit Recommendations*

Row No.	TIGTA Recommendation	IRS Action Proposed or Taken	Status
	TIGTA, Ref. No. 2013-20-025, <i>Desktop and Laptop Software License Management Is Not Being Adequately Performed</i> (June 2013)		
1	<u>Recommendation 1:</u> Develop policies and guidance in the IRM for managing software assets and licenses using the ITIL® best practices.	The IRS established the ESGB. The IRS will use best practices such as the ITIL to develop policies and guidance for managing software and licenses from an enterprise perspective in support of and aligned to IRM 2.14.1. ¹	Not Fully Implemented: Policy and guidance were not included in the IRM.
2	<u>Recommendation 2:</u> Develop User and Network Services organization roles and responsibilities in the IRM for software asset and license management.	The IRS composed and released an updated IRM 2.149.	Not Fully Implemented: Roles and responsibilities were not included in the IRM.
3	<u>Recommendation 3:</u> Develop detailed SOPs for using software license tools to manage software licenses.	The IRS composed and released SOPs Research Ownership and Status of Information Technology Assets for the Purpose of Updating Records in Asset Manager, Asset Management – Enterprise-wide Software User Guide, Asset Management – User and Network Services Software User Guide.	Not Fully Implemented: The IRS did not develop detailed SOPs for using software licensing tools to manage software licenses.
4	<u>Recommendation 4:</u> Implement a specialized software license tool designed to discover, track, and manage software license deployment and usage.	IRS management identified Big Fix® as the software product that will provide a solution to the need for a centralized inventory system that can also monitor cost and usage.	Open: Big Fix has not been fully implemented and is not being used to monitor cost and usage.

¹ IRM 2.149, *IT Asset Management*, (Sept. 23, 2015), this section replaces IRM 2.14.1, *Asset Management, Information Technology (IT) Asset Management*.



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Row No.	TIGTA Recommendation	IRS Action Proposed or Taken	Status
5	<u>Recommendation 5:</u> Develop an inventory of software license data and maintain the inventory with a specialized software license tool designed to discover, track, and manage software license deployment and usage.	IRS management identified Big Fix as a software product that will provide a solution to the need for a centralized inventory system that can also monitor cost and usage.	Open: Big Fix has not been fully implemented and is not being used to monitor cost and usage.
6	<u>Recommendation 6:</u> Maintain data in the inventory that the IRS can use to more effectively review software license agreements, purchases, deployment, usage, and other related aspects of licensing to identify additional savings in software spending.	IRS management identified Big Fix as a software product that will provide a solution to the need for a centralized inventory system that can also monitor cost and usage.	Open: Big Fix has not been fully implemented and is not being used as a centralized inventory system, nor is it monitoring cost and usage.
TIGTA, Ref. No. 2014-20-002, <i>The Internal Revenue Service Should Improve Mainframe Software Asset Management and Reduce Costs</i> (Feb. 2014)			
7	<u>Recommendation 1:</u> Develop policies and guidance in the IRM to manage mainframe software assets and licenses using the ITIL best practices.	The IRS will use best practices, such as the ITIL, to enhance current policies and guidance for managing software licensing from an enterprise perspective in support of and aligned to IRM 2.14.1. The IRS will ensure that policies and guidance are aligned to and include the protocols, functions, and decisionmaking outcomes across Associate Chief Information Officer and other enterprise units by implementing an ESGB.	Not Fully implemented: Policy and guidance were not included in the IRM, SOPs, or manuals.
8	<u>Recommendation 2:</u> Develop an enterprise-wide organizational structure to manage mainframe software assets and licenses.	The IRS will clarify the enterprise-wide organizational structure, including roles and responsibilities, in the IRM for mainframe software asset and license management.	Not Fully Implemented: An enterprise-wide organizational structure to manage mainframe software licenses has not been developed.
9	<u>Recommendation 3:</u> Develop roles and responsibilities in the IRM for all organizational entities responsible for mainframe software asset and license management.	The IRS believes the efforts that will be carried out for Recommendation 2 of this audit will also achieve the necessary actions for this recommendation.	Not Fully implemented: Policy and guidance were not included in the IRM, SOPs, or manuals.



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Row No.	TIGTA Recommendation	IRS Action Proposed or Taken	Status
10	<u>Recommendation 4:</u> Develop detailed SOPs for using mainframe software license tools to manage software licenses.	As part of its enterprise approach, the IRS will enhance SOPs for using existing and/or other toolsets, as appropriate, to manage software licenses for the enterprise.	Not Fully Implemented: The IRS has not developed detailed SOPs for using mainframe software license tools to manage software licenses. This recommendation cannot be closed until all tools have been identified and corresponding SOPs developed.
11	<u>Recommendation 5:</u> Implement a specialized mainframe software license tool(s) designed to discover, track, and manage mainframe software license deployment and usage. The implementation of the tool should include the development of an enterprise-wide, centralized, systematic, and repeatable method to manage and track the deployment of mainframe licenses that can be uniformly used by all organizational entities responsible for managing licenses.	Based on experience, there is no single tool that can discover, track, and manage software license deployment and usage. For a prior TIGTA recommendation (Ref. No. 2013-20-025, Recommendation 4), the IRS is already working to identify and implement a standard enterprise toolkit, which may include multiple tools. The IRS believes these efforts will accomplish this recommendation. TIGTA Ref. No. 2013-20-025 Recommendation 4 is still open and extended until November 15, 2017.	Not Implemented: An enterprise-wide organizational tool to manage mainframe software licenses has not been developed. The IRS is still pursuing a COTS product for developing an enterprise-wide repeatable method to manage and track the deployment of licenses.
12	<u>Recommendation 6:</u> Develop an enterprise-wide inventory of mainframe software licensing data and maintain the inventory with a specialized software license tool designed to discover, track, and manage mainframe software license deployment and usage.	Based on experience, there is no single tool that can discover, track, and manage software license deployment and usage. For a prior TIGTA recommendation (Ref. No. 2013-20-025, Recommendation 5), the IRS is already developing a mainframe software inventory and will leverage this as a starting point. The IRS is also already identifying and implementing a standard enterprise toolkit, which may include multiple tools. The IRS believes these efforts will accomplish this recommendation.	Not Implemented: An enterprise-wide organizational inventory of mainframe software licensing data has not been developed or maintained with a specialized tool. The IRS is still pursuing a COTS product for developing an enterprise-wide repeatable method to manage and track the deployment of licenses.



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Row No.	TIGTA Recommendation	IRS Action Proposed or Taken	Status
13	<u>Recommendation 7:</u> Maintain data in the inventory system that the IRS can use to more effectively review mainframe software license agreements, purchases, deployment, usage, and other related aspects of mainframe licensing to identify additional savings in software spending.	While the IRS is currently maintaining a software inventory, it will enhance this process by leveraging tools. Based on experience, there is no single tool that can discover, track, and manage software license deployment and usage. As such, the IRS will identify and implement a standard enterprise toolkit, which may include multiple tools, towards this recommendation. Data collected via the toolkit will be consolidated and maintained in a central repository.	Not Implemented: An enterprise-wide organizational inventory tool to manage mainframe software licenses has not been developed. The IRS is still pursuing a COTS product for developing an enterprise-wide repeatable method to software license agreements, purchases, deployment, usage, and other related aspects of mainframe licensing to identify additional savings in software spending.
TIGTA, Ref. No. 2014-20-042, <i>The Internal Revenue Service Should Improve Server Software Asset Management and Reduce Costs</i> (Sept. 2014)			
14	<u>Recommendation 1:</u> Incorporate server software license management in the enterprise-wide software management program currently under development.	Server software is already being considered as a component of the enterprise-wide software management program under development. Additionally, an ESGB has been established along with an ESGB Working Group. This effort includes the development of a standardized process for ensuring consistency in asset management across the enterprise. IRS management also stated that they have already completed actions to ensure that software management policies and guidance are aligned to and include the protocols, functions, and decisionmaking outcomes across enterprise units through the ESGB. The IRS is working to complete a number of other software management actions, including developing an enterprise-wide repeatable method to manage and track the deployment of licenses that can be uniformly used by all organizational entities responsible for managing licenses. These and other efforts under development will help move the IRS towards a comprehensive enterprise program for software license management.	Not Fully Implemented: An enterprise-wide organizational structure to manage mainframe software licenses has not been developed. The IRS is still pursuing a COTS product for developing an enterprise-wide repeatable method to manage and track the deployment of licenses.

Source: IRS responses to TIGTA audit report recommendations and Joint Audit Management Enterprise System documents. TIGTA analysis of response actions and Joint Audit Management Enterprise System comments.



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Appendix VI

Glossary of Terms

Term	Definition
Acquisition Gateway	Built by the General Services Administration, it is a workspace for acquisition professionals and Federal buyers to connect with resources, tools, and each other to improve acquisition Governmentwide by acting as one acquisition community.
Best Practices	Proven activities or processes that have been successfully used by multiple organizations.
Entitlement	Rights granted to the user of licensed software and are defined within the license agreement.
Executive Order	A legally binding order given by the President, acting as the head of the Executive Branch, to Federal administrative agencies. Executive Orders are generally used to direct Federal agencies and officials in their execution of congressionally established laws or policies.
Executive Order 13103, <i>Computer Software Piracy</i>	Requires Federal agencies to develop software license management policies and procedures. It also requires Federal agencies to prepare inventories of software present on computers to help ensure that software is used in compliance with copyright laws.
Government Accountability Office	The audit, evaluation, and investigative arm of Congress that provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions.
Information Technology Infrastructure Library®	A widely accepted set of concepts and practices for information technology service management derived from user and vendor experts in both private and public sectors. The ITIL focuses on the key service management principles pertaining to service strategy, service design, service transition, service operations, and continual service improvement with each principle being covered in a separate ITIL core publications. SAM is a key process described within the service transition core publication.



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Term	Definition
Integrated Data Collection	Part of the Portfolio Stat initiative launched by the OMB in Fiscal Year 2012. In Fiscal Year 2013, Portfolio Stat streamlined agency reporting functions and reduced burden through the creation of an Integrated Data Collection approach. The approach is used by agencies to report structured information such as progress in meeting information technology strategic goals, objectives, and metrics as well as cost savings and avoidance resulting from information technology management actions.
Metering Tools	Tools intended to measure active usage of a software product.
National Institute of Standards and Technology	A part of the Department of Commerce that is responsible for developing standards and guidelines for providing adequate information security for all Federal Government agency operations and assets.
Software Asset Management	A business practice that involves managing and optimizing the purchase, deployment, maintenance, utilization, and disposal of software assets within an organization throughout the lifecycle.
Software License Agreement	The legal contract between the owner and purchaser of a piece of software that establishes the purchaser's rights. A software license agreement provides details and limitations on where, how, how often, and when the software can be installed and used and provides restrictions that are imposed on the software. The agreement includes the license model that will be used for defining and measuring the use of the software. For example, a common simple license model could be based on how many people can use the software and on how many systems the software may be installed. The software companies also make special license agreements for large business and government entities that may be different from those provided to the general consumer.
Strategy and Planning organization	A part of the IRS IT organization, its mission is to facilitate the alignment of information technology and business through strategic planning and financial management practices that offer transparency and overall information technology demand, supply, and the value of information technology investments.
Tier 1	Supercomputers and mainframe hardware and software, including peripheral subsystems used in a mainframe system environment.



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Term	Definition
Tier 2	Minicomputers, <i>i.e.</i> , computers usually containing multiple microprocessors, capable of executing multiple processes simultaneously, and may serve multiple users by way of a communications network, including hardware, software, and peripheral subsystems used in that environment.
Tier 3	These systems include all workstation devices and any hardware operating under a Windows operating system, including all hardware used in a desktop environment: workstations functioning with a single-user (stand-alone) operating system including UNIX workstations that run <i>single-user</i> versions of UNIX and workstations that run any Windows operating system. This includes desktops, laptops and docking stations, monitors and keyboards associated with these devices, Personal Digital Assistants, scanners, and printers. Tier 3 also includes new software, hardware, and software maintenance associated with the above items, including performing system backups, hardware upgrades and maintenance, operating system upgrades, and preventive maintenance tasks.
Treasury Directive Publications 85-01, <i>Treasury IT Security Program</i>	Requires that bureaus periodically scan their networks to detect and remove any unauthorized or unlicensed software.
User and Network Services Function	User and Network Services supplies and maintains all desktide (including phone) technology, provides workstation software standardization and security management, inventories data processing equipment, conducts annual certification of assets, provides IT Service Desk as the single point of contact for reporting IT issue, and equips the Volunteer Income Tax Assistance program.



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Appendix VII

Management's Response to the Draft Report



CHIEF INFORMATION OFFICER

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON, D.C. 20224

AUG 22 2017

MEMORANDUM FOR DEPUTY INSPECTOR GENERAL FOR AUDIT

FROM:

S. Gina Garza 
Chief Information Officer

SUBJECT:

Draft Audit Report – The Internal Revenue Service Is Not in
Compliance With Federal Requirements for Software Asset
Management (Audit # 201720017)

Thank you for the opportunity to review the draft audit report. We appreciate the open dialogue with your team during the audit, specifically on the status of Software Asset Management (SAM) in the Internal Revenue Service (IRS) and the limitations of existing technology tools to comprehensively perform software asset management. We also appreciate the acknowledgement that while the IRS is not yet in full compliance with federal requirements in this area, we are making progress toward that goal.

The IRS is committed to meeting the Office of Management and Budget (OMB) Memorandum M-16-12, *Improving the Acquisition and Management of Common Information Technology: Software Licensing* and Public Law No. 114-210, Making Electronic Government Accountable by Yielding Tangible Efficiencies Act of 2016 (MEGABYTE Act of 2016). The Act requires each Federal executive agency, including our parent agency, the Department of the Treasury, to develop a comprehensive software licensing policy that includes clear roles and responsibilities and central oversight authority for managing software licenses within the Federal executive agency.

As noted in the audit, IRS has made progress in addressing the Treasury Inspector General for Tax Administration's (TIGTA's) prior software asset management recommendations. Consolidation of the prior processing tier specific recommendations into three comprehensive recommendations spanning the IRS IT enterprise, will assist the IRS in making further progress. The IRS believes that completing the corrective actions identified in our Corrective Action Plan for this audit will bring us into full compliance with OMB Guidance and the MEGABYTE Act of 2016.

Completing SAM remains an elusive and challenging goal. Automated SAM requires complex inventory functions across many types (tiers) of computing and networking equipment, reconciliation against a limitless range of commercial software license agreements, and complex modeling against continually changing needs. As stated by Department of Treasury and referenced in the report, *"The long and short of it all is that, like most government agencies and Treasury bureaus, there exists no tool or process to complete the MEGABYTE requirement at this time. Treasury continues to work with the*



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General Services Administration to establish rules and a process to get this accomplished."

Within that context, the IRS has implemented many of the functions necessary to build a complete SAM program. As noted, "The IRS has developed enterprise-wide and local SAM policies and procedures." Additionally, the "IRS is (now) using SAM tools currently available to it, such as Big Fix" and Tivoli Asset Discovery for Z (TAD for Z), to determine software inventory. The IRS is also implementing a SAM reconciliation solution that will provide the ability to perform software license management, metering, and entitlement analysis.

The IRS understands that it must go much further to have completely developed governance, policies, guidance, and defined roles and responsibilities for managing software assets. To that end, we will implement the recommendations within current technological, budgetary and operational constraints.

The IRS remains committed, working under the direction of the Department of the Treasury, to meeting the intent of all federal requirements for software asset management. We continue to value TIGTA's insight, support and guidance in these efforts. If you have any questions, please contact me at (202) 317-5000 or Debra Fairweather, IT Program Oversight Coordination, at (202) 317-6458.

Attachment



The Internal Revenue Service Is Not in Compliance With Federal Requirements for Software Asset Management

Attachment

Draft Audit Report – The Internal Revenue Service Is Not in Compliance With Federal Requirements for Software Asset Management (Audit # 201720017)

RECOMMENDATION 1

The Chief Information Officer (CIO) should establish executive governance for Software Asset Management (SAM) within the Internal Revenue Service (IRS) which acts as a centralized group to ensure that effective and knowledgeable decisions are being made timely by authorized personnel.

Corrective Action: The IRS agrees with the Treasury Inspector General for Tax Administration's (TIGTA's) recommendation and will complete the establishment of governance for Software Asset Management (SAM), dependent upon availability of appropriate funding

IMPLEMENTATION DATE: August 31, 2018

RESPONSIBLE OFFICIAL(S): Associate Chief Information Officer (ACIO), Strategy and Planning with support from the ACIOs for User and Network Services; Application Development, Enterprise Program Management Office, Enterprise Operations, Enterprise Services, and Cybersecurity as well as IRS business units.

CORRECTIVE ACTION MONITORING PLAN: We enter accepted Corrective Actions into the Joint Audit Management Enterprise System (JAMES) and monitor them monthly until completion.

RECOMMENDATION 2

The CIO should establish a SAM framework using Federal requirements and industry best practices as guidelines.

Corrective Action: The IRS agrees with TIGTA's recommendation, and will establish a SAM framework using Federal requirements and industry best practices as guidelines, dependent upon availability of appropriate funding. The framework(s) will address SAM capabilities across all computing tiers and related functions as informed by related efforts under the General Services Administration and the Department of the Treasury as noted within the report.

IMPLEMENTATION DATE: October 31, 2018

RESPONSIBLE OFFICIAL(S): ACIO, Strategy and Planning

CORRECTIVE ACTION MONITORING PLAN: We enter accepted Corrective Actions into the JAMES and monitor them monthly until completion.

RECOMMENDATION 3

The CIO should assess current SAM practices to identify gaps within the IRS's management of software licenses and take necessary corrective actions to resolve issues using the SAM framework. This should include establishing centralized



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Attachment

Draft Audit Report – The Internal Revenue Service Is Not in Compliance With Federal Requirements for Software Asset Management (Audit # 201720017)

management for SAM, developing a centralized inventory, and implementing a tool(s) necessary to perform other aspects of SAM such as discovery, metering and entitlement analysis.

Corrective Action: The IRS agrees with TIGTA's recommendation and will identify gaps within IRS's management of software licenses and take necessary corrective actions to resolve issues by using the SAM framework. The IRS will also continue with implementation of tools to improve and automate SAM inventory, utilization and reporting functions. The degree of success and rate of completion will remain constrained by the capabilities/limitations of commercially available SAM tools. Completion of the actions is also dependent upon availability of funding and other factors, such as ongoing changes in commercial software license terms, metrics and practices over which the IRS has no control.

IMPLEMENTATION DATE: October 31, 2018 for updated plan on inventory tool, a plan on SAM tool implementation, and legislatively mandated reporting compliance.

RESPONSIBLE OFFICIAL(S): ACIO, Strategy and Planning

CORRECTIVE ACTION MONITORING PLAN: We enter accepted Corrective Actions into the JAMES and monitor them monthly until completion.