



# Benchmarking the Library of Congress Information Technology Fiscal Year 2014 Budgetary Obligations and Human Capital



Library of Congress Office of the Inspector General

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March 30, 2016

MEMORANDUM FOR: David S. Mao  
Acting Librarian of Congress

FROM: Kurt W. Hyde   
Inspector General

SUBJECT: *Benchmarking the Library of Congress Information Technology Fiscal  
Year 2014 Budgetary Obligations and Human Capital*  
Report No. 2015-IT-101

This transmits the final report summarizing the results of Hewlett Packard's (HP) assessment of the fiscal year 2014 budgetary obligations and human capital of the Library's Information Technology Services. The Executive Summary begins on page *i*, and the full text of HP's assessment appears in Appendix A.

The Office of the Inspector General (OIG) provided this assessment at the request of the Interim Chief Information Officer to assist the newly formed Office of the Chief Information Officer in evaluating its organizational design and base budget. This is a special assessment provided by OIG as a service to Library management. It is not an audit or attestation performed under generally accepted government auditing standards.

We do not require responses by Library management to this assessment. We appreciate the cooperation and courtesies extended by the Office of the Chief Information Officer during this assessment.

cc: Chief of Staff  
Chief Operating Officer  
Chief Information Officer  
General Counsel

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## Executive Summary

During fiscal year (FY) 2015, the Library of Congress (Library), in response to recommendations from the Government Accountability Office and the Office of the Inspector General (OIG), committed to restructuring its Information Technology (IT) Services Directorate, a component within the former Office of Strategic Initiatives service unit.

In January 2015, the Librarian of Congress appointed an interim Associate Librarian for Strategic Initiatives (and interterm CIO). In May 2015, Library senior management announced the realignment of several Library programs and operations including the Office of Strategic Initiatives, which had been established in 2000 to oversee the Library's institution-wide digital initiatives. The realignment called for the creation of an Office of the Chief Information Officer (OCIO), located under the Chief Operating Officer.<sup>1</sup> The OCIO would assume most of the functions of the Office of Strategic Initiatives in addition to overseeing the Library's IT, web services, and repository development functions.

Library senior management looked to the interim CIO to make changes in the new OCIO infrastructure unit. While many critical steps were taken, the interim CIO recognized that better financial information was needed for a permanent CIO to properly realign resources and derive the maximum benefit from operations, and requested assistance from the OIG.

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<sup>1</sup> The Chief Operating Officer is a component of the Office of the Librarian service unit.

The OIG learned that comparative data for IT outlays was not available from OMB even though OMB provides an array of data on agency IT investment. The OIG contracted Hewlett Packard (HP) to assess FY 2014 IT-related obligations, and in the absence of sufficient federal agency benchmarking partners, HP identified Gartner Inc. as a credible resource for benchmarking LOC IT expenditures and human capital.<sup>2</sup> HP's reconstruction of FY 2014 IT-related obligations resulted in a base budget of over \$78.5 million. IT-related staff at that time amounted to 267 full time equivalents (FTE).<sup>3</sup>

For FY 2014, HP found that the greatest amount of operating functions was concentrated within two divisions: Research & Development and Operations. HP opined that IT organizational structures that divide responsibilities in this manner prevent leadership from being able to adequately monitor its activities and mitigate bottlenecks and performance shortfalls. Using Gartner's benchmarking categories,<sup>4</sup> HP identified and recommended nine operating categories that OCIO should implement for operational effectiveness, organizational comparability, and benchmarking.<sup>5</sup> HP also realigned the

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<sup>2</sup> <http://www.gartner.com/technology/about.jsp>

Gartner, Inc. is one of the world's leading information technology research and advisory companies. It provides technology-related data, consulting, and advisory services for its clients on all IT related issues.

<sup>3</sup> The Web Services and Repository Management functions and costs were included and had \$16.7M in budget obligations and 45 FTEs in FY 2014.

<sup>4</sup> *Gartner Group. IT Key Metrics Data 2015: Key Industry Measures: Government — State and Local Analysis: Current Year, (15 December 2014).*

<sup>5</sup> Those categories include data center, end-user computing, IT service desk, voice network, data network, application development, application support, Corporate IT management, and finance and administration.

Library's cost and staffing information into these nine categories for a better comparison to the benchmarked data.

## Benchmark Analysis

In summarizing its assessment, HP identified the following findings<sup>6</sup> that warrant Library senior management's attention as the now permanent CIO makes structural and resource assessments.

### **Based on available data from FY 2014, OCIO-equivalent costs were largely in line with Gartner government IT benchmarks.**

However, HP's comparison of the FY 2014 operations and obligations highlighted the following differences with Gartner data, all of which require further analysis once greater cost accounting is in place:

- Data center expense as a percentage of costs was higher at 29% for the Library versus 20-21% for state & local and federal spending levels. This variance may be warranted depending on whether it's solely due to data storage needs, such as for digital preservation.
- End-user computing was below comparable federal and state outlays at 8% for the Library versus 14% and 11% for state & local and federal spending levels, respectively, raising concerns that the help desk contract is not structured appropriately. HP found that the broad scope of OCIO's IT Services (Help Desk) contract and the lack of performance metrics inhibited

oversight, creating risks for cost and quality.

- Application development was excessively low with the Library at a 4% spending level versus state & local at 13% and federal at 22%. However, some of the Library's costs are possibly borne by LOC service units—such costs will need to be collected and tracked more closely in order to better assess them.
- Application support is high at 25% for the Library, whereas state & local is 19% and federal is 14%, which may indicate missed opportunities in cost savings because the Library is investing too much effort in supporting older applications.

Because this is a benchmarking study and not an audit, the OIG is not making recommendations. Nevertheless, HP identified areas that management should act on in the near term in order to better enable management's decision-making. Some of the areas have been identified in prior OIG reports and recommendations are in process of being implemented, but they warrant mention because of their import to this study. Our discussions with the CIO and Deputy CIO indicated that they plan to take action on these items to improve their service delivery. In the near term, OCIO is taking the following actions:

- As a first step, beginning in FY 2016, the Budget Office and OCIO are attempting to gain more granular information on IT spending from the Library's accounting system.<sup>7</sup>

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<sup>6</sup> HP also identified high levels of risk over some of IT purchase card spending. The OIG has initiated an audit in this area and will report out separately.

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<sup>7</sup> The OIG recommended that OCIO expand Momentum's functionality to allow transactions to be coded based on more granular IT activities. *Information Technology Strategic Planning: A*

- During this audit, to improve its oversight efforts, OCIO hired a new end-user computer chief and assigned to the contract a dedicated Contracting Officer Representative.<sup>8</sup>
- In response to a draft of this report, the CIO engaged a firm to evaluate OCIO's organization and reshape its organizational structure to be a strategic business partner with the Library's service units and to deliver the best possible service to its various customers. In addition, the OCIO is conducting a workload assessment to determine whether further organizational realignments are needed to better meet IT needs.

## Areas for Further Study

The HP team identified four areas for further study that will position OCIO to operate more effectively and efficiently in the long term. This will require a focused effort not just from the OCIO, but from Library senior management, the Office of the Chief Operating Officer, and the service units.

- Develop a clear strategy and goals for the Library's IT function.<sup>9</sup> The OCIO has issued its 2016-2020 strategic plan, a positive first step in

being more responsive to service units. However, until the Library develops a more robust strategic plan that incorporates critical elements of the Library's future, such as one addressing a Library-wide digital strategy, the OCIO's plan cannot fully address the needs of the Library.<sup>10</sup>

- Identify an approach for building more transparency into the Library's budgeting and financial management processes.<sup>11</sup> While the OCFO has taken an initial step to capture certain IT costs, the imperative will be to quickly assist the CIO to better identify and track Library-wide IT costs.
- Define the IT activities and processes that should drive the Library IT operations before making organizational and strategic management decisions within the OCIO.<sup>12</sup> The CIO has initiated developing a service catalog to begin addressing this area.
- Explore processes that would allow for activity-based costing and provide a more insightful knowledge of actual activities being performed for the various service units.<sup>13</sup>

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*Well-Developed Framework is Essential to Support the Library's Current and Future IT Needs*, Report No. 2008-PA-105, March 2009, page 21.

<sup>8</sup> The OIG recommended that the Library tighten procedures for contract oversight, to include performance metrics for service contracts.

*Inadequate Contract Oversight Exposed Library to Questionable Contractor Payments*, Report No. 2011-PA-109, March 2012, page 11.

<sup>9</sup> The OIG recommended this in *Information Technology Strategic Planning: A Well-Developed Framework is Essential to Support the Library's Current and Future IT Needs*, Report No. 2008-PA-105, March 2009, page 13.

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<sup>10</sup> The OIG recommended that the Library create an overarching, transformative eCollections Strategy for collecting electronic works that groups programs, projects, and other IT work together to facilitate effective portfolio management of activities related to collecting electronic works, including born-digital works. *The Library Needs to Determine an eDeposit and eCollections Strategy*, Report No. 2014-PA-101, April 2015, page 34.

<sup>11</sup> *Ibid.*, page 21.

<sup>12</sup> *Ibid.*, page 13.

<sup>13</sup> *Ibid.*, page 21.

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## Table of Contents

Appendix A: HP Assessment..... 1

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## Appendix A: HP Assessment

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# **Analysis and Categorization of the Library of Congress Information Technology Services' FY14 Cost and Human Capital**

Final Analysis Report: January 27, 2016

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## Table of Contents

<b>Table of Contents</b> .....	<b>1</b>
<b>1. Executive Summary</b> .....	<b>2</b>
<b>2. Introduction</b> .....	<b>3</b>
2.1 Background.....	3
2.2 Objectives .....	3
2.3 Approach .....	3
<b>3. FY14 ITS Budget Obligation Analysis</b> .....	<b>4</b>
3.1 Data Overview .....	4
3.2 Findings and Discussion .....	5
3.2.1 Inconsistent and high-level categorization within Momentum obscures the full spending picture required for strategic and operational decision-making and portfolio planning. ....	5
3.2.2 Based on available data regarding FY14 obligations, ITS’ non-pay costs are largely in line with Gartner government IT benchmarks. ....	6
3.2.3 The broad scope of LOC’s IT Services (Help Desk) contract and lack of performance metrics inhibits oversight, creating risks for cost and quality.....	9
3.2.4 There are opportunities for ITS to adhere to LOC’s purchase card policy more closely .....	10
<b>4. FY14 ITS Organizational Structure and Human Capital Analysis</b> .....	<b>11</b>
4.1 Data Overview .....	11
4.2 Findings and Discussion .....	11
4.2.1 ITS’ current structure creates potential organizational barriers to decision-making, spending control, and customer-satisfaction.....	12
4.2.2 There is no center of responsibility on the ITS organizational chart for planning and programmatic direction.....	13
4.2.3 Employee activities are not clearly captured in existing human capital documentation. ....	13
<b>5. Benchmark Analysis</b> .....	<b>14</b>
5.1 Benchmark Findings and Discussion.....	14
5.2 Opportunities for Benchmarking .....	15
<b>6. Recommendations and Areas for Further Study</b> .....	<b>15</b>
6.1 Recommendations .....	15
6.2 Areas for Further Study .....	16
Appendix A. Analysis of Reimbursable Accounts .....	18
Appendix B. FTE Breakdown by IT Category .....	19
Appendix C. FTE Breakdown by Component and Job Title .....	20
Appendix D. OMB Federal IT Spending Data .....	22
Appendix E. IT Functional Framework – Definitions .....	23
Appendix F. ITS Staff Organization Chart (as of January 2015).....	29

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## 1. Executive Summary

The Library of Congress (LOC) is interested in assessing the structure of its Information Technology Services (ITS) division, and adjusting its management and operational resources for more effective and efficient results. To support that goal, the objectives of this report are to: provide an analysis of ITS' budget obligations and related human capital for Fiscal Year 2014 (FY14) and benchmark LOC IT costs against similar Federal agencies.

To meet these objectives, a Hewlett Packard (HP) team collected and analyzed a range of FY14 ITS budget and human capital data. The HP team found no observable inaccuracies in the data. The analysis did, however, surface the following seven findings for LOC leadership's attention as they make structural and resource assessment for ITS:

1. Inconsistent and high-level categorization within Momentum obscures the full spending picture required for strategic and operational decision-making, and portfolio planning.
2. ITS functions are largely in line with Gartner government IT benchmarks.
3. The broad scope of LOC's Information Technology (IT) Services (Help Desk) contract and lack of performance metrics inhibits oversight, creating risks for cost and quality.
4. There are opportunities for ITS to adhere to LOC's purchase card policy more closely
5. ITS' current structure creates potential organizational barriers to decision-making, spending control, and customer-satisfaction.
6. ITS' organizational chart has no center of responsibility for planning or programmatic direction.
7. Employee activities are not clearly captured in existing human capital documentation.

The HP team identified three agencies that had the potential to act as useful benchmarks for LOC: the National Archives and Records Administration, the Small Business Administration, and the Smithsonian Institution. However, there are several barriers to effective benchmarking with other Federal agencies. First, an agency's mission is a primary driver of IT use; using other agencies as an IT spending benchmark is misleading if they have different mission needs. Second, tracking Federal resources consistently across agencies is difficult because agencies define IT costs differently, and capture IT spend in individualized ways that do not lend themselves to inter-agency comparisons.

To address the issues raised in the report, the HP team identified five recommendations:

1. Explore Momentum functionality that allows transactions to be coded by more specific IT activities.
2. Tighten procedures for contract oversight, to include performance metrics for service contracts.
3. Review ITS job descriptions and performance plans to make certain they clearly reflect and document each individual's responsibilities.
4. Conduct a workload assessment, including an inventory of skills required for each ITS position.
5. Ensure that all employees are trained on financial and budgeting policies and procedures.

The HP team also identified four areas for further study:

1. Develop a clear strategy and goals for LOC's IT function.
2. Identify an approach to build more transparency into LOC budgeting and financial management.
3. Define the IT activities and processes that should drive LOC, before making organizational and management decisions for ITS.
4. Explore processes that would allow for activity-based costing.

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## 2. Introduction

### 2.1 Background

The mission of the Library of Congress' (LOC) Office of Strategic Initiatives (OSI) was to direct the overall IT strategic planning for the Library and the national program for long-term preservation of digital cultural assets. Information Technology Services (ITS), a directorate within OSI, is responsible for performing Information Technology (IT) services for the Library. LOC management is interested in assessing the ITS structure and adjusting its management and operational resources for more effective and efficient results. To assess the ITS structure, LOC management must first determine what its ITS costs were for the most recently closed fiscal year, and break those costs down by activity and category. However, the current configuration of the LOC's budgeting, financial management and reporting systems are not designed to capture ITS' operating costs at that level of detail.

### 2.2 Objectives

To assist with an assessment of ITS' structure and resourcing decisions, the LOC Office of the Inspector General (OIG) requested that the Hewlett Packard Company (HP) team analyze ITS' operating obligations and human capital for the most recently closed fiscal year, 2014 (FY14). To this end, the objectives of this report are to:

- Provide an analysis of FY14 ITS budget obligations and related human capital, and
- Identify three to four similar sized Federal agencies with multiple appropriations and bureaus of business activity, and benchmark against LOC IT costs and human capital by IT category.

### 2.3 Approach

The HP team's analysis was based on a collection of the following data: FY14 ITS transactions from LOC's financial management system, Momentum, payroll time and attendance reports from LOC's WebTA system, the 23 position descriptions that apply to ITS employees, interviews with six members of ITS management, a review of contract data, and a review of related documentation.

The HP team validated the data, conducting interviews where there were questions or clarifications that needed to be made. In addition to the full data review and research regarding Federal IT spending best practices, the HP team conducted the following more detailed analyses:

- After the data was validated, the HP team reviewed the transactions to determine if the requisitions, travel requests, credit card purchases, and training requests were appropriate IT costs for an organization such as LOC. This included making certain that the cost projected match typical costs, whether the item purchased was current technology or outdated technology (except in the case of support for legacy systems), and whether justification was provided to substantiate transactions.
- The HP team manually categorized the ITS FY14 IT obligations and human capital into nine IT functional areas defined by Gartner, an IT research and advisory company<sup>1</sup>, and used this data to determine how LOC's IT spending compares against Gartner's government-wide benchmarks. (See Appendix E for more detail on how these are defined). Categorizing LOC's IT budgetary

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<sup>1</sup> Gartner is a leading IT advisory and research company based in Stamford, CT. Their products and services include IT Benchmark Analytics, which provide organizations with comparisons of their IT performance relative to industry peers.

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transactions into functional areas created a better foundation for understanding costs, and also allowed the HP team to compare ITS spend against other government IT spend.

- To validate contract spending, the HP team reviewed contract Statements of Works (SOW) and related documents for contracts over \$100,000.00, focusing on the top ten largest contracts. During those reviews the HP team identified costs where more information was needed, and conducted interviews with ITS managers to reconcile questions and gain additional insight into the workflow of approval for IT spending.
- To validate the human capital data, the HP team aligned each individual listed in the payroll documents against the ITS organizational chart and their position descriptions.
- LOC also requested an analysis of two reimbursable funds, the Allocated Working Fund Account #010896 and Other Reimbursable Account #010802. The HP team listed the use of funds based on original transaction obligations for each account, broken down by amount, recipient, date, and reason for outlay (see Appendix A.)

The HP team found no observable inaccuracies in the FY14 ITS obligation data provided, and confirmed that each individual was accounted for in the payroll system. The analysis did, however, surface issues that warrant LOC leadership's attention as they make structural and resource assessments.

The remainder of this report details those findings, and also discusses benchmarks with other Federal agencies. Sections 3 and 4 detail the findings associated with the budget obligation and human capital analyses, respectively. Section 5 provides data regarding similar agency IT spend, and a more detailed discussion on Federal IT benchmarking challenges and opportunities. Section 6 provides LOC leadership with recommendations and areas for further study as they assess ITS' structure and resources in an effort to achieve more efficient and effective results.

### **3. FY14 ITS Budget Obligation Analysis**

#### **3.1 Data Overview**

Table 1, below, provides a snapshot of ITS' FY14 obligations, organized by pay and non-pay object classes. This breakdown of the \$63.5M total spend is based on the FY14 Actual Obligations. The remainder of this section details the findings that arose when the HP team conducted a more detailed analysis of this spend based on Momentum data and other sources.

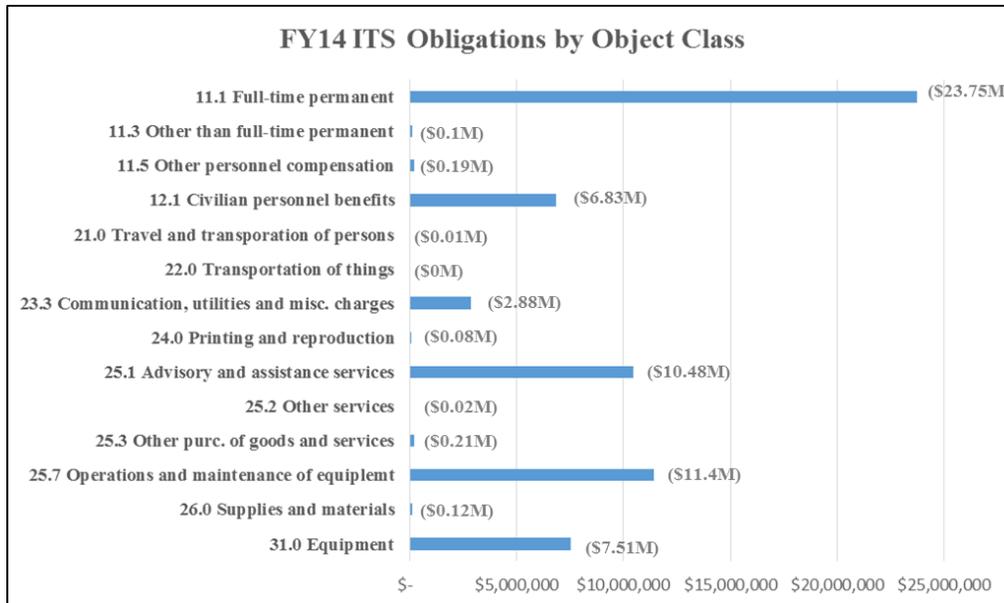


Table 1: ITS FY14 Obligations by Budget Object Class Code

### 3.2 Findings and Discussion

In conducting the analysis of FY14 ITS obligations, the HP team identified four findings that warrant leadership attention as ITS makes structural and resource assessments:

1. Inconsistent and high-level categorization within Momentum obscures the full spending picture required for strategic and operational decision-making and portfolio planning.
2. Based on available data regarding FY14 obligations, ITS activities are largely in line with Gartner government IT benchmarks.
3. The broad scope of LOC's IT Services (Help Desk) contract and lack of performance metrics inhibits oversight, creating risks for cost and quality.
4. There are opportunities for ITS to adhere to LOC's purchase card policy more closely

Each finding is discussed in further detail, below.

#### 3.2.1 Inconsistent and high-level categorization within Momentum obscures the full spending picture required for strategic and operational decision-making and portfolio planning.

The main challenge facing the HP team in analyzing FY14 ITS budget obligations was a lack of fidelity in the way financial transactions are tracked in Momentum. Although the analysis did not reveal inaccurate costs in the system, incomplete or opaque data make it difficult to understand LOC IT spend at a meaningful level of detail. Three issues contribute to this lack of financial transparency.

First, Momentum, does not track IT costs in ways that captures what the organization actually does. While Momentum allows LOC to tag financial transactions based on some budgeting categories, (e.g., those associated with reporting requirements or budget requests) the existing configuration appears to be

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limited when it comes to tagging transactions based on IT function.<sup>2</sup> For example, current Momentum reports provide total spend for traditional budget object class codes such as Advisory Services or Equipment, but cannot show what was spent on specific IT activities such as Application Development or End-User Computing. Without this capability, it is difficult for leadership to determine how the organization invests in specific IT elements, handicapping operational, management and strategic decision-making.

The second dynamic blurring insights into IT spending is the inconsistencies in the way transactions are categorized in Momentum. For example, software licenses can be found in two different object classes: 2563, “Maintenance of Software” or 3114, “Computer Software.” While there is a distinction between the two, separate offices or people might legitimately interpret them differently, and as a result categorize the same purchase as two different object class codes. Unlike the issue of Momentum functionality described above, this issue is human-centric, often stemming from policy and behavioral dynamics such as outdated procedures, training, or differences in the way policies are interpreted on different teams. Although the issue occurs at the level of single transactions, the impact of inconstant categorization becomes greater as the problem compounds across the organization. Inconsistencies that seem small at first can quickly have the result of diluting the accuracy of a report (e.g., total spend in one area might be artificially inflated due to inconsistent tagging) and eventually lowering utility of the overall data coming out of the system.

Finally, the Library does not have a mechanism to capture the entire amount of IT spend in the agency. While the ITS budget is one component of LOC, using it as a measure of LOC’s IT spend will result in an artificially low figure. Other entities within LOC spend money on IT, sometimes in a way that is duplicative of ITS resources and sometimes necessary.<sup>3</sup> For example, as part of this analysis, the HP team identified several clear IT line items within OSI’s budget. The absence of a financial system that captures the full amount of IT spending inhibits oversight, preventing leadership from catching inaccuracies, mismanagement of funds or overspending. It also inhibits strategic decision-making, as leadership is unable to see a full picture of what LOC’s IT activities are, what they cost, or how IT contributes to the overall mission of the agency.

Ideally, LOC would be able to track its IT (and other costs) at a level of fidelity that allows it to easily access data about the way it makes pay and non-pay investments in IT, and what the impact or value of those investments are. To do that, LOC would have to be able to clearly identify and categorize its activities and their costs into areas that align to a set of goals or larger strategy – meaning that it would have to address the transparency issues described above. Being able to track dollars and measures of effectiveness associated with those areas of interest would help LOC leadership make more informed resource allocation decisions, and align investments with their strategic priorities.

### 3.2.2 Based on available data regarding FY14 obligations, ITS’ pay and non-pay costs are largely in line with Gartner government IT benchmarks.

In order to get a sense of how ITS’ provision of IT support compares to other public sector organizations, the HP team identified how much LOC spent on specific IT activities; activities that other organizations also consider when analyzing their costs.<sup>4</sup>

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<sup>2</sup> This assessment is based on the data provided to the team for this analysis. Additional Momentum functionality may exist within LOC’s configuration. Where it does not, it may be available by investing in additional Momentum modules or functionality based on LOC’s goals.

<sup>3</sup> GAO, “Library of Congress: Strong Leadership Needed to Address Serious Information Technology Management Weaknesses” GAO-15-312, March 2015.

<sup>4</sup> See Section 5 for a discussion about benchmarking against other Federal agencies in particular.

To address this challenge, this HP team manually tagged each FY14 ITS Momentum transaction according to the nine IT functions used in the “IT Functional Area Framework” within Gartner’s *IT Key Metrics Data 2015: Key Industry Measures*.<sup>5</sup> This framework underlies Gartner’s metrics for assessing an organization’s “expenses” (versus capital outlays) in the context of their overall IT portfolio.<sup>6</sup> Pay spend was calculated by reviewing each employee’s performance plan and assigning them to one functional category. The percentage of total staff serving each function was then applied to the total for FY14 pay, which produced a dollar figure for approximate amount spent on pay for each IT function. (See Appendix B for more detail.) The results of this analysis are shown in Table 2 and 2A, below. Note: Per the request of LOC senior management, the HP team also analyzed the OSI Pay and Non-Pay spend Web Services (WS) and Repository Management (RM) based on FY14 Momentum transactions for those offices.

	ITS FY14 - Non-Pay	ITS FY14 - Pay	Total ITS FY14	OSI FY14 (WS & RM) Non-Pay	OSI FY14 (WS&RM) Pay	Total OSI FY14 (WS&RM)
Data Center	\$11,727,575.84	\$4,631,400.00	\$16,358,975.84	\$5,676,818.28	\$429,975.00	\$6,106,793.28
End-User Computing	\$1,570,708.14	\$4,322,640.00	\$5,893,348.14	\$156,444.56	\$414,487.00	\$570,931.56
IT Service Desk	\$4,112,392.47	\$2,470,080.00	\$6,582,472.47	\$0.00	\$72,456.00	\$72,456.00
Voice Network	\$2,019,588.15	\$1,852,560.00	\$3,872,148.15	\$3,827.25	\$0.00	\$3,827.25
Data Network	\$4,683,041.82	\$617,520.00	\$5,300,561.82	\$2,035,039.01	\$758,127.00	\$2,793,166.01
Application Development	\$0	\$926,280.00	\$926,280.00	\$1,086,016.96	\$1,020,130.00	\$2,106,146.96
Application Support	\$6,291,047.64	\$10,189,080.00	\$16,480,127.64	\$1,753,592.73	\$1,264,536.00	\$3,018,128.73
IT Management	\$533,816.82	\$4,013,880.00	\$4,547,696.82	\$256,988.46	\$1,617,101.00	\$1,874,089.46
Finance & Admin	\$28,714.29	\$1,852,560.00	\$1,881,274.29	\$67,128.63	\$98,545.00	\$165,673.63
<b>Total</b>	<b>\$30,966,885.17</b>	<b>\$30,876,000.00</b>	<b>\$61,842,885.17</b>	<b>\$11,035,855.88</b>	<b>\$5,675,357.00</b>	<b>\$16,711,212.88</b>

Table 2: FY14 ITS and OSI (WS and RM) Pay and Non-Pay Spend by Gartner IT Function<sup>7</sup>

	Total ITS FY14	Total OSI FY14 (WS&RM)	Combined Total ITS & OSI (WS&RM) FY14	Percent of Combined Total
Data Center	\$16,358,975.84	\$6,106,793.28	\$22,465,769.12	29%
End-User Computing	\$5,893,348.14	\$570,931.56	\$6,464,279.70	8%
IT Service Desk	\$6,582,472.47	\$72,456.00	\$6,654,928.47	8%
Voice Network	\$3,872,148.15	\$3,827.25	\$3,875,975.40	5%
Data Network	\$5,300,561.82	\$2,793,166.01	\$8,093,727.83	10%
Application Development	\$926,280.00	\$2,106,146.96	\$3,032,426.96	4%
Application Support	\$16,480,127.64	\$3,018,128.73	\$19,498,256.37	25%
IT Management	\$4,547,696.82	\$1,874,089.46	\$6,421,786.28	8%
Finance & Admin	\$1,881,274.29	\$165,673.63	\$2,046,947.92	3%
<b>Total</b>	<b>\$61,842,885.17</b>	<b>\$16,711,212.88</b>	<b>\$78,554,098.05</b>	<b>100%</b>

Table 2A: FY14 ITS and OSI (WS and RM) Total Spend by Gartner IT Function<sup>8</sup>

<sup>5</sup> Gartner Group. *IT Key Metrics Data 2015: Key Industry Measures: Government — State and Local Analysis: Current Year, (15 December 2014)*.

<sup>6</sup> The definition of each IT Functional area is listed in Appendix E.

<sup>7</sup> Note that some non-pay transactions did not fall into any of the nine categories, and were excluded from the total.

<sup>8</sup> Note that some non-pay transactions did not fall into any of the nine categories, and were excluded from the total.

Note that the categorization above should only be considered to be an initial allocation at gauging how ITS uses resources compared to others; it is an estimation of how ITS funds were actually expended, as resources and contracts may have provided multiple categories of services. In addition, non-pay spend was tagged based on information available in Momentum about each transaction. The pay figures are approximations for two reasons. First, employee position descriptions only appear to be general descriptions of what employees actually do day-to-day, meaning that the categorizations were made with only partial information (See Section 4.2.3 for more detail.) Second, many employees wear multiple hats, and actually perform several functions in their daily activities, making wholesale categorizations a poor reflection of how much human capital is actually invested.

For the purposes of an initial look at ITS IT spending relative to other public sector entities, the HP team compared the figures above to Federal-government and State- and Local-government benchmarks calculated by Gartner, shown in Table 3, below.

	State & Local 2014	State & Local 2015	Federal 2014	Federal 2015	ITS FY14	OSI FY14 (WS & RM)	Combined FY14 ITS & OSI
Data Center	20%	25%	21%	19%	26%	37%	29%
End-User Computing	14%	14%	11%	12%	10%	3%	8%
IT Service Desk	8%	9%	7%	7%	11%	<1%	8%
Voice Network	6%	6%	6%	6%	6%	<1%	5%
Data Network	10%	10%	9%	10%	9%	17%	10%
Application Development	13%	10%	22%	21%	1%	13%	4%
Application Support	19%	16%	14%	15%	27%	18%	25%
IT Management	6%	6%	6%	6%	7%	11%	8%
Finance & Admin	4%	4%	4%	4%	3%	1%	3%

*Table 3: Gartner Federal and State & Local (S&L) IT Function Metrics Compared to FY14 ITS and OSI (WS and RM) Pay and Non-Pay Spend*

In interpreting this comparison, it is important to note that these metrics and any variances are only meaningful to the extent that they represent areas where it makes sense for LOC to be similar to other entities. For example, if LOC’s mission requires it to use more data storage than other agencies, then Data Center metrics are less useful benchmarks. Similarly, variances between ITS spending and Gartner benchmarks do not automatically indicate that something is wrong. They simply signal areas that warrant a closer look, as discussed below. With this in mind, the HP team compared the Gartner benchmarks to the FY14 ITS totals, and made the following observations:

- **Data Center:** ITS’ FY14 data center costs accounted for 26% of its total, greater than the 2014 and 2015 Gartner metrics for Federal agencies (21% and 19% respectively.) This variance may be warranted. In 2014 LOC made investments in storage and security due to the mission need to store large amounts of data for future preservation. Replicating this analysis for multiple years would provide more insight into “normal” data center investments.
- **End-User Computing and IT Service Desk:** This is an example of where variance is only meaningful to the extent that the metric reflects something the organization considers to be important. If LOC is interested in monitoring the total amount it spends on supporting end-user experiences – including providing service desk support – then understanding how it compares to other agencies at the aggregate level is a useful data point. If, LOC wants to see how ITS spend on service-desk support alone compares to others, then the more granular look is more useful. Note that because LOC contracts out the IT Help Desk function, it should expect to see a higher

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non-payroll cost and lower payroll cost relative to other organizations who conduct the function in-house (that data is not provided here.)

- **Application Development and Application Support:** In FY14, ITS spend on Application Development of 1% was significantly lower than the Gartner benchmarks of 20% in 2014 and 21% in 2015. ITS' FY14 Application Support spending was over 10% higher than the Gartner Federal benchmarks. This does not necessarily signal a problem, just an area for further investigation. For example, if LOC uses more commercial off the shelf products than other entities due to different mission requirements, then these variances could be expected. By purchasing more applications instead of developing them in-house (relative to peer organizations) LOC would spend relatively less on Application Development, and may need more money for Application Support. If LOC is overspending on enhancements and operations and maintenance (O&M) relative to new development however, these variances could signal a missed opportunity to realize cost savings. In this example, LOC might be in a situation where it is investing money in supporting or maintaining older applications, when developing a new application to replace them would ultimately be more cost effective. Again, the benchmark variances alone would not automatically point to this scenario; they simply signal an area where further investigation is needed.

Again, while this analysis provides a foundation for a conversation about ITS spending priorities, more detailed data collection and analysis outside the scope of this study can be conducted for further insight. A deeper investigation into the activities that were funded by each non-pay transaction, along with a focused workload study would result in a more accurate reflection of what ITS spent in each category. Looking forward, new accounting approaches would give ITS tools for capturing cost in a way that can better inform management and operational decisions. In evaluating these approaches, ITS would have to consider the training and resource investments required to execute them well. For example, institutionalizing an activity-based costing model would provide more granular – and likely relevant – cost data for the tough management decisions facing Federal Agencies today. That said, it would require more sophisticated data capture and modeling capabilities that can tie costs to specific services that incurred them.

### 3.2.3 The broad scope of LOC's IT Services (Help Desk) contract and lack of performance metrics inhibits oversight, creating risks for cost and quality.

In FY14 the single largest non-pay ITS obligation was for a contract originally intended to be for help desk support (See Table 4, below with title EUC14C002 IT HelpDesk Customer Support). Upon further investigation, the HP team discovered that the scope of the IT HelpDesk Customer Support contract extended well beyond help desk support, and was actually quite broad. It included ten Contract Line Item Numbers (CLINs); Call Center, Telecommunications, Cabling Services, Audio/Visual Support, Configuration, Servers, Network Monitoring, Software Packaging, Project and Program Management Integration, and Programming. Interviews confirmed that the IT HelpDesk Customer Support contract had expanded well beyond its original design. The increased scope may have contributed to cost and quality risk for several reasons. First, broadly scoped contracts reduce oversight capabilities, which in turn impacts LOC's ability to manage quality as there are fewer controls that apply to the diverse set of activities that end up being performed. Second, reduced oversight obscures visibility into specific spending within the contract.

Document Number	Title	Amount
RQITS20140079	EUC14C002 IT HelpDesk Customer Support	\$3,938,675.20
RQITS20140236	SEC14M008 AppDetectivePro Maintenance - FP53801	\$3,014,060.30
RQITS20140083	ESE14M005 IBM HW_SW Maint_OptYr1 - FP44179	\$1,478,310.62
RQITS20140082	TFA14L01 Cisco 4500 HW and Maint Refresh - FP45684	\$1,019,874.35
RQITS20140292	Additional Flash Storage - Link to LCOSI14D0063	\$787,371.12
RQITS20140081	NAV14M013 Oracle HW_SW Maint_SAMF_LIC-FP45755	\$745,189.86
RQITS20140126	TFA14H008 Data Wi-Fi equipment Expansion - FP50144	\$741,740.70
RQITS20140012	FY14-411 EMC SAN Service Maintenance - FP33903	\$723,208.06
RQITS20140155	Security Operations Center - FP51708	\$700,000.00
RQITS20140183	ESE14S008 VMWare Licenses - FP48580	\$604,679.86

Table 4: Top Ten FY14 ITS Momentum Transactions

A review of the IT HelpDesk Customer Support contract also revealed that the metrics included were either insufficient or not meaningful and the HP team’s interviews revealed that the performance reporting related to those metrics did not result in data that was closely tracked or used by LOC. Contracts for help desk support normally contain performance metrics, such as length of time to respond to calls, length of time to resolve calls, etc., which serve a dual purpose. First, they can be used to monitor the level of service being provide by the supplier, and ensure that it is adequate. Second, they can be communicated with a broader community so they understand the level of service that is being provided, and engage in an informed dialogue about whether additional service (funding) is necessary. Without solid metrics associated with the IT HelpDesk Customer Support contract, LOC is unable to evaluate whether the supplier is meeting its contractual commitments, determine if the level of support was sufficient to meet the end user community needs, and/or identify areas for improvement or potential cost savings.

### 3.2.4 There are opportunities for ITS to adhere to LOC’s purchase card policy more closely

The LOC has a detailed directive that governs employees’ use of purchase cards(*OCGM Directive 06-01: Use and Management of Government Purchase Card*, Office of Contracts and Grants Management, Office of the Chief Financial Officer, September 18, 2006.) The document outlines clear roles and responsibilities for completing and approving requests, however the HP team’s interviews revealed opportunities for the organization to follow the policy more closely. For example, in some cases cardholder or approver designees were able to complete or approve requests. Since we were not conducting an audit of purchase card compliance we were unable to determine the root causes of the observed compliance issues. Therefore, scope limitations prohibited us from determining whether these behaviors occurred due to weaknesses in the system, a lack of awareness or training, or other reasons. However, our review of purchase card transactions indicated LOC may have high levels of risk over its ITS purchase card spending.

## 4. FY14 ITS Organizational Structure and Human Capital Analysis

### 4.1 Data Overview

The HP team analyzed a range of ITS human capital data, including payroll documents, position descriptions and organizational charts. Table 5, below, presents a breakdown of ITS by General Schedule (GS) level and component based on the ITS Organization Chart found in Appendix F.<sup>9</sup> Appendix B and Appendix C offer two additional breakdowns of the same human capital data: Appendix B shows the allocation of full-time equivalents (FTE) by IT Category, which was arrived at by mapping Job Descriptions to Garter’s IT functions. Appendix C shows the data in the table below with the additional detail of Job Title distribution.

ITS Component	GS level										Total
	7	9	10	11	12	13	14	15	SL		
Office of the Director									2		2
Operations				1					3	1	5
Research & Development										1	1
Congressional Research Service							15	1			16
Copyright						1	7	1			9
Database Administration						2	7	1			10
Data Telecommunications		1	1			1					4
Digital & Web Initiatives		1			1	3	6	1			12
Digital Scanning					8	3	1				12
End-User Computing					3	1	9				13
Enterprise System Engineering NAVCC							5	1			6
Infrastructure					1	4	8	1			14
IT Security						3	6	1			10
Lead System Information Technology									1		1
Library Services /Law Library					2	2	4	1			9
Multimedia					5	3	8	1			17
Network & Storage					1		14				15
Resources Management					3	5	2	1			11
Servers							17				17
Solution Architect									1		1
Technical Facilities & Services									1		1
Technology Assessment					1		3	1			5
Voice Communications	1				6	5					13
Other					3	1	9	5			18
<b>Total</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>34</b>	<b>34</b>	<b>123</b>	<b>22</b>	<b>4</b>		<b>222</b>

Table 5: ITS FTE by Division and GS Level

### 4.2 Findings and Discussion

Based on an analysis of ITS’ organizational structure and human capital data, the HP team identified three findings that warrant leadership attention as ITS makes structural and resource assessments:

<sup>9</sup> Note that ITS Organization Chart in Appendix F is dated January 2015. Between January 2015 and the time that this analysis was conducted in the summer of 2015, there were changes in the number of ITS employees. As such, there are slight variations between the totals in Table 5 and Appendix F.

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1. ITS' current structure creates potential organizational barriers to decision-making, spending control, and customer-satisfaction.
  2. There is no center of responsibility on the ITS organizational chart for planning and programmatic direction.
  3. Employee activities are not clearly captured in existing human capital documentation.

Each finding is discussed in further detail, below.

#### 4.2.1 ITS' current structure creates potential organizational barriers to decision-making, spending control, and customer-satisfaction.

For FY14 ITS had five major divisions: Research & Development (R&D), Resources Management, IT Security, Technology Assessment and Operations. Based on the organizational chart and number of employees assigned to each division, the majority of activity within ITS appears to be concentrated within two divisions: R&D and Operations. R&D appears to contain the majority of application development-type activities, while Operations contains activities typically categorized as services and support. IT organizational structures that divide responsibilities this way present risks for leadership to monitor and mitigate.

The first risk is decision-making bottlenecks. Housing the bulk of activities within two divisions creates a large span of decision-making for the Assistant Directors overseeing them. With a wide range of activities funneling up to them, there is a potential for delays on anything that falls outside of normal processes, or that requires decisions from the top of the organization. Similarly, communications downward might see delays. With this organizational construct it is important to keep a close eye on processes throughout the organization, to ensure that sub-organizations are empowered to make decisions wherever possible.

The second risk is that, because this organizational construct blurs responsibilities for new developments, enhancements, and O&M, ITS must take other measures to capture what resources are being devoted to each of those three areas. IT organizations must often evaluate the trade-offs between developing new applications and enhancing existing applications. While, in some cases, it is less costly to enhance existing applications, organizations can find themselves in situations where so many enhancements are needed, that it would ultimately be more cost effective to replace an application with a new one. Similarly, organizations may find themselves investing in new application development when the same outcome could be achieved for less money by simply enhancing an existing application. Some IT organizations organize themselves around these functions (e.g., a "Plan-Build-Run") structure, which gives them visibility into how they are allocating resources against them. That structure, however, comes with its own risks so it may not make sense for all organizations, who instead can identify how costs are distributed through other means, such as activity-based costing. Without some clear visibility or other controls, however, ITS will not be able to identify when they are devoting resources to activities that are only providing marginal value, when they could potentially invest fewer resources for greater impact (i.e., investing in system enhancements when new tools would be more cost effective.)

Finally, the FY14 ITS organizational structure does not seem to be clearly organized around customer needs. Although some units within R&D focus on LOC customer units, others are organized by function, as is all of Operations. ITS also is not wholly organized around customer delivery, for example, it is not organized as a "Plan-Build-Run" structure where there are teams devoted to IT planning, developing and O&M. Without a clear customer-facing design, the organization might deliver a disjointed customer experience if that risk is not mitigated through other means (e.g., matrixed groups or dedicated processes for customer interaction.)

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While there is nothing fundamentally flawed about the ITS organizational chart, it has the potential to create undesirable dynamics if not managed well. Ultimately, LOC leadership should drive organizational decisions based on how they would like ITS to operate in practice, and be diligent about managing risks that are likely inherent in any structure they implement.<sup>10</sup>

#### 4.2.2 There is no center of responsibility on the ITS organizational chart for planning and programmatic direction.

In ITS' organizational chart there is not a clearly defined component that is responsible for making planning and programmatic decisions with respect to LOC's IT. The two divisions with the bulk of the activities assigned to them are not, on paper, designed for strategic thinking; both are driven by operational needs. The absence of a central planning component on the organizational chart does not automatically mean that the organization is unable to make these types of decisions. These responsibilities could lie outside of ITS, or reside with inter-organization groups or boards.

The absence of a clearly designated organizational component does, however, require leadership to establish a strong governance process through some other mechanism, to ensure clear areas of responsibility, accountability and lines of authority throughout the organization. Based on observations made during this analysis, it appears that ITS may be in a situation where this governance process is currently weak, or is not successfully resulting in these clearly defined areas of responsibility. There is evidence of potentially unclear lines of responsibilities stemming from apparent misalignments between named organizational functions and actual activities. For example, R&D does more than just research and development; it supports LOC in system requirements and conducts other activities that fall outside the scope of examining new technologies. Similarly, the Infrastructure unit within R&D appears to be misnamed, since it supports applications versus telecommunications or a data center. To the extent that this misalignment creates confusion within the organization around who-does-what, issues with the organizational chart are likely contributing to inefficiencies within LOC's IT function.

While an organizational chart is just one set of lines delineating responsibilities – not a construct intended to govern an organization – it should be based on clearly articulated responsibilities and processes that align to a single strategy. Without a shared understanding at all levels on how they are supposed to work, organizations run the risk of becoming overly fragmented (i.e., separating Budgeting, Portfolio, and EA functions instead of using them as an integrated set of information) and inefficient (i.e., if lower level entities do not have clarity on what they are accountable for or how they fit in with other components.)

#### 4.2.3 Employee activities are not clearly captured in existing human capital documentation.

Many ITS employees shared the same position description. For over 200 employees the HP team identified 23 distinct position descriptions. The position descriptions were general, and it is unclear whether they accurately reflect the full range of activities that employees perform day-to-day. Although the HP team's analysis did not explore employee activities, anecdotal evidence suggests that the data in the position descriptions does not provide an accurate picture of the activities each person performs. Employees in any organization often wear many hats, performing multiple functions, beyond what is outlined in an official position description.

Documentation of the specific activities each person is performing provides critical visibility into whether each organizational component has the right mix of expertise and is performing at the level required to properly execute the mission. For example, Table 5, above, shows that with the exception of one GS 15,

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<sup>10</sup> Note that during the interviews conducted for this project, the HP team did not inquire about, or include any analysis related to the new organizational changes.

all of the people in both the Congressional Research Service and Servers components are GS-14s. Without an understanding of what each person actually does for that group and for LOC more broadly - and what the desired capabilities are for those components - it is difficult to determine whether those human capital allocations are appropriate.

The lack of clear visibility into employee activities can have several negative impacts on the organization. First, oversight and accountability of employee performance become more difficult without a documented, shared understanding of what the job entails and what success looks like. Second, having employee responsibilities readily available is a valuable source of data for leadership as they look across the organization to make structural decisions, (e.g., What is the most logical grouping of employees into teams?) resource allocation decisions, (e.g., Where are there capability gaps or overlaps? What percentage of our pay spend goes to Application Development?) or strategic decisions (e.g., Where can we divest from activities that are not supporting our highest priorities?) To identify the breakdown of position descriptions that best reflect the organization’s actual and desired operations – and associated performance plans - further investigation outside the scope of this tasking, would be required.

## 5. Benchmark Analysis

### 5.1 Benchmark Findings and Discussion

Interviews with ITS leadership revealed that the organization has little insight into how LOC’s IT budget compares to similar entities. For the purposes of this analysis, the HP team identified three Federal agencies that were useful benchmarks for LOC based on their size, mission and/or structure of their bureaus of activity: the National Archives and Records Administration (NARA), the Small Business Administration (SBA) and the Smithsonian Institution.

Agency	Total FY14 Enacted Budget	Total FY14 IT Spending	Total FY14 FTE
Library of Congress	\$611M	\$63M*	3120
National Archives and Records Administration	\$389M	\$103M	2892
Small Business Administration	\$929M	\$115M	3267
Smithsonian Institution	\$805M	\$66M	4293

Table 6: LOC Benchmark Agencies

(\*LOC’s FY14 Total IT Spend is based on the ITS budget for that year. As discussed earlier in this analysis, this figure is not an exact measure of what LOC spends on IT. Total IT Spend for the other agencies was provided by OMB Information based on major and minor agency IT investments. See Appendix D for an expanded list of Federal Agency IT Spend. Total FY14 Spend and FTE data was provided by agency Congressional Budget Justifications.)

While benchmarking IT spend against other Federal agencies may provide valuable insight for LOC leadership, good Federal IT benchmarks are difficult to come by. Information more detailed than what’s provided in Table 6 – including data about IT categories - is not publically available. Further, the figures that are available, including those above, generally offer poor points for comparison for multiple reasons. First, mission plays a significant role in the need and allocation of IT resources. As a result, agencies have different needs for IT; some more costly than others. If LOC were to benchmark its spending against another agency, it would be important to consider differences in mission. If another agency’s mission

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required unique types of IT support that are not important for LOC's mission, that agency's IT spend would not be an appropriate benchmark for LOC.

Second and more problematic is the fact that tracking Federal resources is notoriously difficult to do, especially in a manner that is consistent across organizations. Federal agencies define IT differently and often have different mechanisms for capturing costs. Not unlike LOC, many agencies are still determining how to track their IT spending, both in terms of using technology in the best way possible, and also establishing consistency across sub-components. A total IT spend amount for one agency could include elements that another agency did not include in their definition of IT. Currently, many agencies are still tracking spending at fairly high levels (e.g., by object class) or in highly individualized ways that do not lend themselves to inter-agency comparisons (e.g., internal spreadsheets used by specific CIO offices or cost-data for specific contracts.) One exception is spending on large IT initiatives, where data is collected and shared for OMB's IT Dashboard. Although some agencies, including LOC, do not participate in this, it offers one potential platform for LOC benchmarking in the future.

## 5.2 Opportunities for Benchmarking

Despite current challenges around obtaining Federal data, there are still opportunities for LOC to use benchmarks to inform their decisions. Organizations like Gartner Group have developed industry-wide benchmark data, including for the public sector, beyond just the metrics used in this report. To take advantage of these, LOC can look across the available metrics (provided by Gartner or others) to determine which are most useful for measuring progress against their specific goals. For some metrics, the requisite LOC data likely exists, whereas new data collection or tagging efforts may be needed for other metrics. In calculating these metrics, it is critical that the team doing it pay close attention to the operational definitions that the creator of the metric – e.g., Gartner – established. If they use a different definition then resulting comparisons will likely be meaningless. (For a list of definitions used for the metrics in this report, see Appendix E.)

In the longer term, there are opportunities for LOC to get involved with government-wide initiatives to tackle the challenge of collecting and reporting quality data regarding IT. For example, the CIO Council, established in 2002 and led by OMB, is an inter-agency forum focused on IT management. Several of the initiatives they sponsor are aimed at helping agencies share information and best practices. In addition, LOC could partner with similar agencies (e.g., NARA) to develop more tailored information sharing channels and best practice exchanges. As LOC matures its IT practices, the new CIO organization might also consider publishing its own budget information or comparisons in strategic plans, annual reports, and through other means to increase this visibility of LOC's IT spending.

## 6. Recommendations and Areas for Further Study

### 6.1 Recommendations

Based on the analysis above, the HP team identified five near-term, tactical actions LOC can take to improve visibility and control over its IT spending.

1. **Explore Momentum functionality that allows transactions to be coded based on more granular IT activities.** Despite current challenges tracking IT spending in Momentum, changing financial systems is costly and time-consuming. Momentum may have additional features that provide incremental capabilities tailored to the needs of the user, which could be explored with a relatively small investment of time and resources. Additional capabilities would likely allow LOC

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to make improvements in its financial management practices, if implemented along with clear policies and guidance around its use.

2. **Tighten procedures for contract oversight, to include performance metrics for service contracts.** Interviews and research over the course of this study revealed opportunities for LOC to be more closely involved with contract oversight, particularly associated with IT services. Where these contracts involve a wide range of support, LOC should devote time and resources to designing, implementing and monitoring performance metrics that ensure the delivery of services are aligned to the goals of the agency.
3. **Review ITS job descriptions and performance plans to make certain they clearly reflect and document each individual's responsibilities.** Employees in IT organizations often perform a complex, dynamic set of tasks that are closely integrated among components. While generalized job descriptions are easier to maintain, they obscure visibility into the workings of an organization, making it difficult for leadership to evaluate whether they have the right mix of human resources required to meet LOC's goals. Investing the time to create individualized job descriptions and performance plans, that flow from functional plans, will help leadership make more informed resource decisions, ultimately contributing to a more efficiently run organization.
4. **Conduct a workload assessment that includes an inventory of the skills required for each position in ITS.** As LOC identifies how it would like to align its organizational structures and resources to achieve its IT goals, it will be important to take a close look at how the organization functions now, versus how it should function in an ideal state. A workload assessment will help leadership see who in the organization conducts which activities, including those that are performed by individuals who wear multiple hats. This visibility will help identify duplicative functions, gaps or inefficiencies in processes, as well as potential needs for organizational realignments.
5. **Ensure that all employees are trained on policies and procedures.** While some improvements to financial and organizational management must be made at the leadership or technology level, many problems can be solved in a much less costly way: by ensuring that employees are using tools correctly, and in line with the policies that are meant to govern their correct use. Ensuring that employees are aware of how to use these tools and how to follow the policies and procedures that govern them will stem a number of challenges that come from inconsistent or incorrect inputs into the system.

## 6.2 Areas for Further Study

In addition to the tactical actions above, the HP team identified four areas for further study that will position ITS to operate more effectively and efficiently in the long term. These each offer opportunities for incremental progress toward an improved posture for IT financial tracking and management, which is likely preferable to wholesale system changes given LOC's fixed budget environment.

1. **Develop a clear strategy and goals for LOC's IT function.** Before making decisions about organizational structure or resource allocation, LOC and ITS leadership should come to agreement on the organization's vision, strategy and goals for its IT function. Those documents will provide a framework and guidance for subsequent management decisions, helping ensure that organizational, process and resource structures are all aligned to a common goal.
2. **Identify an approach for building more transparency into LOC budgeting and financial management processes.** This approach should be based on a driving strategy, using the goals of that strategy to determine what information is important for tracking progress toward them. From

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there, the approach would focus on means for gaining insight into that information (e.g., developing policies or data dictionaries to ensure consistent and accurate financial tracking.)

3. **Define the IT activities and processes that should drive LOC, before making organizational and management decisions for ITS.** As LOC examines ITS' operational and management structure, it will be difficult to determine what an optimal organizational design or human capital plan should be without having a clear picture of the processes that do (or should) drive the organization. Once those processes are identified, leadership will be able to make decisions based on how LOC actually conducts the business of IT, and develop governance documents and procedures accordingly (e.g., the optimal role of the CIO, Responsibility Assignment Matrices – also known as “Responsible-Accountable-Consulted-Informed” (RACI) charts - to clarify roles and decision-making hierarchies.)
4. **Explore processes that would allow for activity-based costing.** As LOC matures its IT capabilities, it will be important to understand where IT resources are being expended and what the impact of those investments are. Identifying a realistic plan for LOC to build an activity-based costing capability will help the agency make better financial decisions in the future, both in terms of identifying efficiencies or cost savings, and demonstrating the value and impact of its expenditures.

## Appendix A. Analysis of Reimbursable Accounts

LOC requested an analysis of two reimbursable funds, the Allocated Working Fund Account #010896 and Other Reimbursable Account #010802. The tables below list use of funds based on original transaction obligations for each account, broken down by amount, recipient, date, and reason for outlay.<sup>11</sup>

### Allocated Working Fund Account # 010896

Type	Document ID	Amount	Recipient	Date	Reason for Outlay
RQ	ITS20140109	\$ 60,396.21	BAI	19-Sep	End User Experience Tool Monitoring Software
RQ	ITS20140127	\$ 117,861.30	Force3	13-Aug	LAN Tech Refresh Installation Services
RQ	ITS20140139	\$ 8,383.50	VARIQ CO	9-Sep	Microsoft Product Support
RQ	ITS20140244	\$ 850.00	Immix Technology/Kronos	29-Sep	WebTA software upgrade
RQ	ITS20140252	\$ 2,020.40	Best Buy	24-Sep	60" TV & Blu-Ray Disc Player
RQ	ITS20140254	\$ 28,833.60	IBM	12-Aug	IBM License
RQ	ITS20140259	\$ 13,735.80	Cysco Systems	25-Sep	High Speed Fault Tolerant Switch Ports
RQ	ITS20140262	\$ 47,368.38	Indus	29-Aug	Professional Services
RQ	ITS20140265	\$ 5,616.30	SmartNet/New Tech	29-Sep	Cisco Hardware, Software and Maintenance
RQ	ITS20140269	\$ 8,400.00	Advantage	29-Sep	Professional Services
OC	ITS20140144	\$ 250.00	TelcomExpress2225	17-Sep	Refurbished Telephone Sets
OC	ITS20140147	\$ 19.99	GSA Advantage259	17-Sep	Materials for NAVCC..Printer Cassette Tray
OC	ITS20140157	\$ 809.55	Hello Direct 809	14-Sep	Headsets
OC	ITS20140160	\$ 88.92	Amazon	12-Sep	Thermometers for Data Center
OC	ITS20140161	\$ 68.00	GSA Advantage259	16-Sep	Cassette Tray Standard 250 Sheet CM2320 Series
OC	ITS20140162	\$ 2,495.50	Graybar2495	26-Aug	Fiber Optic Cable (qty 350)
OC	ITS20140163	\$ 2,139.89	CDWG	17-Sep	Materials for Data Center
OC	ITS20140164	\$ 1,967.69	CDWG	17-Sep	Materials for Data Center
<b>Total</b>		<b>\$301,305.03</b>			

### Other Reimbursable Account #010802

Type	Document ID	Amount	Recipient	Date	Reason for Outlay
RQ	ITS20140237	\$ 147,371.62	Softchoice Corp	30-Sep	Archer Software Licenses
RQ	ITS20140252	\$ 15,775.92	Best Buy	24-Sep	Audio Visual Equipment
RQ	ITS20140261	\$ 150,000.00	Serena Software	29-Sep	Serena Workflow Mgmt Svcs
RQ	ITS20140262	\$ 194,000.00	INDUS	29-Aug	Engineering Advisory Services
RQ	ITS20140265	\$ 21,085.83	New Tech Solutions	29-Sep	Quickset Camera FP58214
RQ	ITS20140269	\$ 40,000.00	Advantaged Solutions	29-Sep	FRS Assessment for MOM Cloud
RQ	ITS20140283	\$ 5,614.56	Verizon	28-Aug	Cell Telephony
RQ	ITS20140283	\$ 421.20	Verizon	6-Aug	Cell Telephony
OC	ITS20140133	\$ 418.14	CDW	18-Jul	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 322.73	CDW	18-Jul	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 102.80	CDW	18-Jul	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 364.72	CDW	18-Jul	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 364.72	CDW	15-Aug	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 102.80	CDW	15-Aug	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 322.73	CDW	15-Aug	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 401.12	CDW	15-Aug	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20140133	\$ 17.02	CDW	12-Sep	FY 14-CC-Toner Cartridges for HP M750 dn
OC	ITS20130143	\$ 287.87	Amazon	29-Oct	FY13-CC Amazon for Cooper
OC	ITS20130144	\$ 733.40	Avaya	29-Oct	FY13-CC Avaya
OC	ITS20140156	\$ 567.58	Best Buy	17-Sep	FY14-CC BestBuy567 TFAS
<b>Total</b>		<b>\$578,274.76</b>			

<sup>11</sup> The information presented was derived from analyzing the Spending Lines Reports provided by LOC for account numbers 010896 and 010802. The appropriate reference document id was taken from the report and used to retrieve the required data from the documents in the Momentum system. Note that the data is based on RL, RQ, OT, TA, and OC transactions only.

## Appendix B. FTE Breakdown by IT Category

The chart below shows the percentage of staffing by IT function for ITS and OSI (WS & RM), compared to Gartner’s 2014 and 2015 State & Local and Federal Benchmarks, see Appendix E. For detail regarding the dollar amounts for pay-spending, please see Table 2, above.

The staffing percentages were calculated by reviewing each employee’s position description and assigning them to one functional category. They should be treated as an approximation of actual staffing distribution for two reasons. First, employee position descriptions only appear to be general descriptions of what employees actually do day-to-day, meaning that the categorizations were made with only partial information. Second, many employees wear multiple hats, and actually perform several functions in their daily activities, making wholesale categorizations a poor reflection of how much human capital is actually invested in different activities.

### Gartner Federal and State & Local IT Function Staffing Metrics Compared to FY14 Staffing

	S&L 2014	S&L 2015	Federal 2014	Federal 2015	ITS FY 14	OSI (WS & RM) FY14
Data Center	17%	20%	16%	13%	15%	9%
End-User Computing	14%	13%	10%	11%	14%	7%
IT Service Desk	10%	10%	12%	10%	8%	2%
Voice Network	4%	4%	4%	4%	6%	0%
Data Network	7%	6%	7%	6%	2%	11%
Application Development	16%	14%	25%	27%	3%	22%
Application Support	19%	19%	12%	12%	33%	25%
IT Management	8%	8%	8%	10%	13%	22%
Finance & Admin	5%	6%	6%	7%	6%	2%

# Appendix C. FTE Breakdown by Component and Job Title

The table below presents a breakdown of ITS FTE by General Schedule (GS) level, ITS component and job title, based on payroll data for the fiscal year ending September 30, 2015.

Organization & Job Title	GS Level								Grand Total
	7	9	10	11	12	13	14	15	
<b>Office of the Director</b>								2	2
Director ITS - 12405								1	1
Deputy Director, ITS								1	1
<b>Assistant Director Operations</b>				1			3	1	5
Administrative Specialist - 64818				1					1
Assistant Director for Operations - 13207								1	1
IT Specialist - 57501								1	1
IT Specialist (SYSANALYSIS) - 260484								1	1
Project Manager Digital Int - 12342								1	1
<b>Assistant Director Research &amp; Development/Copyright</b>								1	1
Assistant Director for Research & Development - 195639								1	1
<b>Congressional Research Service</b>						15	1		16
Information Technology Specialist (SYSANALYSIS) - 141540								1	1
IT Specialist - 79144							5		5
IT Specialist (DATAMGT) - 201106								1	1
Supervisor Information Technology Specialist - 12830								1	1
Systems Analyst - 12871						8			8
<b>Copyright</b>						1	7	1	9
Info Technology Specialist - 12869									1
Information Technology Specialist (SYSANALYSIS) - 141540						2			2
Supervisor Information Technology Specialist - 12830							1		1
Systems Analyst - 12871							5		5
<b>Data Administration</b>						2	7	1	10
Database Administrator - 12436									7
Database Administrator - 12437						2			2
Supervisor Information Technology Specialist - 12830								1	1
<b>Data Telecommunications</b>		1	1			1	1		4
Computer Assistant - 10897									1
Computer Assistant - 60939			1						1
Head Data Telecommunications Section - 079283						1			1
Info Technology Specialist - 139424									1
<b>Digital &amp; Web Initiatives</b>		1			1	3	6	1	12
Info Technology Specialist - 110721									1
Info Technology Specialist - 12869						2			2
Info Technology Specialist - 8483		1							1
INFO Technology Specialist (APPSW) - 8486					1				1
Information Technology Specialist (SYSANALYSIS) - 141540						1			1
IT Specialist - 79144							2		2
Supervisor Information Technology Specialist - 12830								1	1
Systems Analyst - 12871							3		3
<b>Digital Scanning</b>					8	3	1		12
Head, Digital Scan Section - 057157									1
Info Technology Specialist - 12869						3			3
IT Specialist - 12292						8			8
<b>End-User Computing</b>					3	1	9	2	15
IT Specialist - 57472									1
IT Specialist - 57476							1		1
IT Specialist (CUSTPT) - 198636							7		7
IT Specialist (CUSTPT) - 12481						2			2
Program Specialist - 80017				1					1
Lead Info Tech Specialist - 12814								1	1
Supervisory Information Technology Specialist - 057154								1	1
Systems Analyst - 12871							1		1
<b>Enterprise System Engineering NAVCC</b>							5	1	6
IT Specialist (OS) Systems Programmer - 12791							5		5
Supervisory Info. Technology Specialist (SYSADMIN) - 056993								1	1
<b>Infrastructure</b>					1	4	8	1	14
Info Technology Specialist - 110721									1
Info Technology Specialist - 12869						3			3
INFO Technology Specialist (APPSW) - 8486					1				1
Information Technology Specialist (SYSANALYSIS) - 141540						2			2
Supervisor Information Technology Specialist - 12830								1	1
Systems Analyst - 12871							6		6
<b>IT Security</b>									3
Information Tech Specialist (INFOSEC) - 203300									2
IT Specialist (INFOSEC) - 171985									1
IT Specialist (INFOSEC) - 171987									4
IT Specialist (INFOSEC) - 203299									2
Supervisory IT (IT Security) - 57150									1
<b>Lead System Information Technology</b>									1
Lead Info Tech Specialist - 12815									1
<b>Library Services/Law Library</b>								2	2
Info Tech Specialist - 141539									1
Info Technology Specialist - 110721								1	1
INFO Technology Specialist (APPSW) - 8486								2	2
Information Technology Specialist (SYSANALYSIS) - 141540									1
Lead Info Tech Specialist - 12814									1
Supervisor Information Technology Specialist - 12830									1
Systems Analyst - 12871									2
<b>Multimedia</b>								5	3
Chief MMG									1
Info Technology Specialist - 12869									2
IT Specialist - 12292									3
Lead Info Tech Specialist - 130284									4
Multi-Media Specialist - 136591									2
Multi-Media Specialist - 171082									1
Program Specialist - 12969									1
Visual Design Tech Specialist - 12422									3
<b>Network &amp; Storage</b>								1	14
IT Specialist - 57472									1
IT Specialist (OS) Systems Programmer - 12791									12
Supervisory Information Technology Specialist (SYSADMIN)									1
Systems Analyst - 12871									1
<b>Resources Management</b>								3	5
Administrative Officer - 115202									4
Administrative Officer - 238893									2
Administrative Specialist - 187861									3
Group Chief, Resources Management Group - 183442									1
Procurement Analyst - 209411									1
<b>Servers</b>									17
IT Specialist (OS) Systems Programmer - 12791									12
IT Specialist Systems Engineer - 187858									1
Supervisory Information Tech Specialist (SYSADMIN) - 240585									1
Systems Analyst - 12871									1
Systems Security - 12550									2
<b>Solution Architect</b>									1
IT Specialist (SYSANALYSIS) - 260484									1
<b>Special Project</b>									4
INFO Technology Specialist									1
INFO Technology Specialist - 205578									1
ITS (Enterprise Architecture) - 179018									1
Program Specialist - 12583									1
<b>Technical Facilities &amp; Services</b>									1
Chief, Technical Facilities and Services - 057147									1
<b>Technology Assessment</b>								1	3
Chief, Technology Group									1
IT Specialist - 320077									1
IT Specialist - 57453									1
IT Specialist - 57456									1
Systems Analyst - 12871									1
<b>Voice Communications</b>								1	6
Head Voice Telecommunications - 050432									1
IT Specialist (CUSTSPT) - 12481									1
Switch Maintenance Tech - 12554									4
Telecom Operator - 231997									1
Telecommunications Specialist - 57522									1
Telecommunications Specialist - 57515									3
Telecommunications Specialist - 57518									2
<b>Grand Total</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>31</b>	<b>33</b>	<b>114</b>	<b>22</b>	<b>210</b>

The table below presents a breakdown of OSI FTE (WS and RM) by GS level and job title.

Job Title	GS Level						Grand Total
	9	11	12	13	14	15	
Administrative Specialist - 64818		1					1
Digital Media Project Coordinator - 12327					3		3
Digital Media Project Coordinator - 12328					1		1
Information Technology Specialist - 12342						1	1
Information Technology Specialist - 171279				3			3
Information Technology Specialist - 172004					1		1
Information Technology Specialist - 184635	1						1
Information Technology Specialist - 202955			1				1
Information Technology Specialist - 63910					8		8
Information Technology Specialist (Internet) - 129478					2		2
Information Technology Specialist (Senior Designer/Art Director) - 184636					1		1
Information Technology Specialist (SYSANALYSIS) - 79144					1		1
Information Technology Specialist (SYSTEMS ANALYSIS) - 172003					1		1
Information Technology Specialist (SYSTEMS ANALYSIS) - 63909				1			1
IT Specialist - 311647					1		1
IT Specialist (INET) - 12317				3			3
IT Specialist (INET) - 311373			1				1
IT Specialist (INET) - 312046					1		1
IT Specialist (Information Architect) - 203005					3		3
IT Specialist (Project Manager) - 129476					2		2
Lead Information Technology Specialist - 174241					1		1
Supervisory IT Project Manager - 115400						1	1
Supervisory IT Specialist - 12693						1	1
Supervisory IT Specialist - 12694						1	1
Supervisory IT Specialist - 13319					4		4
<b>Grand Total</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>7</b>	<b>30</b>	<b>4</b>	<b>45</b>

## Appendix D. OMB Federal IT Spending Data

The table below provides an overall summary of IT spending from OMB's Federal IT Dashboard. The table includes the following information 2012 (PY) Actuals, 2013 (CR), and 2014 (BY) Budget. "CR" refers to "Continuing Resolution." "Count" refers to the number of investments (major and non-major) that are active on OMB's IT Dashboard. The table also includes information regarding Development, Modernization and Enhancement (DME) and Operations & Maintenance (O&M) totals.

The OMB IT Dashboard is an online tool that displays information on over 7,000 Federal IT investments. Information provided on the dashboard includes a subset of data from agency IT Portfolio and Business Case reports, and agency updated activity information, agency CIO evaluations, and other investment information. For more information about the IT Dashboard, please refer to: [www.itdashboard.gov/faq](http://www.itdashboard.gov/faq).

For details regarding information that is included as part of agencies' Dashboard submissions (formerly comprised of OMB Exhibit 53 and 300 data), please refer to FY 2016 IT Budget – Capital Planning Guidance, available at:

[https://www.whitehouse.gov/sites/default/files/omb/assets/egov\\_docs/fy\\_2016\\_guidance\\_06272014.pdf](https://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/fy_2016_guidance_06272014.pdf).

Report on Information Technology (IT) Spending for the Federal Government											
Federal Agency	Count	2012 (PY)		2014 (BY)		DME		DME		O&M	
		Actuals	2013 (CR)	Budget	Actuals	2013 (CR)	Budget	Actuals	2013 (CR)	Budget	
Department of Agriculture	287	2,538	2,526	2,510	447	437	306	2,091	2,088	2,204	
Department of Commerce	136	2,474	2,449	2,507	854	903	929	1,621	1,547	1,578	
Department of Defense	2,924	35,032	34,123	34,099	10,534	9,712	9,368	24,498	24,411	24,730	
Department of Education	163	557	622	621	65	101	105	492	521	516	
Department of Energy	955	1,579	1,523	1,529	234	191	213	1,345	1,331	1,317	
Department of Health and Human Services	740	7,181	7,416	7,288	987	911	811	6,193	6,505	6,477	
Department of Homeland Security	345	5,558	5,674	6,072	1,249	1,125	998	4,308	4,549	5,075	
Department of Housing and Urban Development	45	353	461	294	107	113	149	246	348	145	
Department of the Interior	228	1,033	1,045	1,013	124	101	55	909	945	958	
Department of Justice	306	2,753	2,687	2,657	774	569	506	1,978	2,117	2,152	
Department of Labor	135	577	596	611	86	101	94	491	494	517	
Department of State	74	1,374	1,358	1,417	220	228	271	1,154	1,130	1,146	
U.S. Agency for International Development	37	133	165	126	23	59	27	110	106	98	
Department of Transportation	365	2,996	3,146	3,128	1,642	1,740	1,686	1,355	1,406	1,442	
Department of the Treasury	295	3,407	3,706	3,746	691	942	886	2,717	2,764	2,860	
Department of Veterans Affairs	33	3,168	3,267	3,890	643	586	544	2,524	2,681	3,346	
U.S. Army Corps of Engineers	46	535	483	493	30	34	29	505	448	463	
Environmental Protection Agency	120	422	419	448	58	57	67	364	361	381	
General Services Administration	82	537	549	486	96	101	88	441	449	398	
National Aeronautics and Space Administration	68	1,463	1,433	1,436	36	34	26	1,427	1,399	1,410	
National Archives and Records Administration	34	108	119	103	5	1	9	103	118	94	
National Science Foundation	17	103	99	99	19	19	14	84	80	85	
Nuclear Regulatory Commission	38	134	151	152	23	11	22	111	141	130	
Office of Personnel Management	56	82	85	86	18	21	21	64	64	65	
Small Business Administration	35	102	115	115	30	32	38	73	84	77	
Smithsonian Institution	20	65	67	66	1	2	2	64	65	64	
Social Security Administration	74	1,456	1,605	1,504	644	596	655	812	1,009	849	
<b>Federal Grand Total</b>	<b>7,658</b>	<b>75,722</b>	<b>75,889</b>	<b>76,496</b>	<b>19,641</b>	<b>18,729</b>	<b>17,918</b>	<b>56,081</b>	<b>57,161</b>	<b>58,578</b>	

Source: OMB, *Federal IT Spending for Budget Year 2014*, <https://it-2014.itdashboard.gov/>

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## Appendix E. IT Functional Framework – Definitions

Adapted from: *IT Key Metrics Data 2015: Key Industry Measures: Government — State and Local Analysis: Current Year*, Gartner Group, (15 December 2014), pp.25-34.

### IT Functional Framework

*The following sections provide guidance on how to count costs and FTE numbers, as defined by the scope of the IT functional area framework/chart of accounts.*

#### Data Center

Note: Data center (enterprise computing and storage) includes mainframe, Linux, Unix and Windows servers, storage, and any other platform running in the data center.

Hardware: Processing devices: Include all hardware in server platform configurations, including internal disk storage, controllers, external disk arrays, tape libraries, optical jukeboxes, processors, memory, cards and other offline media supplies.

Software: Annual costs for host and virtual OS licenses, virtualization and partitioning software, utilities, databases, middleware, content/document management search engines, messaging, communications (TCP/IP, FTP and host-based) and server security software.

#### Connectivity

- Intra-data-center connectivity: This typically includes routers, switches, load balancers, controllers and appliances. Data center communication networks are dedicated networks that are segregated or isolated from the general-purpose LANs or WANs. General-purpose or shared network costs are excluded from the data center and should be allocated to the data network.
- Inter-data-center connectivity: This typically includes the transmission cost and hardware cost for the fiber, used and unused (dark fiber), and the switches and controllers. Data center remote communication networks are dedicated networks that are segregated or isolated from the general-purpose LAN or WAN. General-purpose or shared network costs are excluded from the data center and should be allocated to the data network.

Disaster Recovery: Includes disaster recovery contracts (computer and communications) for hot sites (shell facilities), dedicated hardware, software and connectivity.

Facilities/Occupancy: Costs for power/heat management, furniture, access systems, office space, raised floor and / or slab using overhead cable trays etc.

Personnel: Operations/maintenance, engineering technical services, planning and process management, service administration, management and administration, and facilities management.

#### End-User Computing

##### Hardware

- User client and peripheral hardware: desktop, laptop, thin-client and tablet PCs, personal and shared printers, multi-functional printers (MFPs or MFDs), handheld devices such as smartphones, and messaging devices. Transmission costs for these devices are excluded and should be allocated to the data network.
- IT management hardware: This encompasses hardware that primarily supports an IT process, not a business or user process. Examples are test and training devices, servers hosting network and system management (NSM) or asset management software, and devices used by the IT staff supporting the end-user computing environment. This also includes supporting a hosted virtual desktop (HVD) installation.

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## Software

- User client software.
- Personal productivity and database: This includes new word processors, spreadsheets, presentation packages, personal databases and other personal productivity software executing on client systems. It also includes upgrades.
- Messaging and groupware: This includes new and upgraded email, groupware and collaboration software.
- IT Management Software: This includes IT software that is used exclusively for IT functions including network, systems, storage and asset management, training and computer-based training (CBT) software as well as security software (antivirus, personal firewall, encryption, etc.). This also includes supporting a hosted virtual desktop (HVD) installation.

Disaster Recovery: Annual costs of hardware, software, connectivity, occupancy and contracts specifically dedicated to disaster recovery for end-user computing.

Occupancy: Occupancy costs should include fully burdened costs for the facilities being used by the staff supporting the end-user computing environment. Some examples include office space, furniture, electricity, maintenance, property taxes, security and office supplies.

Personnel: Operations/maintenance, engineering technical services, planning and process management, service administration, management and administration.)

## **IT Service Desk**

Hardware: PBX, ACD, interactive voice response, computer-telephony integration, IT service desk end user computing devices, and IT service desk application servers.

Software: This includes all software that is necessary to operate the IT service desk, such as expert knowledge tools, problem management tools, quality monitoring, self-service, workforce management software, workflow management software and IT service desk management portal software.

Occupancy: Occupancy costs should include fully burdened costs for the facilities being used by the staff supporting the IT service desk environment. Some examples include office space, furniture, electricity, maintenance, property taxes, security and office supplies.

Transmission: Includes inbound 800 service, dedicated trunking, local service, outbound long distance, Internet access (for example, IT service desk portal) and networking between IT service desks.

Disaster Recovery: Annual costs of hardware, software, connectivity, occupancy and contracts specifically dedicated to disaster recovery for IT service desk.

Personnel: IT service desk agents, operations/maintenance, engineering technical services, planning and process management, service administration, management and administration.

## **Voice Network**

Note: Total voice network includes voice premise technology and wide-area voice network costs, as well as dedicated cellular (mobile) voice network costs.

### Hardware

- Wide-area voice network hardware: Switching and routing, as well as terminating hardware. Terminating hardware includes microwave, satellite, compression, multiplexer/channel bank, PBX network interface card and channel service unit/data service unit (CSU/DSU).
- Voice premise: Telephone system equipment (such as voice switch/server and peripherals, including modules and uninterruptible power supply [UPS]), premise system phones (voice only; smartphones

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such as BlackBerry, iPhone and Android-based devices are excluded and should be allocated to the end-user computing environment), voice mail hardware (for example, processors and storage) and message authentication control (MAC) materials.

- IT management (network operations center [NOC]): This includes hardware that is located within a client's NOC and is used to support a client's centrally managed voice infrastructure/network. This includes client devices (PCs on NOC desktops) as well as servers (NOC), located within the NOC or elsewhere, but used primarily by the NOC to support the voice network infrastructure. The costs for these client devices/servers may need to be prorated between voice and data services, depending on a client's NOC environment.

#### Software:

- Switch/voice server and peripherals (e.g., automatic call distribution [ACD], voice response unit [VRU]) and voice mail software costs.
- IT management (NOC): Software used by the NOC primarily to support/manage a client's voice networks. The costs for this software may need to be prorated between voice and data services, depending on a client's NOC environment.

Transmission: Includes all outbound and inbound transmission costs. It also includes the annual cost for local central office lines (where applicable) as well as cellular (mobile) voice only transmission costs.

Disaster Recovery: Disaster recovery contracts (communications) for hot sites (shell facilities), dedicated hardware, software, and connectivity.

Occupancy (For Personnel Only): Occupancy costs should include fully burdened costs for the facilities being used by the staff supporting the voice network service. Some examples would include office space, furniture, electricity, maintenance, property taxes, security and office supplies. Occupancy for hardware (for example, closet space) is specifically excluded (that is, occupancy costs should apply only to the people supporting a client's voice network).

Personnel: Operations/maintenance, engineering technical services, planning and process management, service administration, management and administration.

## **Data Network**

Note: Data network includes WAN, LAN and Internet access services (IASs), as well as dedicated cellular (mobile) data network costs:

- WAN: Connectivity and transmission of business-critical data between enterprise locations and business partners
- LAN: Accounts for the provisioning of communications and connectivity to critical business systems within enterprise sites and campuses (Note: Costs associated with permanent building cabling, horizontal and vertical, are excluded. Likewise, costs for any interbuilding cabling — copper and/or fiber — that would be found on a campus are also excluded.)
- IAS: Enterprise access to the global Internet, for the use of its personnel and for the use of its external customers to access enterprise websites

#### Hardware

- Security hardware: Dedicated data network firewall hardware/servers, intrusion/detection servers and devices, as well as encryption hardware.
- NOC hardware: This includes hardware that is located within a NOC to support a centrally managed data network infrastructure/network. This includes test equipment and remote monitoring equipment, client devices (PCs on NOC desktops) and network management servers (NOCs).
- Switching, routing and wireless hardware, including switches and routers, multiplexers, satellite equipment, boundary (branch) routers, backbone routers and bridges, and wireless access points.

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- Other dedicated data network hardware, including Domain Name System (DNS) and Dynamic Host Configuration Protocol (DHCP) servers, optimization equipment such as Internet load balancing hardware, UPS, MAC hardware and MAC cable (closet to desktop).
  - Some of this may need to be prorated between the voice and data network.

#### Software

- Security software: Dedicated data network firewall software, intrusion/detection software as well as encryption software.
- NOC software: All NSM software costs related to the NOC's support of the data network infrastructure/ network.

Transmission: Annual data network transmission costs, such as carrier digital services including Frame Relay access, ports and PVCs (Permanent Virtual Circuits), ATM (Asynchronous Transfer Mode) access, ports and PVCs, MPLS (Multiprotocol Label Switching) access, ports, and CARs (Committed Access Rates) which also includes specific charges for Quality of Service (QoS) commitments, sometimes referred to as traffic shaping, T3/E3, dial backup service, Synchronous Optical Network (SONET), metropolitan Ethernet, and dark fiber, as well as annual cost for circuits connected to the Internet service provider and cellular (mobile) data transmission costs.

Disaster Recovery: Disaster recovery contracts (communications) for hot sites (shell facilities), dedicated hardware, software, and connectivity.

Occupancy (For Personnel Only): Fully burdened costs for the facilities being used by the staff supporting the data network. Some examples include office space, furniture, electricity, maintenance, property taxes, security and office supplies.

Personnel: Operations/maintenance, engineering technical services, planning and process management, service administration, management and administration.

### **Applications**

Application Development: New code for a new application and functional enhancements to the current code that take more than two person-weeks, or that typically add eight function points or more. A "functional enhancement" is defined as "a change made for a user that allows additional capabilities (from a business point of view) that were not there before. In some environments, major enhancements can actually be added in less than two person-weeks. If this is the case, and eight function points or more are added (about 800 lines of COBOL or 300 lines of a database language), then this is still categorized as development

#### Application Support:

- Bug fixes of any size or duration, maintenance of hard-coded data or tables (including field size changes) embedded within the programs (any size or duration), and functional enhancements to current code that take less than two person-weeks and typically add fewer than eight function points, or any project that produces no new business functionality for the user.
- A "functional enhancement" is defined as "a change made for a user that allows additional capabilities (from a business point of view) that were not there before." In some environments, major enhancements can actually be added in less than two person-weeks. If this is the case, and eight function points or more are added (about 800 lines of COBOL or 300 lines of a database language), then this is categorized as development rather than support.

Hardware: This includes only hardware (mainframes, servers, end-user computing devices) used by the application development or support staff members to do their jobs (that is, client devices as well as servers and a portion of the mainframe used for application development and testing). This excludes end-user or production hardware.

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### Software:

- Development and support software required by the application development and support staff members to do their jobs. It may include the languages/compilers/databases, development/testing tools and IT management software tools, such as project estimators and project schedulers.
- Business functionality software: For application support, this includes the maintenance cost of off-the-shelf vendor packages, as well the annualized cost of the software.

Occupancy: Fully burdened costs for the facilities used by the development or support staff and included in this analysis view. Some examples would include office space, furniture, electricity, maintenance, property taxes, security and office supplies.

### Personnel

- Application development: This includes staff involved in developing new applications, enhancing existing applications, installing new packages and installing major functional enhancements to existing packages.
- Application support: This includes staff involved in supporting applications that exist within the current portfolio. It also includes personnel who are responsible for fixing programming problems uncovered when applications are running in production. It does not include any personnel who are responsible for running the production applications. If an upgrade for a packaged application primarily contains fixes for existing problems, then the efforts involved in installing such a maintenance upgrade are included in application support.

## **Corporate IT Management**

Only include functions that are at a level within the IT organization that, after best effort, cannot be allocated to an IT functional area.

Office of the CIO/CTO: This includes the "C-level" IT management, including the CIO and CTO functions. Also included here are the direct reports of the CIO, who spend the majority of their time providing enterprise-wide support other than the functions outlined below (that is, special projects).

IT Human Resources: This includes resources dedicated to human resource issues surrounding the recruiting and retention of IT staff.

IT Marketing: This includes resources dedicated to marketing the capabilities of the IT organization to the business units.

Technology Planning and Process Management: This includes activities related to the planning for and management of current and future technology needs, and the establishment of policies and processes relating to technology. This also includes, but is not limited to, systems research, product management, technology evaluation and purchase decision making, the establishment of processes surrounding security and virus protection, and business continuity/recovery.

Disaster Recovery: This includes resources dedicated to planning, testing and implementing contingency procedures across all IT functions. This also includes the staff dedicated to safeguarding the enterprise's ability to continue operations of vital business functions following physical damage or other catastrophes that impact business facilities. Responsibilities include:

- Maintaining disaster recovery documentation
- Negotiating contingency site arrangements and serving as liaison with the vendor
- Managing off-site data retention

Security: This includes resources that oversee the development of standards and procedures for ensuring overall network and systems integrity.

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## **IT Finance and Administration**

Only include functions that are at a level within the IT organization that, after best effort, cannot be allocated to an IT functional area.

IT Administration: This includes direct administrative and clerical support to enterprise-level IT. Positions include secretary, receptionist and administrative assistant.

Budget and Chargeback: This area establishes the overall IT budget, monitors actual expenses versus the budget, arranges financing for purchases and performs financial reporting to other enterprise areas. Staff members also handle the operation of the chargeback system. Positions include financial analyst and chargeback administrator.

### Asset Management

- **Tracking:** This area provides the administrative support for tracking systems and system components. It accounts for labor and contract costs for managing depreciation records and lease contracts, performing asset inventories (physical or automatic management), asset identification and tracking, asset database management, change recording and reconciliation. It also includes the creation and maintenance of an up-to-date record of installations, moves, adds, changes, removals and final disposal of all assets (for example, hardware, software and circuits). The record contains information for locating, assessing, auditing, troubleshooting, counting and assigning assets, or performing other technical and business functions without the need to repeatedly visit the asset location or reassemble data records. It also includes the determination of an asset's useful life, including planning for the installation, upgrade, and removal/disposal of the asset and executing the plan.
- **Procurement:** This area solicits bids, negotiates purchasing agreements, establishes purchase orders, validates vendors' bills, coordinates with accounts payable for payments and handles contract administration.

Quality Assurance: This includes staff responsibility for monitoring, tracking and recommending solutions for improving the content and delivery of services provided by the customer service contact center.

Training: This refers to the primary source for the delivery of training within the IT organization and for end users in the business units. This area may also prepare the training materials, evaluate employee skills and assist in the creation of custom training programs for the organization.

