ASSESSMENT REPORT
An Agency of City and County of Denver
Software Asset Management Assessment
November 2017

Office of the Auditor
Audit Services Division
City and County of Denver

Timothy M. O’Brien, CPA
Denver Auditor
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Or download and view an electronic copy by visiting our website at: www.denvergov.org/auditor
Audit report year: 2017
AUDITOR’S REPORT

A third party has completed a Software Asset Management Assessment. The assessment found some areas of strength, and some areas that need improvement, which have been communicated to the City’s Technology Services department for further evaluation.

This assessment is authorized pursuant to the City and County of Denver Charter, Part 2, Section 1, General Powers and Duties of Auditor.

We extend appreciation to Technology Services and the personnel who assisted and cooperated with us during the assessment.

Denver Auditor’s Office

Timothy M. O’Brien, CPA
Auditor
Transmittal Letter

We are pleased to provide this Software Asset Management Assessment performed in accordance with our Statement of Work dated June 15th, 2017 by Deloitte & Touche LLP, as requested by City of Denver Auditor’s Office (the “Company”).

Our services and deliverables are solely for the Company’s benefit, and are not intended to be relied upon by any person or entity other than the Company. The Company should not disclose the services or deliverables, or refer to the services or deliverables, except as specifically set forth in the statement of work.

Our services were performed in accordance with the Statement on Standards for Consulting Services issued by the American Institute of Certified Public Accountants (AICPA) and did not constitute an engagement to provide audit, compilation, review, or attestation services as described in the pronouncements on professional standards issued by the AICPA, the Public Company Accounting Oversight Board, or other regulatory body and, therefore, we did not express an opinion or any other form of assurance with respect to our services.

We did not provide any legal advice regarding our services, nor did we provide any assurance regarding the outcome of any future audit or regulatory examination or other regulatory action. The responsibility for all legal issues with respect to these matters, such as reviewing all deliverable[s] and work product[s] for any legal implications to the Company, will be the Company’s. It is further understood that management is responsible for, among other things, identifying and ensuring compliance with laws and regulations applicable to the Company’s activities.

We look forward to working with you in the future.

[Signature]

Deloitte & Touche LLP
Software Asset Management Assessment  
City and County of Denver

Background

Deloitte & Touche LLP (Deloitte) was tasked by the City Auditor’s Office (City Auditor) to deliver a Software Asset Management (SAM) assessment of the City and County of Denver technology services department. The nature of the services performed for the City and County of Denver included two phases as described below:

Current State Assessment and Gap Analysis

- Planning and Scoping
  - Develop agreed upon project plan establishing roles and responsibilities, timelines and deliverables
  - Identify and schedule meetings with key stakeholders and conduct initial scoping meetings with selected stakeholders
  - Generate data request list and gather documentation such as organizational charts, and policies and procedures to be reviewed during the engagement
  - Establish overall project governance, cadence meetings, and escalation / remediation process

- Data Gathering
  - Interview key stakeholders to determine the current state of Technology Services SAM capabilities including roles and responsibilities of the SAM team and supporting business unit such as procurement, infrastructure, legal, etc.
  - Gather relevant documentation (i.e., IT Asset Management related documentation, data related to software lifecycle (refer to Figure 1) and work with vendor management teams to obtain vendor spend and entitlement data
**SAM Lifecycle**

**Forecast and Request**
- Collect and aggregate forecast data

**Analyze and Procure**
- Review and assess new / incremental software demand
- Perform a product rationalization analysis
- Compare license availability for installation requests
- Review acquisition requests and procure software licenses

**Install and Maintain**
- Install software
- Respond to and resolve software license inquiries
- Manage software license financial treatments

**Monitor and Track**
- Maintain software catalog
- Maintain software contract inventory
- Maintain software license inventory
- Assess, analyze and report software compliance
- Track software compliance issue remediation

**Decommission and Reuse**
- Review software/hardware decommission requests
- Review personnel change impacts
- Uninstall software

**FIGURE 1 – SAM LIFECYCLE**

- **SAM Assessment**
  - Assess the current SAM environment including, contracting and procurement, software compliance, software deployment, software monitoring and tracking, and software decommissioning
  - Confirm findings with stakeholders and update as appropriate
  - Create gap analysis & provide recommendations
  - Create a gap analysis detailing SAM process and control gaps identified and review the findings with the management team (refer to Figure 2)
  - Compile SAM process control observations and improvement opportunities to address gaps identified for improvement in the immediate and long-term time frame
Prioritization and Vendor Baseline Assessment

- **Create Vendor Prioritization Framework**
  - Gather major software vendor contracts and work with IT and Procurement to gather software spend data in order to analyze and identify the City’s highest spend vendors
  - Provide a Vendor Prioritization Framework which includes the highest risk vendors, based on spend data received, audit frequency, and agree upon a selected vendor for baseline exercise

- **Contract and Entitlements**
  - Conduct a review of software contracts and entitlements and work with IT, procurement, outsourcers, vendors, and resellers to determine the current license, maintenance, & subscription entitlement for agreed upon vendor, the data from which will be used to develop an entitlement assessment

- **Discovery & Deployment Validation**
  - Collect software installation information and compare entitlement and deployment data leveraging existing tools, or Contractor’s scripts if required
  - Conduct completeness & accuracy testing for software inventory records

- **Reporting & Recommendations**
  - Provide a software baseline assessment that consolidates deployment and entitlement data and review the assessment with the management team
  - Utilize findings from Phase 2 to identify potential savings opportunities, remediation areas to limit compliance exposure, and process improvements
Observations

Below are a selection of observations resulting from the two phases of SAM assessment:

1) The current SAM program has not been integrated with existing discovery sources in order to identify all software deployment, compliance and license positions throughout the City in an automated process.
2) There is a lack of formalized and understood policies and procedures across the SAM lifecycle, and knowledge of software licensing and compliance is inconsistent throughout the organization.
3) There is lack of a well-defined, robust, and automated method of assessing unused or unallocated software licenses in both personal computers and servers.
4) There is uncertainty associated with the compliance of server licenses due to lack of in-house licensing expertise and lack of visibility into software deployment in the datacenter environment.

Recommendations

Below are a selection of recommendations resulting from the two phases of SAM assessment:

1) Accountability and awareness for the SAM mission should be clearly articulated from leadership in order to drive completion of SAM objectives.
2) The software governance function should enable the SAM program to access critical data to carefully report on software compliance, including server access controls to determine completeness of inventory data.
3) Maintain accountability by clearly defining roles, responsibilities, access, and communicating these roles across the organization so as to promote visibility to the mission of the SAM program.
4) Formalize processes and controls around management of phases of the software lifecycle to ensure consistent practice across agencies and Technology Services.

Agency Response
November 07, 2017

Auditor Timothy O’Brien, CPA
Office of the Auditor
City and County of Denver
201 West Colfax Avenue, Dept. 705
Denver, Colorado 80202

Dear Mr. O’Brien,

The Office of the Auditor has conducted a Software Asset Management Assessment.

This memorandum provides a written response for each reportable condition noted in the Auditor’s Report final draft that was sent to us on October 17, 2017. This response complies with Section 20-276 (c) of the Denver Revised Municipal Code (D.R.M.C.).

AUDIT FINDING 1

<table>
<thead>
<tr>
<th>RECOMMENDATION 1</th>
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<td>Accountability and awareness for the SAM mission should be clearly articulated from leadership in order to drive completion of SAM objectives.</td>
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<table>
<thead>
<tr>
<th>Agree or Disagree with Recommendation</th>
<th>Target date to complete implementation activities (Generally expected within 60 to 90 days)</th>
<th>Name and phone number of specific point of contact for implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>1/31/2018</td>
<td>John Pira 720-913-4055</td>
</tr>
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Narrative for Recommendation 1
Technology Services (TS) agrees with the finding. TS will formally approve and communicate ITAM charter across the agencies and departments supported by Technology Services to establish the executive sponsorship and drive completion of SAM objectives.
AUDIT FINDING 2

RECOMMENDATION 2
The software governance function should enable the SAM program to access critical data to carefully report on software compliance, including server access controls to determine completeness of inventory data.

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Narrative for Recommendation 2
Technology Services (TS) agrees with the finding. The Information Technology Asset Management (ITAM) Program Charter, once officially approved, will further enable the SAM program to perform software-related compliance activities such as conducting self-audit and inventorying software data by establishing processes to perform risk-based reconciliations.

TS will also perform a cost-benefit analysis to determine whether an additional software management tool should be invested to further enhance the software asset risk management and compliance capabilities.

AUDIT FINDING 3

RECOMMENDATION 3
Maintain accountability by clearly defining roles, responsibilities, access, and communicating these roles across the organization so as to promote visibility to the mission of the SAM program.

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Narrative for Recommendation 3
Technology Services (TS) agrees with the finding. As stated in the narrative for Recommendation 1, ITAM Program Charter will be updated to add clarity to define roles, responsibilities, and access control. The charter will be communicated across the
agencies and departments supported by Technology Services to ensure the execution of the SAM mission and objectives.

AUDIT FINDING 4

RECOMMENDATION 3.1
Formalize processes and controls around management of phases of the software lifecycle to ensure consistent practice across agencies and Technology Services.

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Narrative for Recommendation 4
Technology Services (TS) agrees with the finding. TS manages software lifecycle, such as requesting and installing software, by utilizing Service Now, an Information System Service Management (ITSM) tool. TS will further formalize and document the processes and controls around Service Now and perform spot checking to ensure the processes are consistently followed and enforced.

TS will also perform a cost-benefit analysis to determine whether an additional software management tool should be invested to further enhance the software asset risk management and compliance capabilities.

Please contact John Pira at 720-913-4055 with any questions.

Sincerely,

Scott Cardenas
Chief Information Officer
cc: Valerie Walling, Deputy Auditor, CPA, CMC
    Heidi O’Neil, CPA, CGMA, Director of Financial Audits
    Kevin Sear, CPA, CIA, CISA, CFE, CGMA, Audit Manager
    Christopher Todd, Chief Technology Officer
    Alex Stefanacci, IT Director
    John Pira, IT Manager
    Samantha Shih, IT Compliance Analyst