

Audit Report Number 2007-07
City of Richmond
Audit of DIT – Software Licensing
March 2007

Executive Summary

March 16, 2007

The Honorable Members of City Council
Richmond City Audit Committee

The City's Auditor's Office has completed an audit of Software Licensing for the City. The primary objective of the audit was to ascertain whether software located on the City's network was properly licensed.

Background

A software license is a legal statement that grants permission for software usage. The license also informs the user that the software is copyrighted and that copying the software without permission of the copyright holder is illegal.

To monitor and enforce compliance with software licenses, the Business Software Alliance (BSA), an international organization, was created to represent leading software developers such as Microsoft, Adobe, and McAfee. Usage of unlicensed software could expose the City to significant liability for copyright infringement. The Federal Copyright Act imposes civil penalties of up to \$150,000 for each occurrence and criminal penalties of up to \$250,000 per occurrence, in addition to five years in prison.

Methodology

We conducted our audit in accordance with Government Auditing Standards issued by the Comptroller General of the United States. To satisfy the objective of this audit, interviews were conducted with the Department of Information Technology's staff. In addition, the City's network was scanned using software called System Integrator to identify software installed on City's machines. The City Auditor's office believes that the audit provides a reasonable basis for conclusions regarding the internal control structure and recommendations.

The management of the City of Richmond, Virginia is responsible for maintaining the financial records of the City. It is also responsible for establishing and maintaining a system of internal accounting control. In fulfilling this responsibility, management is required to assess the expected benefits and related costs of control procedures.

Overall Conclusions

The City is not compliant with its software license policy. Furthermore, it was not possible to determine whether the City holds proper licensing for software on its machines.

- Limited test work showed 340 copies of improperly licensed software was found on City machines. If prosecuted for copyright infringements, the City could face up to \$51,000,000 and \$85,000,000 in civil and criminal penalties, respectively.
- In addition, lack of information about the number of personal computers owned by the City makes the adequacy of licenses for Microsoft® Windows and Office products unknown. This situation may have resulted in either an overpayment of \$126,360 or a need for additional payment of \$526,500 for licenses. In addition,

if inadequate licenses exist for these products, the City could face up to \$135,000,000 and \$225,000,000 in civil and criminal penalties, respectively.

Recommendations

The following recommendations are listed in the order they appear in the detailed report:

1. *Centralize City-wide acquisition, installation, and upgrades of software. (The Department of Information Technology (DIT) is in the position to best to accomplish the centralization of software management.)*
2. *Establish a centralized library for all software and license documentation and hire a software librarian.*
3. *Prohibit users from installing and deleting any software on computers assigned to them. Allow only DIT personnel the ability to install and delete software on computers.*
4. *Delete all software that does not pertain to City operations and for which the City does not have licenses.*
5. *Require City agencies to purchase licenses for software needed to carry out their objectives.*
6. *Establish procedures to ensure employees are made aware of the City's software policy and require their acknowledgement in writing.*
7. *Establish a procedure to comply with software license agreements that allow for concurrent usage.*

The City Auditor's Office appreciates the cooperation received from DIT staff. These recommendations have been shared with the Department of Information Technology management. Please feel free to contact the City's Auditor's Office for any questions related to this report.

Introduction

The City Auditor's Office has completed an audit of Software Licensing. This audit was performed as a part of the 2007 Audit Plan and was conducted in accordance with Generally Accepted Government Auditing Standards.

Objectives

The objective of the audit was to ascertain whether software located on the City's network was properly licensed.

Methodology

To satisfy the objective of this audit, interviews were conducted with the Department of Information Technology's staff. In addition, the City's network was scanned using software called System Integrator to identify software installed on City's machines.

Background

A software license is a legal statement that grants permission for software usage. The license also informs the user that the software is copyrighted and that copying the software without permission of the copyright holder is illegal.

As a result of the recent increase in software piracy, the major software developers such as Microsoft, Adobe, and McAfee formed an organization called the Business Software Alliance (BSA) to educate and enforce software license compliance on behalf of its members. BSA offers rewards of up to \$200,000 to individuals who come forward and report software piracy by their current or former workplace.

For a diverse organization, such as the City of Richmond where thousands of computers are being used, the potential exists for users to install unauthorized and unlicensed software on the computer assigned to them. As a result, the City could be exposed to significant liability for copyright infringement.

What are the liabilities for copyright infringement?

The Federal Copyright Act imposes civil penalties of up to \$150,000 for each occurrence and criminal penalties of up to \$250,000 per occurrence, in addition to five years in prison.

The Department of Information Technology has issued a Software Standard for Personal Computers that prohibit users from installing personally owned software on City computers. In addition, the policy states that pirated software is never authorized. A license must exist for each user or application. While the City has a policy, it does not have a formal process to verify and assure software is properly licensed prior to installation.

What did the audit find?

It was not possible to determine whether the City holds proper licenses for software on all of its machines. Several reasons, as listed below, prohibited the auditors' ability to determine proper licensing of software.

DIT estimates that the City owns between 2,700 and 3,600 personal computers. However, the software tools available to DIT did not detect all computers on the City network.

- DIT does not have any other ancillary record of total inventory of City-owned computers. Therefore, the relevant and accurate information needed for comprehensive study was not available.
- DIT also lacks information about all software installed on the City owned computers. This situation not only prohibits DIT's monitoring of software licensing compliance but has a significant impact on DIT's ability to provide support to the users.

***The number of
enterprise licenses
that the City needs
could not be
determined***

As a result, DIT cannot determine the number of licenses needed for the software installed on the City computers. For example, the City paid for 2,958 enterprise licenses for Microsoft Windows and Microsoft Office. If the City owns only 2,700 computers, then it has overpaid for licenses in the amount of about \$126,360. On the flip side, if the City has 3,600 computers, it needs to purchase an additional 900 licenses which would cost the City an estimated \$526,500. In addition, if 900 licenses are needed, the City is at risk of being held liable for copyright infringement that could cost

City could incur millions of dollars in civil and criminal penalties

up to \$135,000,000 and \$225,000,000 in civil and criminal penalties, respectively.

A limited review of personal computers showed 340 unlicensed copies of Microsoft Visio and Microsoft Project on City-owned machines. For noncompliance in this limited sample, the City could face a copyright infringement liability up to face up to \$51,000,000 and \$85,000,000 in civil and criminal penalties, respectively. Similar situation may exist for other software products installed on the City computers. It was not possible to quantify the City's exposure. However, it appears that the City could incur substantial liability. This situation must be addressed immediately by the Department of Information Technology and the City Administration.

In the future, a mechanism must be established to empower DIT to control the installation of software on the City's computers in order to monitor compliance with the Federal Copyright Act.

Numerous copies of software unrelated to City business was found on computers

Also, there were 838 MP3 files (music files) as well as games and screensavers on numerous personal computers. The games and screensavers may require appropriate licenses, which could not be located during the audit. These types of software are unrelated to the City's business and do not belong on the City computers. These types of files and software use a significant amount of computer

resources and thereby adversely impact a computer's performance. They are undesirable for three reasons:

- first, compliance with license agreements cannot be assured as an employee may have installed the software both on his/her home computer and on the City computer;
- second, they do not serve any official business purpose and can negatively impact productivity; and
- finally, sharing or downloading files could introduce a virus to the City's network.

Relocating or refurbishing computers

The City does not have a process to transfer licenses upon relocation of computers within agencies or from one agency to another due to organizational changes. For example, licenses for software installed on the Department of General Services were not transferred to the Department of Public Works when the agency was reorganized.

Concurrent or Server Licenses

The City does not have a reasonable knowledge of the applications in which concurrent or server-based licenses apply. For example, software licensing details relating to Advantage (the City's financial software) is not known by Finance or DIT. Furthermore, the City does not have a process to monitor usage levels on software licensed under concurrent usage agreements (client-host). Concurrent or server licenses allow a specific number of connections to the primary server application (host) at any given time. However, the concurrent license agreement may allow the

client software to be installed on many computers without infringing on the copyright. In order to assure compliance with this type of license agreement, “connection manager software” should be in place. This software allows only a specified number of connections to the host and denies access based on the contractual arrangements. Without relevant usage data it is not clear if the City is in compliance with the license agreement provisions for these types of applications.

Recommendations

- 1. Centralize City-wide acquisition, installation, and upgrades of software. (The DIT is in the position to best accomplish the centralization of software management.)*
- 2. Establish a centralized library for all software and licenses documentation and hire a software librarian.*
- 3. Prohibit users from installing and deleting any software on computers assigned to them. Allow only DIT personnel ability to install and delete software on computers.*

4. *Delete all software that does not pertain to City operations and for which the City does not have licenses.*
5. *Require City agencies to purchase licenses for software necessary to carry out their objectives.*
6. *Establish procedures to ensure employees are made aware of the City's software policy and require their acknowledgement in writing.*
7. *Establish a procedure to comply with software license agreements that allow for concurrent usage.*

MANAGEMENT RESPONSES

To: Umesh Dalal, City Auditor

From: Gene J. Doody, CIO & Director of Information Technology

Date: March 6, 2007

Subject: Response to Audit Findings for the Software Licensing Audit

The purpose of this memo is to provide an official response from the Department of Information Technology (DIT) to the recent Software Licensing Audit conducted by the City Auditor, Umesh Dalal. The audit findings have revealed a number of weaknesses that currently exist in the process and execution of how software licenses are managed on personal computers used by city employees. The Department of Information Technology does not dispute the validity of any of the findings that were identified as part of the audit documentation, and either has ongoing activities or plans in place that are targeted at addressing these weaknesses. DIT has performed extensive research on best practices for managing software licensing, and has also trained key staff and personnel in the use of software automation tools that are vital to helping the city maintain the strict adherence to the software licensing requirements that come with the use of these products.

There are two significant inhibitors to DIT's ability to implement the recommendations laid out in these findings and successfully completing the remediation activities. The first is a common theme in each of these audits, which is the lack of assigned budgetary funds within DIT for the acquisition and maintenance of software licenses on an enterprise basis. To achieve this result, the city would need to consolidate budget dollars from across the city and aggregate them in DIT's budget for enterprise management. In addition, a policy and process would need to exist to allocate funds from projects to DIT when the project includes the purchase of software licenses as part of the project scope and delivery.

DIT has utilized Gartner, Norex, and other well respected research groups to identify and ratify the best practices cited in this audit document. DIT believes that if the recommendations provided were implemented as defined by this audit, it would allow the City of Richmond to achieve the efficiency and effectiveness required for full compliance with the software license agreements that govern the use of these products. DIT further believes that if these recommendations are

not fully implemented, the risk identified by the City Auditor as it relates to civil penalties cannot be fully mitigated.

C: William E. Harrell, Chief Administrative Officer
Patrick Roberts, Chief of Staff to the CAO
Rick Wood, IT Manager, End User Services

**Appendix A – Management Responses/Action Plan
DIT – Software Licensing**

Recommendation# 1: Centralize the acquisition, installation, and upgrades of software. The Department of Information Technology is in the position to best accomplish the centralization of software management.

Concur **Do not concur (Please explain)**

Action steps	Responsible Employee	Target Date
1. Remove all administrative rights from PC's with the exception of the system administrators. This will limit the unauthorized installation and removal of software	1. Desktop Team and Server Team	1. August, 2007
2. Research and introduce other technologies that restrict access to systems and allow better control of downloads.	2. Desktop Team	2. September, 2007
3. Restrict rights by use of Active Directory (AD) group policy with appropriate rights	3. Server Team	3. October, 2007
4. Develop procedures and create a team to purchase, and distribute Desktop equipment. It is estimated that this will require 2 additional Desktop personnel. (2 FTE's, about 140,000.00 per year)	4. Management, Budget and Desktop support	4. July, 2008

Recommendation# 2: Establish a centralized library for all software and licensed documentation		
<input checked="" type="checkbox"/> Concur <input type="checkbox"/> Do not concur (Please explain)		
Action steps	Responsible Employee	Target Date
1. Determine the accurate inventory of software.	1. Desktop Team	1. March, 2007
2. Install software only with verifiable licenses.	2. Desktop Team	2. March, 2007
3. Create a secure physical location to store and manage Definitive Software Library (DSL).	3. Desktop Team	3. June, 2007
4. Create a DSL according to ITIL best practice.	4. Desktop Team	4. September, 2007
5. Create a working copy of all Software and send originals off site to be stored for Disaster Recovery.	5. Desktop Team	5. October, 2007

<p>Recommendation # 3: Prohibit users from installing and deleting any software on computers assigned to them. All installation and deletion of software should be coordinated through DIT</p> <p style="text-align: center;"> <input checked="" type="checkbox"/> Concur <input type="checkbox"/> Do not concur (Please explain) </p>		
Action steps	Responsible Employee	Target Date
1. Remove all rights to PC's except DIT Administrators	1. Desktop Team and Server Team	1. September 2007
2. Research and introduce other technologies that restrict users access to systems and allow better control of downloads. i.e. VMware, Citrix, or Blade PC technologies	2. Desktop Team	2. August, 2008
3. Restrict access by use of Active directory group policy allowing appropriate rights	3. Server Team	3. September, 2007
4. Proactively remove all illegal software currently on the city systems	4. Desktop Team, Server Team	4. June, 2007

Recommendation # 4: Delete all software that does not pertain to City operations <input checked="" type="checkbox"/> Concur <input type="checkbox"/> Do not concur (Please explain)		
Action steps	Responsible Employee	Target Date
1. Produce reports and provide lists of applications and software to responsible persons in each department to determine official software for the City of Richmond while the ownership of all PC assets are established in DIT	1. Desktop Team	1. April 15, 2007
2. Remove software not approved by the agencies, to include those known unapproved software, like screen savers etc.	2. Desktop and Server Team	2. July 2007
3. Obtain ownership of all PC's, distribute, Manage from DIT. (To meet this goal we will require an increase of 2 FTE's, about 140,000.00 per year)	3. Management, CAO, Budget and Finance	3. July 2008

Recommendation# 5: Require city agencies to purchase licenses for software necessary to carry out their objectives.		
<input checked="" type="checkbox"/> Concur <input type="checkbox"/> Do not concur (Please explain)		
Action steps	Responsible Employee	Target Date
1. Create reports with authorized licenses for Agencies/Departments	1. Desktop Team	1. May 2007
2. Distribute licenses report available to Automation Coordinators	2. Desktop Team	2. June, 2007
3. Remove all unauthorized licenses from City systems	3. Server Team, Desktop Team	3. November 2007
4. Purchase and manage an inventory discovery and maintenance tool (see #3.1 above)	4. Desktop Team	4. July 2008
5. Create processes for Desktop team to manage the software library (see #2.3 above)	5. Help Desk	5. July 2007
6. Create, Interview and hire employee to coordinate, manage and safeguard the software library	6. Management	6. July 2008

Recommendation # 6: Use SMS to improve service to users. <input checked="" type="checkbox"/> Concur <input type="checkbox"/> Do not concur (Please explain)		
Action steps	Responsible Employee	Target Date
1. Create and publish a security document that all City Employees must sign explaining the Security Software Policy. The document would be signed at employee orientation.	1. DIT Administration and Human Resources	1. April 2007
2. Work with and provide a City software policy that is required for all employees. Initiate the requirement through the CAO's office for enforcement.	2. Automation Coordinators, CAO, IT Administration	2. April 2007
3. Communicate the policy and request assistance from the Automation Coordinators in each department.	3. AC Program Manager	3. April 2007

Recommendation # 7: Establish a procedure to comply with software license agreements that allow for concurrent usage.		
<input checked="" type="checkbox"/> Concur <input type="checkbox"/> Do not concur (Please explain)		
Action steps	Responsible Employee	Target Date
1. Inventory applications using concurrent licenses and add to the Asset Management database	1. Desktop Team	1. August 2007
2. Create, train and enforce processes to maintain inventory and management of concurrent licenses	2. Desktop Team, DIT Administration	2. November 2007
3. Acquire tools that will allow changes to a baseline inventory to automatically alert systems administrator when changes occur – The tools required are unfunded. The cost for these tools are \$300,000.00 (same tool as #3)	3. Management, Budget	3. July 2008

Summary

Currently, DIT lacks resources to respond to all of the recommendations of the audit. In our provided action steps, we identify both new management tools and increased staff to the Desktop Support Team. Of course, these measures do come with a cost. The enterprise management product that we have identified costs approximately \$300,000.00. This product would give DIT extensive control of installed software,

hardware inventory and license management. This measure would save the City thousands in asset management and employee efficiency.

For DIT to be responsible for the compliance of the City's software usage we need to control the purchase and usage process. DIT's budget must be increased to include hardware purchasing for the entire City. We would require 2 additional personnel (\$140,000/yr) to receive, provision, manage and deploy computer assets. In this way, we would standardize the hardware environment, increasing control, life cycle and manageability.

Once the hardware and software platform has been standardized, systems management and updating tools, such as SMS, will add increased value to the City. Licensing can be quickly and accurately controlled and hardware/software inventory will be complete and accessible. Compliance to the recommendations of the audit are obtainable goals for DIT but will require the financial support and procedural change that have been outlined.