

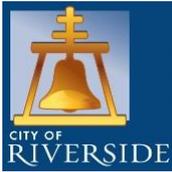
PERFORMANCE
AUDIT

Innovation and
Technology
Department

**Mobile Device
Management**

September 2018

Office of Organizational
Performance and Audit
Cheryl Johannes, Manager



Office of

Organizational Performance and Audit

Objectives of Review

The objectives of the audit were to evaluate mobile device management practices and internal controls in place to determine consistency with City policies and procedures.

Background

The Innovation and Technology Department provides the following services: network support, server and datacenter operations, applications, help desk, desktop, cybersecurity, geographic information systems, and project management.

The department provides a “one-stop shop” service for all City mobile devices, such as smartphones, iPads, PDA tablets, etc. – from procurement through disposal.

Full control of the City’s mobile devices, including provider service, updates, wipes of data, etc. begins with a comprehensive mobile device management system to develop a baseline inventory for all devices. Using a device management system is a way to complete the management of the full lifecycle of mobile devices.

PERFORMANCE AUDIT ~ Summary

Innovation and Technology Department ~ Mobile Device Management

Since the release of the IT Inventory Asset Management audit in January 2016, the IT Department has made meaningful progress in improving controls for all IT inventory items (including mobile devices) along with increased tracking and oversight of IT assets.

Four (4) recommendations for improvement were noted in the IT Inventory Asset Management audit:

Recommendation	Actions Taken
Utilize the existing IT Online Ordering procedure as a guide to develop a Citywide policy for technology purchases	Completed – Technology Software and Acquisition policy was implemented July 2017
Develop a procedural document that provides IT sections with instructions on conducting physical inventories	A draft policy to address this finding is underway
Conduct a Citywide physical inventory of current IT assets	TBD
Consider further enhancing the efficiency of operations by automating the inventory tracking process	Funding has been identified and a draft RFP has been tentatively developed for an integrated Helpdesk and inventory management system

Based on our current review, opportunities exist for continued improvement in the management of mobile device inventory. We recommend IT implement the following actions to further build upon the positive steps previously taken by the department:

- ***Periodically reconcile devices listed in the department’s mobile device management (MDM) to the Computer and Mobile Inventory SharePoint site;***
- ***Improve the departmental process/practice when mobile devices are upgraded or replaced for employees; and***
- ***Ensure mobile device services are deactivated timely for employees no longer with the City.***

AUDIT OBJECTIVES

The Office of Organizational Performance and Audit (OOPA) completed an audit of the Innovation and Technology (IT) Department Mobile Device Management. The objectives of the audit were to evaluate mobile device management practices and internal controls to determine consistency with City policies and procedures.

AUDIT SCOPE and METHODOLOGY

We conducted the audit during the months of May through July 2018, which included a review of the mobile device lifecycle from procurement through disposition/disposal¹. The following methods were used to assess the overall control environment and internal processes in conducting our audit:

- Reviewed research material and audit reports from various sources to obtain mobile device management best practices;
- Reviewed the Mobile Device Communication Policy (03.007.00), the Technology and Use Security Policy (03.002.00), and the Technology Selection and Acquisition Policy (03.017.00);
- Interviewed the IT Deputy CIO and additional IT Department staff;
- Reviewed the SharePoint database and related documentation to confirm procedures were followed from purchase through deployment;
- Conducted walkthroughs of department areas and storage spaces to validate physical security controls;
- Reconciled AT&T and Verizon billing invoices to IT's Mobile Device Management (MDM) application report for smartphones;
- Reconciled the City's financial system (IFAS) Employee Report for Resignation, Termination, or Retirement report to MDM to verify mobile service was disconnected timely;
- Reviewed MDM reports to confirm security settings and department monitoring controls;
- Reconciled MDM inventory of smartphones to IT's Computer and Mobile Inventory listing on SharePoint; and
- Reviewed IT's procedure for mobile device replacement and disposal; selected a sample of deactivated mobile devices listed on the SharePoint database to confirm practices were consistent with procedures.

BACKGROUND

Smartphones and other mobile devices require a complete end-to-end, full lifecycle approach – from procurement and provisioning, to configuring security and applications, to decommissioning or disposal.

PROCUREMENT

The Innovation and Technology (IT) Department is responsible for ensuring that all technology-related purchases conform to City technology standards and is responsible for the actual purchasing process for technology-related items (assets) requested by other departments (e.g. computers, mobile devices, servers, etc.)².

¹ The audit scope did not include employee-owned mobile devices approved for business use.

² As of July 2018, there were 984 mobile devices assigned to departments as noted in Appendix A.

IT has implemented the Technology Selection and Acquisition Policy (03.017.00). IT's Client Services administers the mobile device procurement process/procedure. As part of the Selection and Acquisition process, IT utilizes an online Order Request Form located on IT's SharePoint. When an order is initiated, the system assigns a tracking number. Once the request is approved, the tracking number provides a permanent record for the order. The order goes through several approvals in the SharePoint; IT places the order with the appropriate vendor when final approval is granted.

IT manually updates all technology purchases on to a Computer and Mobile Inventory list on its SharePoint page. The list includes department/division, device type, smartphone number (if applicable) and IT technician. The list is updated periodically to current disposition of assets.

INSTALLATION / DEPLOYMENT / TRACKING

Upon receipt from the vendor of an ordered mobile device, Client Services confirms the order, installs the MDM software on the device, and contacts the receiving department/employee.

IT entered into an agreement with MobileIron in February 2012 to implement a mobile device management (MDM) strategy. MobileIron's Virtual Smartphone Platform provides IT the ability to continuously monitor, manage and secure mobile devices, data, and applications from registration to retirement. The City currently owns the following MobileIron licenses and utilizes their respective features:

- MobileIron Sentry – an in-line gateway that manages, encrypts, and secures traffic between the mobile device and the backend system. It controls access to ActiveSync-enabled email servers.
- App@Work – an application distribution library, allowing IT to install approved in-house and third-party mobile applications to employees.

IT Operations manages the MobileIron platform. Operations uses audit and security logs to track mobile device activity, and troubleshoot problems as needed. The following MobileIron features allow IT to address various challenges and risks related to mobile device management:

- Tracks lost or stolen City devices (devices can be wiped remotely)
- Supports device types from multiple service providers (such as AT&T and Verizon), and various operating systems (such as iOS and Android)
- Allows visibility for all devices connected to the City infrastructure
- Ensures devices contain appropriate authentication, encryption and privileges controls.
- Promotes accountability and transparency by tracking the way devices are used, and provides feedback to management

REPLACEMENT

No formal mobile device replacement strategy exists; however, IT actively works with AT&T and Verizon contacts to take advantage of exclusive offers or deals that may be available, to ensure users have the best options if/when they are approved for a device upgrade. If a device is upgraded, IT determines if the old device can be recycled and if so, wipes the device but retains it in IT to be used as needed by employees.

DISPOSAL

A department/employee contacts IT when a device is no longer needed or not usable. Client Services disposes devices determined to be beyond repair. A transfer of data from the old device to a new one is completed if needed, and the service provider is contacted to switch the service from the old device to a new one, or to terminate service. A full factory reset is performed to wipe all information from the device, and it is taken to the City's e-waste facility for disposal. IT updates final disposition of the device on the Computer and Mobile Inventory list.

FINDINGS and RECOMMENDATIONS

IT has established a solid mobile device management foundation to build upon through implementation of the following:

FINDING	RECOMMENDATION
<p>1. Inventory records in both the MDM and the Computer and Mobile Inventory SharePoint site are not updated timely and inaccurate.</p> <p>OOPA compared 646 smartphones listed as ACTIVE in the MDM report dated July 23, 2018 to the Computer and Mobile Inventory List on the department's SharePoint site, and noted the following:</p> <ul style="list-style-type: none"> • 118 smartphones (18%) listed in MDM did not reconcile to the SharePoint inventory Having a complete and valid inventory list ensures that all IT assets (including mobile devices) are accounted for. An incomplete or inaccurate list exposes the City to misappropriation or loss of devices. • 30 smartphones (4%) listed in MDM were assigned to employees no longer with the City (see Appendix B) As noted in the Mobile Communications Device Policy, city-issued mobile devices should be wiped when an employee resigns or is terminated. If the department has not reassigned a device, it should be returned to IT and removed from the MDM to ensure an accurate database is maintained. • The Computer and Mobile Inventory did not have an accurate final disposition for mobile devices for employees no longer with the City Seven (7) of the 30 smartphones noted above were not listed in the Computer and Mobile Inventory. The 23 remaining smartphones and a sample of employees from the IFAS Employee Report for Resignation, Termination, or Retirement³ were reviewed on the SharePoint site and there was no final disposition of the device. The inventory list should reflect 	<p>IT should periodically reconcile, at least annually, MDM to the Computer and Mobile Inventory SharePoint database to ensure records are accurate and updated timely.</p>

³ Devices for the employees selected from the IFAS list were not listed on the MDM platform.

<p>that the employee has left the City, and whether the device was repurposed or submitted for e-waste.</p>	
<p>2. The MDM report reflected several employees assigned to multiple smartphones.</p> <p>Of the 646 smartphones issued, there were 103 instances that an employee was assigned two (or more) devices. It appears that a new phone was issued to the employee; however, the old phone is still assigned and listed as ACTIVE (in most cases the phone number is the same). The old devices are inactive with the service provider; inactive devices should be returned to IT and removed from the MDM tracking system to ensure an accurate database is maintained.</p>	<p>IT should review the MDM inventory list and confirm with the department that the inactive device is no longer needed; have the device returned to IT.</p> <p>Going forward, IT should revise their practices - if a device has been upgraded for an employee, IT should exchange the new device for the old one <u>at the time the employee receives the new device</u>. MDM should be updated at that time to reflect this transaction.</p>
<p>3. Some mobile devices were not deactivated timely.</p> <p>Our reconciliation of AT&T and Verizon billing invoices to the 646 cell phones in the MDM inventory report indicates the billing service was not deactivated timely, leading to overcharges. In addition, our review of AT&T and Verizon invoices also reflects untimely deactivation for additional mobile devices (iPads, air cards, and/or other PDAs).</p> <p>The table in Appendix C lists the employee's separation date and the last service charge date, along with the monthly amount the department absorbed.</p>	<p>Upon notification from Human Resources that an employee is no longer with the City, IT should check the MDM and SharePoint inventory database to confirm that the employee was issued a mobile device. If the employee was issued a mobile device(s), IT should immediately contact the employee's department to determine disposition of the device. If the device is to be deactivated, IT should take immediate action and cancel the service and update MDM and the Computer and Mobile Inventory SharePoint database.</p>

CONCLUSION

A mobile device-enabled workforce benefits employees and the departments through productivity and operational efficiencies. As the use of mobile devices become more prevalent in the workplace, organizations should understand the associated risks, as noted below⁴:

- Mobile devices cross boundaries and network perimeters, and can bring malware into the enterprise network;
- Hackers can discover the device and launch an attack;
- Mobile devices may be lost or stolen due to their portability; and
- Employee-owned devices while not connected to the network may interact with e-mail or store sensitive documents.

We believe the IT Department's implementation of noted recommendations will improve the overall administration and tracking of mobile devices, while mitigating risks such as the ones noted above. We will periodically follow up with IT for status updates and to validate corrective actions taken by the Department for this audit.

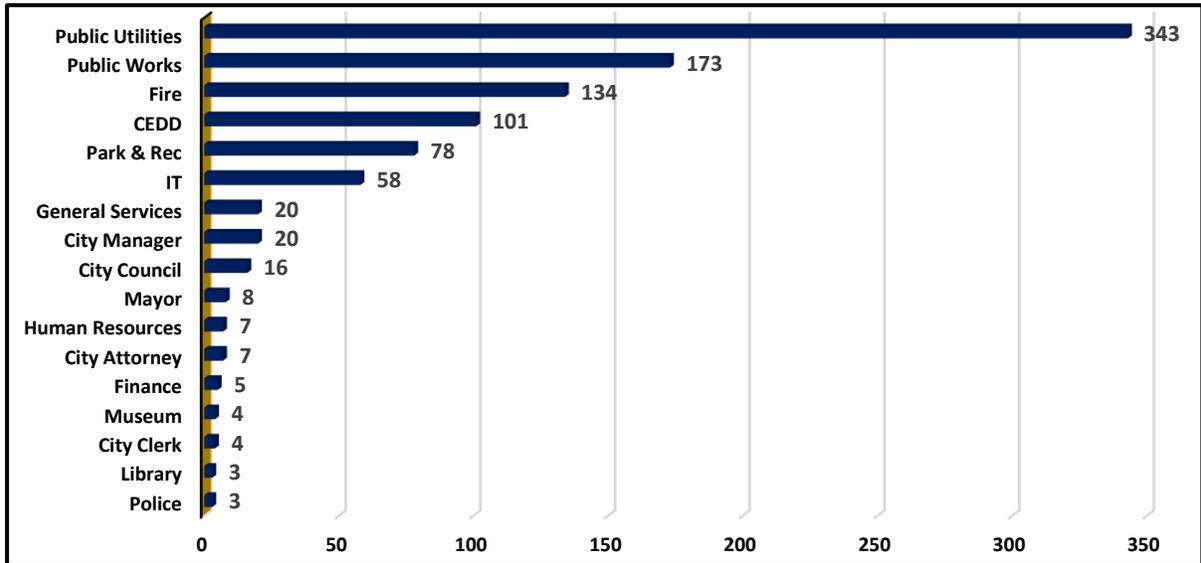
We discussed various aspects of mobile device management with the Interim CIO and IT staff. A draft of this report was provided for clarification, comment and feedback prior to finalization. Management's formal response to our recommendations is attached.

We extend our appreciation to the IT Department and staff that assisted us during this performance audit. Should you have any questions, please contact the Office of Organizational Performance and Audit.

⁴ Securing Mobile Devices, ISACA, 2010.

APPENDIX A

City Mobile Devices by Department⁵



Data retrieved from the AT&T and Verizon billing invoices for July 2018.

⁵ The Police Department's special operation devices are automatically exempt from the Mobile Communication Device Policy (03.007.00). Per the policy, special operation devices are defined as those devices assigned to undercover personnel, personnel on special assignment, or those devices purchased through a grant.

Appendix B

Active Smartphones in MDM for Employees no longer with the City (as of 7/23/2018)

User ID	Last Check-In	Model	Registration Date	Status
Employee 1	2016-09-09T21:02:42.000Z	iPhone 4S	2013-10-09T23:28:34.000Z	Licensed User
Employee 2	2017-10-20T20:56:07.000Z	iPhone SE	2016-09-09T21:13:27.000Z	Licensed User
Employee 3	2018-05-03T01:15:21.000Z	iPhone 6	2015-05-04T15:41:39.000Z	Licensed User
Employee 4	2018-05-01T15:20:37.000Z	iPhone 6 Plus	2014-12-19T00:06:07.000Z	Licensed User
Employee 5	2015-12-29T18:14:00.000Z	iPhone 4S	2014-04-24T22:17:03.000Z	Licensed User
Employee 6	2015-11-17T22:48:05.000Z	iPhone 5c	2015-04-27T18:18:10.000Z	Licensed User
Employee 7	2017-10-11T22:26:36.000Z	iPhone 6s Plus	2017-06-12T20:39:09.000Z	Licensed User
Employee 8	2015-09-24T11:41:20.000Z	iPhone 4S	2013-01-07T23:33:03.000Z	Licensed User
Employee 9	2016-11-09T21:09:50.000Z	iPhone 4	2014-05-27T17:14:35.000Z	Licensed User
Employee 10	2018-01-29T05:28:12.000Z	iPhone 6 Plus	2015-04-09T21:03:36.000Z	Licensed User
Employee 11	2017-12-29T21:42:22.000Z	iPhone 6s Plus	2016-11-18T00:40:31.000Z	Licensed User
Employee 12	2017-06-06T18:43:01.000Z	iPhone 3GS	2012-06-19T23:40:48.000Z	Licensed User
Employee 13	2017-09-21T02:11:51.000Z	iPhone 6s	2017-06-06T20:37:26.000Z	Licensed User
Employee 14	2018-05-03T01:18:48.000Z	iPhone 7 Plus	2018-04-26T20:41:51.000Z	Licensed User
Employee 15	2015-01-09T23:00:52.000Z	iPhone 5c	2013-12-13T22:45:56.000Z	Licensed User
Employee 16	2018-05-03T01:20:43.000Z	iPhone 6s	2016-09-13T16:44:26.000Z	Licensed User
Employee 17	2016-10-01T20:56:19.000Z	iPhone 4S	2014-06-04T17:50:24.000Z	Licensed User
Employee 18	2018-04-12T19:46:28.000Z	iPhone 6	2016-04-28T18:15:46.000Z	Licensed User
Employee 19	2017-12-12T23:54:19.000Z	iPhone 6 Plus	2015-02-13T19:00:33.000Z	Licensed User
Employee 20	2016-11-23T03:32:27.000Z	iPhone 6 Plus	2015-05-15T17:32:03.000Z	Licensed User
Employee 21	2018-03-22T14:28:15.000Z	iPhone 6	2015-11-24T21:12:24.000Z	Licensed User
Employee 22	2018-05-03T00:45:59.000Z	VK810 4G	2015-01-09T22:00:52.000Z	Licensed User
Employee 23	2016-03-09T16:44:49.000Z	iPhone 4S	2014-08-25T22:59:14.000Z	Licensed User

APPENDIX B - continued

User ID	Last Check-In	Model	Registration Date	Status
Employee 24	2017-12-15T20:04:53.000Z	iPhone 6s	2016-03-09T18:19:03.000Z	Licensed User
Employee 25	2016-06-28T12:22:11.000Z	iPhone 6	2016-04-01T23:12:25.000Z	Licensed User
Employee 26	2015-10-14T14:12:06.000Z	iPhone 4S	2012-06-04T21:22:44.000Z	Licensed User
Employee 27	2015-10-03T16:39:39.000Z	iPhone 6 Plus	2015-05-20T17:17:26.000Z	Licensed User
Employee 28	2018-05-03T01:10:20.000Z	iPhone 5c	2018-03-28T23:51:30.000Z	Licensed User
Employee 29	2018-03-24T19:28:25.000Z	iPhone 5s	2017-10-17T22:07:23.000Z	Licensed User
Employee 30	2016-04-01T18:33:24.000Z	iPhone 5s	2013-10-18T18:51:06.000Z	Licensed User

APPENDIX C

Finding 3. Some mobile devices were not deactivated timely:

Employee	Separation Date	Last Service Charge Date	Monthly Amount	Total
Employee #1 (RPU)	10/20/2017	7/16/2018	\$ 46.25	\$ 370.00
Employee #2 (RPU)	12/29/2017	4/12/2018	44.93	134.79
Employee #3 (PW)	8/31/2017	12/6/2017	46.25	92.50
Employee #4 (Finance)	4/13/2018	current as of July 2018	52.67	105.34
Employee #5 (Library)	4/6/2018	current as of July 2018	64.00	128.00

In addition to the above, our review of AT&T and Verizon invoices also reflects untimely deactivation for additional mobile devices⁶:

Employee	Separation Date	Last Service Charge Date	Monthly Amount	Total
Employee #1 (RPU)	12/29/2017	7/16/2018	\$ 46.25	\$ 277.50
Employee #2 (RPU)	12/29/2017	7/16/2018	25.74	154.44
Employee #3 (RPU)	7/27/2017	4/12/2018	24.51	196.08
Employee #4 (RPU)	12/29/2017	4/12/2018	24.51	73.53
Employee #5 (PW)	4/13/2018	current as of July 2018	36.90	73.80
Employee #6 (CEDD)	3/8/2018	current as of July 2018	25.74	77.22
Employee #7 (CEDD)	1/25/2018	current as of July 2018	37.30	186.50
Employee #8 (PW)	4/13/2018	current as of July 2018	220.06 ⁷	440.12

⁶ iPads, air cards, and/or other PDA where a monthly service charge was billed.

⁷ Six (6) separate devices at \$38.01 each.