# CITY COMPUTERS:
## Computers found with difficulty, tracking systems need to be improved

A REPORT FROM THE CITY AUDITOR
October 2007

Office of the City Auditor
Portland, Oregon

CITY OF

**PORTLAND, OREGON**

OFFICE OF THE CITY AUDITOR
Audit Services Division

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October 16, 2007

TO: Mayor Tom Potter
Commissioner Sam Adams
Commissioner Randy Leonard
Commissioner Dan Saltzman
Commissioner Erik Sten
Ken Rust, Chief Administrative Officer, Office of Management and Finance
Matthew Lampe, Chief Technology Officer, Office of Management and Finance

SUBJECT: Audit of City computers, (Report #350)

Attached is Report #350 containing our review of the tracking and documentation of City computer resources. Written responses to the audit from Mayor Tom Potter and Interim Chief Technology Officer Mark Greinke, are included at the back of the report.

We ask that the Commissioner in Charge direct the Chief Technology Officer to prepare a status report in one year, or sooner, detailing steps taken to address the recommendations contained in our report. The status report should be sent to the Audit Services Division.

We appreciate the cooperation and assistance we received from the Bureau of Technology Services as we conducted this audit.

GARY BLACKMER
City Auditor

Audit Team: Drummond Kahn
Fiona Earle
Beth Woodward
Kari Guy
Kristin Johnson

Attachment

# CITY COMPUTERS:
## Computers found with difficulty, tracking systems need to be improved

**Summary** The City maintains approximately $4.4 million of desktop computers, central processing units and laptops. The Bureau of Technology Services (BTS) is responsible for purchasing, installing and maintaining these assets. We found that City computers could be at risk of loss or misuse because the city's tracking systems' data – including the computer inventory records – are incomplete and sometimes inaccurate. These systems aren't consistently able to track the location and user of a City computer over its life.

Best practices suggest that computers should be uniquely identified, effectively tracked, monitored and managed. We found shortcomings in the City's systems when compared against these best practices.

The City's computers are tracked on three separate systems which are used to produce the City's computer inventory reports. Altiris is the BTS computer-management system that reports on the City's computer equipment (excluding the Police and Bureau of Emergency Communications (BOEC) computers). For security reasons, the computers at the 9-1-1 Center (BOEC) and the Police computers are not fitted with the software to communicate with the BTS Altiris server.

The use of multiple tracking systems, and unconnected systems to record a computer's maintenance movements during its life cycle, makes consistent tracking more difficult.

We had difficulty finding 11 percent of the computers in our sample. After we located these computers with the Bureau of Technology Services' assistance, we found that nearly 3 percent of computers in a second sample did not appear in the relevant computer-tracking system. In addition, about 4 percent of this second sample was incorrectly recorded in the computer-tracking systems.

Based on our analysis, it appears the City also did not record in its inventory about 5 percent of the computers it purchased. This problem includes the main City tracking system, a separate Police computer tracking system, and also applies to new computers purchased through a Federal grant.

We make several recommendations at the end of this report to improve the tracking and monitoring of the City's computer assets.

## Background

Prior to November 2002, individual bureaus purchased and owned the information systems they required, including computers. The term "computer" in this report includes desktop computers and laptops. Some, but not all, bureaus had an inventory of their computers, but this data was not validated by the Bureau of Technology Services (BTS) after City Council consolidated ownership of and responsibility for Information Technology (IT) assets (applications, systems, and assigned equipment such as computers) in BTS. Since November 2002, BTS has been responsible for purchasing, installing, maintaining and managing all IT assets, including computers, in keeping with BTS' established standards.

However, according to BTS management, the process of consolidating purchasing and building an appropriate inventory process and system for the City's computers has been a work-in-progress in the intervening years. BTS management has stated that consolidated purchasing of computers through BTS began in July 2006, but that BTS could not obtain space until late Spring 2007 in which to implement a new procedure for scanning the bar codes of computers upon receipt from the vendors to create an automated asset record. BTS management told us that they conducted a computer inventory clean-up process from July 2004 through 2006 to address customer concerns regarding billing accuracy.

BTS supports approximately 5,000 active computers for the City, excluding the Portland Development Commission. BTS tracks most of the City's computers with the Altiris system. Altiris is an IT-man-

agement software that communicates with, and gathers data from individual computers. This data includes when the computer was last logged onto the network, who used it, where it is and what software it contains. This automated system is a more efficient way for BTS to keep track of the City's computers than by a comprehensive physical inventory spread over approximately 180 locations, which would be time consuming and labor-intensive.

However, the data that comes out of any automated tracking system, for management's use, is only as good as the data that goes into it. Altiris has had, and continues to have, problems with the automated inventory data coming into it, due to:

- lack of Altiris software on computers
- lack of a connection to the network (especially for laptops)
- lack of electronic identification data within older computers

Computers in the Bureau of Emergency Communications (BOEC) and the Police Bureau are not fitted with the Altiris software to communicate with the BTS Altiris server. The Police Bureau and BOEC have their own networks. The BTS staff assigned to BOEC and the Police Information Technology Division (ITD) use different systems to track these bureaus' computers for security reasons. The Police ITD's system relies heavily upon the manual compilation of data from various sources to provide an inventory report. The Police ITD said that they were aware of the need for a better tracking program but told us that they lacked the staff and resources to write a suitable tracking program for the Bureau.

We understand the security concerns that prevent the Police and BOEC computers from directly communicating with the main computer-tracking system. However, it is our opinion that BTS could strengthen the computer-tracking systems in these bureaus to make them compatible with the City's main computer-tracking system.

Computers almost always cost less than $5,000 per unit, and are considered "minor equipment." As a result, the City's computers are not recorded in a fixed asset register. However, since computers

are still valuable, and are relatively easy to move, they can be easily misplaced, stolen and/or misused. In addition to the risk of financial loss if computers are lost or stolen, there is also the risk of loss of, or inappropriate release of, City data. The City Administrative Rule on Internal Controls and Management's Responsibility requires all City managers to have controls to safeguard, track and manage assets purchased with public funds. This is also a good management practice.

It is good management practice, and an International Association of Information Technology Asset Managers (IAITAM) best practice, for an IT inventory management system to include:

- A comprehensive inventory of hardware and software IT assets to validate the physical presence of these computer assets
- Auto-discovery technology (auto-inventory). However, auto-discovery cannot detect what is not connected to the City's networks
- Spot physical inventories to find the computers on the ground that are not connected
- An integrated set of tools to capture pertinent data relating to all events in the computer's life-cycle – installs, moves, adds, changes and disposals. A centralized asset inventory can't do this on its own
- Unique asset identification – both unique physical identification tags on the outside of the computer, and the unique external and electronically coded serial numbers
- Data integrity and mechanisms for analyzing and efficiently correcting inaccuracies when they occur in the computer inventory data
- A documented process of the asset data-capture through-out the computer's life-cycle

In addition, it is our opinion that in order to be really useful, an IT asset inventory must not only be complete, but should also be detailed enough to allow the people who use, manage or maintain the

computers to physically find them easily and quickly. There can be approximately 180 computers on a single floor in the Portland Building. It is reasonable to expect that a good IT asset inventory would track the assets by individual room or cubicle number. In the case of laptops, they should be assigned to an individual "owner", who would have day-to-day responsibility for their safe custody.

However, BTS management told us that neither the City, nor most Bureaus individually, have an accurate mapping of the rooms and cubicles and a standard addressing schema. BTS management states that they can trace the location of a computer that is active on the network through electronic mapping of the jack number it is plugged into. Since there is no accurate map of the rooms and cubicles to associate with the jack numbers, BTS indicated that it cannot easily track City computers to that level of physical location.

The lack of a consistent identifier, like a serial number, for all computers in the tracking system records may make it difficult for BTS or bureau management to track, identify or safeguard the City's computers.

## Objectives, Scope and Methodology

The primary objective of this audit was to determine if the City's personal computers are in their expected locations. In addition, we wanted to determine whether management in BTS and other bureaus has adequate systems to track the location of computers assigned to them.

To achieve these objectives, we randomly selected a statistically valid sample of 57 City computers (3 percent of 1,879 computers) purchased by the City of Portland from its two main suppliers, Dell Inc., and Gateway Computers Inc., during the two years ended March 31, 2007. Our sample, drawn from the vendors' records, was representative of the population of desktops (78 percent) and laptops (22 percent) purchased from these vendors during this period. We searched for our sample computers by serial number in the records provided by BTS, and the BTS staff at the Police ITD and BOEC to determine the completeness and accuracy of the City's tracking systems'

records and to obtain the locations where these computers were expected to be.

In June 2007, we physically inspected the 57 sampled computers. We compared the name and serial number obtained from the BTS and Police ITD's tracking systems, to the name tag attached to the machine and the serial number engraved on the machine, to determine if each computer was in the location (or in the custody of the person, in the case of laptops) it was supposed to be.

When any of the computers in our sample appeared to be missing, we followed up with BTS management and the relevant bureau staff, through inquiry and further physical inspection, until we confirmed the location of all the computers in our sample. Had we found any of the sampled computers missing, we would have inquired of BTS and bureau management and inspected the related documentation to determine if the disposal of such computers had complied with City rules.

We reviewed the computer-related policies and procedures of the City of Portland, BTS, BOEC and the Police ITD. We interviewed managers and staff in BTS, at the 9-1-1 center, at the Police Bureau and other selected bureaus.

To further assess the adequacy of the BTS' and the Police ITD's tracking systems, while we were physically checking the location of the initial sample of 57 computers, we also examined the three personal computers and/or laptops in closest proximity to the original sample units. We obtained their serial number, name tag, manufacturer and descriptions. Not every computer in the initial test had three close neighbors, but we collected data from 158 additional computers in June 2007.

We performed a reverse test of the 158 neighbor computers: we attempted to trace them back to BTS' and the Police ITD's records to determine whether the desktops and laptops currently in use across the City have been completely and accurately recorded in the systems used to track the City's computers and had not been purchased or connected to the City networks without BTS' knowledge.

The scope of our review excluded any examination of the software contained on the computers tested. We did not power-up the computers inspected to see if they were operating. The Portland Development Commission's computers were excluded from our review because BTS does not provide computers or technology services to the Portland Development Commission. We also did not test the controls to ensure the recording of computer purchases in the City of Portland's financial records.

We conducted our work in accordance with generally accepted government auditing standards.

## Audit Results

We found the City's personal computers (desktop computers, central processing units and laptops) were generally in the expected locations. However, the City's systems that track the location of these computers have many gaps in their data related to the locations of some computers and their serial numbers, specifically:

- The City's computer inventory records from the tracking systems were not detailed enough to let us easily locate a representative, random sample of computers by physical inspection. The main tracking system cannot provide physical locations as specific as an office, and in some locations it cannot automatically provide a computer's location by floor. Although we eventually found all computers in our sample, and determined that all were still in the possession of City employees, this was only after some searching, with assistance from the Bureau of Technology Services' management and staff. Our initial attempt to find 6 out of 57 computers (11 percent) at the expected location was not successful. One laptop (1.8 percent) was finally found in a different building than expected.
- Computers are not assigned to an individual on the tracking systems for day-to-day responsibility. Some computers are not used exclusively by an individual but are shared.
- We found that City data maintained on the computer-tracking systems is not complete or accurate. We found that 4 out

of 158 computers (2.5 percent) in a second sample did not appear in the City's two relevant computer-tracking systems. We found that another 7 computers (4.4 percent) in this second sample were incorrectly recorded in the computer-tracking systems.

- We determined that the problems with the completeness and accuracy of the data on the tracking systems especially related to the serial numbers, for the City's personal computers. For example, approximately 16 percent of the "active" status computers recorded on one tracking system did not have a valid serial number.
- In part this is due to some of the older computers (known as "white boxes") that are still in use. BTS management told us that these "white boxes" were locally built without an electronically discoverable serial number and BTS will try to replace them by the end of FY 2008. In addition, BTS management stated that some of the Dell computers had been given replacement components with inaccurate serial numbers by the manufacturer, which the manufacturer and BTS are working to correct.
- We found that the City computer-tracking systems record an unusually large number of "retired" computers. "Retired" status means that a computer has been taken out of active service and is awaiting collection for disposal. BTS does not have enough storage space to house the 855 computers (approximately 16 percent of the computers on the main tracking system) recorded as retired at the end of May 2007. One of the computers in our second sample in active service at the Police Training Division in Camp Withycombe was incorrectly recorded as retired.
- There are computers in use in the City, not just unconnected laptops, which fail to communicate with the tracking systems and are not recorded by the auto-inventory performed by these systems. As a result, these computers could be unknown to the rotating staff who should be managing and supporting them. Some computers do not report a location at all to the tracking system, and more report "location

unknown". According to BTS management, BTS was not performing spot physical inventories to find these computers until the spring of 2006.

- We determined that the systems used to track the City's computers have not completely and accurately recorded about 5 percent of the computers purchased during the two year period ending March 31, 2007. This included the Bureau of Technology Services and the Police Information Technology Division.
- Computers purchased using Federal Homeland Security Grants are not purchased with the Bureau of Technology Services' knowledge, and are not recorded in the tracking systems, despite the City's policies to centralize computer purchasing.
- We found there was no documentation of the systems for tagging or identifying the location of BOEC or Police Bureau computers. The staff who track and maintain these computers belong to BTS, however, the process of tracking computers used by the Police and at the 9-1-1 Center differs from the process used by BTS for other parts of the City.

Although the Bureau of Technology Services' management indicated to us that their tracking systems are adequate, the conditions and causes listed above make it more complicated for City management to track, manage and safeguard the City's computers. We are concerned that City line managers will have difficulties similar to ours in locating computers without the help of the Bureau of Technology Services' technical knowledge.

## Recommendations

We recommend that the Mayor direct the Office of Management and Finance (OMF) and the Bureau of Technology Services to:

1. **Ensure the completeness and accuracy of the data contained in the City's tracking systems relating to computers.**

BTS management needs to weigh the cost of identifying and recording the missing serial numbers in its tracking systems against the value of these assets. Refine the IT Operations Policy, Process, and Procedure relating to the exclusion of City computers from Altiris reporting for any reason, to the noting of "loaner laptops" in Altiris and to the tracking of such laptops while on loan to the bureaus. Take steps to ensure that the refined policies are followed. Identify data that is incomplete, inaccurate and/or conflicting within Altiris' modules. This data could arise from the historical legacy of re-using computer names, or from Altiris' reports of "non-reporting" and "location unknown" computers. Routinely investigate and resolve such data problems.

2. **Ensure that all computers deemed to be retired have been located and if they are no longer in the City's possession, that they were appropriately disposed.**

3. **Document the IT Operations Policy, Process, and Procedure relating to the tracking of computers at the Police Bureau and at BOEC's 9-1-1 Center.**

4. **Work with BOEC to strengthen the tracking of computers at the 9-1-1 Center.**

   This could involve better use of BTS staff's existing tools, but it may require the provision of stronger computer-tracking tools, such as might be compatible with the systems used by BTS to track most of the City's computers.

5. **Work with the Police Bureau to strengthen the tracking of computers by the Police Information Technology Division (ITD).**

   This could involve better use of the Police ITD's existing tools, but it may require the provision of stronger computer-tracking tools, such as might be compatible with the systems used by BTS to track most of the City's computers.

6. **Work with the Bureau of Purchases of OMF to ensure that computers purchased through grant-funding are adequately recorded in the computer-tracking systems.**

   The City's computer-tracking systems should include grant-funded computers in their records. For example, the City's Homeland Security Grant Purchasing Procedures could be revised to require any Bureau raising a grant-funded purchase of IT equipment to inform BTS about this proposed increase in the inventory of City computers.

7. **Work with the Facilities Services of OMF's Business Operations Division to obtain an accurate map with addresses of the rooms and cubicles in City facilities, so that BTS can associate detailed physical locations with the jack numbers that computers use.**

# RESPONSES TO THE AUDIT

Office of Mayor Tom Potter
City of Portland

# MEMORANDUM

**DATE:** October 05, 2007

**TO:** Gary Blackmer, City Auditor

**FROM:** Tom Potter, Mayor

**CC:** Commissioner Adams
Commissioner Leonard
Commissioner Saltzman
Commissioner Sten

**SUBJECT:** Comments on Final Draft of audit of City Computers: computers found with difficulty, tracking systems need to be improved

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Thank you for your review of the City's computer tracking system. We appreciate the work that went into creating this report. This audit contains extremely useful and important information that can be used as a baseline for years to come.

I have reviewed the Bureau of Technology Services' (BTS) response to the report. I am supportive of the key recommendations in the Audit. I am also pleased with the positive progress BTS has made tracking the City's computers over the last few years.

I fully support all efforts to continue to develop the City's computer tracking system. This audit makes it clear that it is important to monitor our computer tracking practices. I look forward to working with BTS and the Auditor's Office to continue to improve this process.

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# CITY OF PORTLAND

OFFICE OF MANAGEMENT AND FINANCE

**Tom Potter, Mayor**
**Kenneth L Rust, Chief Administrative Officer**

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October 3, 2007

To: Gary Blackmer, Auditor

From: Mark Greinke, Interim Chief Technology Officer

Subject: Response to Final Draft of Audit Report - City computers: Computers found with difficulty, tracking systems need to be improved

Thank you for the opportunity to respond to the final draft of your audit of desktop and laptop computer asset tracking. I would like to express my gratitude to you and your staff for conducting the audit and providing BTS with recommendations for improving our ability to properly track these assets. The Bureau of Technology Services (BTS) and Office of Management and Finance welcome opportunities to receive fair and constructive feedback regarding our business practices. Accurate tracking of personal computer inventory is an important function of BTS and is necessary to reduce the risk of loss to the City.

BTS is supportive of the key recommendations in the audit. BTS will:

1. Ensure the completeness and accuracy of the data contained in the City's tracking systems relating to computers.

2. Review all computers deemed to be retired, ensure that they have either been located, or if they are no longer in the City's possession, document the appropriate disposal.

3. Document the current BTS Policies, Processes and Procedures relating to the tracking of computers at the Police Bureau and at BOEC's 9-1-1 Center, and the existing Police ITD procedures. The Police ITD staff who works with purchasing computers will transfer to BTS in FY 07-08. BTS staff currently purchases and deploys computers at the 9-1-1 Center. BTS will work with BOEC and with Police to adopt the Altiris based tracking process to strengthen the tracking of computers in these bureaus, and if feasible given security constraints create a unified asset management database by the end of FY 07-08.

4. Work with the Bureau of Purchases of OMF to ensure that computers purchased through grant-funding are appropriately recorded in the computer-tracking systems.

5. Explore with Facilities Services of OMF's Business Operations Division the feasibility of their developing and maintaining an accurate map with addresses of the rooms and cubicles in City facilities.

Although BTS agrees with the recommendations, we believe it is important to note the significant strides we have made over the last few years including the implementation of automated asset tracking tools, bar coding and labeling practices as well as implementing environmentally friendly donation and disposal of computers. We are also pleased to note that all 205 of the sampled computers selected for the audit were properly located - albeit with more effort than desirable.

I appreciate the thorough review of our desktop and laptop computer asset tracking efforts. BTS will make every effort to implement the changes recommended by the audit.

Thank you.

cc: Mayor Potter
Ken Rust
Matthew Lampe

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Report #350, October 2007

Audit Team Members: Fiona Earle, Beth Woodward, Kari Guy, Kristin Johnson

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