

Information Technology

Improve Inventories and Software Management

September 2005

Suzanne Flynn
Multnomah County Auditor

Audit Staff

Judith DeVilliers

Mark Ulanowicz

The Table of Contents links to different sections of the document.

To go to a particular section or page:

- a) Place the cursor over the line that contains the section heading.
- b) Wait until the open hand  symbol changes to pointer .
- c) Click once to activate link

To return to Table of Contents use Back to Table of Contents buttons at the beginning of each section.



SUZANNE FLYNN, Auditor

Multnomah County

501 SE Hawthorne, Room 601

Portland, Oregon 97214

Telephone (503) 988-3320

Fax (503) 988-3019

www.co.multnomah.or.us/auditor

Date: September 28, 2005

To: Diane Linn, Multnomah County Chair
Maria Rojo de Steffey, Commissioner, District 1
Serena Cruz, Commissioner, District 2
Lisa Naito, Commissioner, District 3
Lonnie Roberts, Commissioner, District 4

From: Suzanne Flynn, Multnomah County Auditor

Subject: Management of Personal Computers and Software

The attached report covers our audit of the County's management of Personal Computer (PC) inventories and software. This audit was included in our FY05-06 Audit Schedule.

As noted in the audit, both information technology and the Information Technology organization (IT) have undergone tremendous change in the last few years. The number of PCs and the size of the network in the County have increased dramatically. Generally, we found that IT had done a good job in managing the change and supporting the County's resource needs. This audit focuses on a few areas that need improvement:

- Increased accountability of PCs as assets
- More efficient deployment of software
- Better coordination between IT and departments in using Microsoft Access to create databases

We have discussed our findings and recommendations with management in the Department of County Management and IT. A formal follow-up to this audit will be scheduled within 1-2 years.

We would like to acknowledge and thank the management and staff in the Information Technology organization for the cooperation and assistance extended to us.

Table of Contents

Summary	1
Background	3
Scope and Methodology	4
Results	5
IT is making progress	5
Management of personal computers as assets is not adequate	5
County software is not used efficiently	7
IT not always consulted on departments' software use	8
Recommendations	11
Responses to the Audit	12
Diane Linn, Multnomah County Chair	13
Becky Porter, Chief Information Officer	14

The Table of Contents links to different sections of the document.

To go to a particular section or page:

- a) Place the cursor over the line that contains the section heading.
- b) Wait until the open hand  symbol changes to pointer .
- c) Click once to activate link

To return to Table of Contents use [Back to Table of Contents](#) buttons at the beginning of each section.

Summary

Personal computers (PCs) have quickly become an integral part of the County workplace. They provide an essential means of communication and access to information as well as a more efficient tool to complete work tasks. The number of PCs in the County has increased dramatically, from 2,400 in FY96 to 4,800 in FY05.

The County's Information Technology organization (IT) has taken steps in the past few years to better manage its complex system of PCs and software. In 1996, IT completed a strategic plan that provided for expanding the use of technology and also recognized the importance of standardization Countywide. Since then, the County has standardized hardware, operating systems, and software. In FY02, IT staff in departments were reassigned to the central IT organization in an effort to improve services and reduce costs.

The purpose of this audit was to determine how PC and software inventories were managed and the risks posed by databases created on PCs using Microsoft Access. The audit was limited to general use commercial software and excluded the Sheriff's and District Attorney's Offices because IT does not manage technology for these agencies.

We found that while IT managed PCs for the purposes of identifying workload, it did not adequately inventory them for asset protection. Asset management provides financial accountability and identifies custodial responsibility, as well as establishing a record of all purchases, the location of the assets, and the disposition when the asset is discarded. There is a Countywide asset management system administered by the Finance Division; however, it includes only assets with individual values of over \$5,000. PCs fall below this value. Prior to the centralization of IT services, asset management of PCs had been a departmental responsibility. Since centralization, this new role for IT has not been fully implemented.

Historically, software was purchased individually by departments. The County could save money and better manage software license compliance if it managed software on a Countywide basis. There is currently no inventory of software on its PCs, which makes ensuring compliance with licensing agreements difficult. We also sampled 29 software packages and from that sample estimated the value of these unused licenses to be about \$160,000. The County could capture more savings if it redistributed unused software among departments in the County rather than purchasing new.

IT is responsible for providing hardware, software, and services to departments. Departments can also independently purchase and develop specialized software and run it on the County's network. In some cases, it appeared that programs (and departments) were not taking into account the impact of independent software usage decisions on total system costs and, as a result, decreased system efficiency for the County as a whole. Sometimes individual programs with time constraints must move quickly to deliver services. However, the County needs a more methodical review of these decisions to determine the potential impact on all operations.

We recommend that IT work with the departments to better document business needs, user requirements, and the use of County PCs. The County should create an inventory of PCs and better manage software and licensing. To reduce the risk of department-created databases increasing County costs, the departments and IT should develop minimum standards for database applications.

Return to Table of Contents

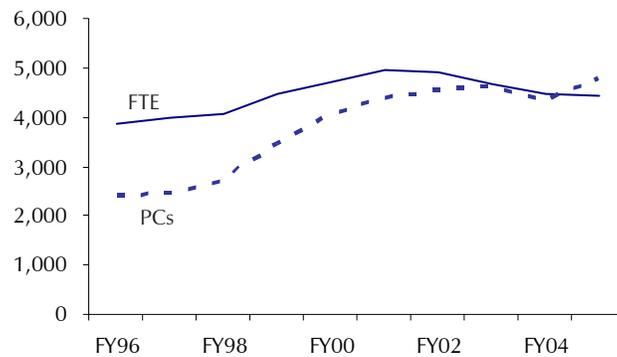
Background

In today's technical environment, personal computers (PCs) serve as a communications link sometimes replacing mail and telephone contacts with email and the Internet. Today, nearly every County employee has a PC or access to one to do his/her regular work. The County also has computers available to citizens in the libraries and other locations to provide access to information and the ability to review public records.

Employees use PCs for a wide range of work, from checking email to engineering design work. Most County PCs have Microsoft Office software along with various other commercial software applications as needed. In addition to allowing access to email and the Internet, the County's systems connect and share information with multiple outside organizations and other governments.

The number of PCs in the County has increased dramatically in the last ten years. In FY96, there were approximately 2,400 PCs in the County, with only half connected to one of 30 Local Area Networks (LANs). In FY05, the County's information system was a complex network located in 105 sites with 4,800 computers.

PCs to Total FTE
FY96 to FY05



Source: Auditor's Office based on County records

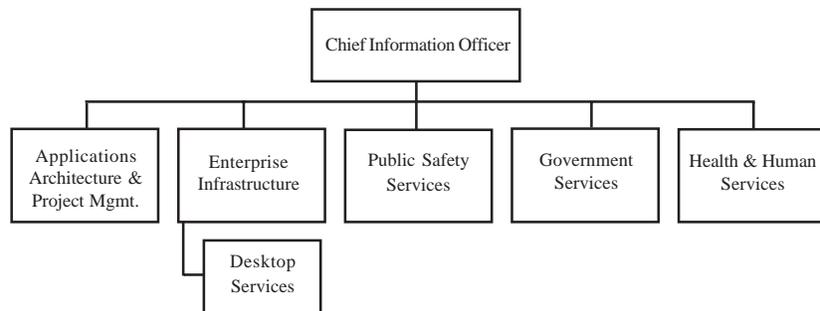
The number of employees and the amount of expenditure required to maintain and expand the County's ability to take advantage of new technology have also increased. In FY96, half of the Information Technology (IT) staff, 58 employees, were in the Information Services Division's budget and half of the staff, 60 employees, were included in departmental budgets. In FY02, the County reorganized and combined all department information technology staff into one central organization under the Department of Business & Community Services. For FY05, the Information Technology budget was at \$41 million with the equivalent of 169 full-time employees (FTE).

Return to Table of Contents

Because IT activities were spread throughout the County and not centralized prior to FY02, we were unable to determine historical information on expenditures. Even now, actual expenditures on information technology are higher than the IT budget because departments still have staff providing IT services.

The Information Technology organization is divided into five major functional areas. Two of the areas have Countywide responsibilities while the other three areas are generally dedicated to specific service groups within the County. Management of PCs and the software is included in the Enterprise Infrastructure Unit. Software maintenance and development that is specific to a department function is the responsibility of the Government Services, Health and Human Services, and Public Safety Services Divisions.

Exhibit 2



Scope and methodology

The objective of this audit was to determine how PCs and software inventories were managed and the risks posed by databases created on PCs using Microsoft Access. Our look at software was limited to general use “out of the box” commercial software and did not include specially designed software used for specific purposes. The Sheriff’s and District Attorney’s Offices were also excluded because IT does not manage technology for these agencies.

We researched best practices, reviewed County policies and rules relating to computers and software, and reviewed budget and accounting records. We interviewed IT and departmental management and staff involved with PC and software activities. We accessed information and research from Gartner Research, which is a nationally recognized information technology research organization. We used software reporting available through the IT organization that provided us information about all computers that log into the LAN, and accessed IT reports that combine two other sources of data for more complete information about who is using computers. We reviewed IT reports about usage of selected software on PCs.

This audit was included in our FY05 audit schedule and was conducted in accordance with generally accepted government auditing standards.

Return to Table of Contents

Audit Results

IT is making progress

Managing a complex system of computers and software requires planning and the support of both staff and technology. The first steps the County took in managing its PCs were part of the IT strategic plan developed in 1996. The plan not only provided for funding and increasing technology, but also recognized the importance of standardization Countywide. The strategic plan created committees to work on specific areas, a process for better communication among departments, and Countywide standards. The Flat Fee Program was established to provide a way for departments to budget for PC replacement over an extended period and to pay for software licensing. During the last ten years, other standards were created for hardware, operating systems, and additional software.

In FY02, IT staff in departments were assigned to the central IT organization in an effort to improve IT services and reduce costs. Since then, efforts have continued to standardize purchasing of computers and hardware, operating systems, and commonly used software. The County's desktop management program is following best practices in areas of standardization and cost controls.

The challenge IT had to face during the last ten years was to balance the need for efficiency and continue to provide needed services so departments could do their jobs effectively. The challenge continues as IT Desktop Services begins the move from PCs for every employee to a thin client system, which means software and computing runs centrally rather than on the desktop PC.

Best practices suggest that the change process should include steps to understand user requirements and business needs. During the course of our audit we had difficulty even identifying the location and users of County PCs. For this reason, IT must make efforts to gain a better understanding of who is using PCs and how they are being used if the conversion to thin client is to be successful.

Management of personal computers as assets is not adequate

An inventory of PCs can serve more than one purpose. The adequacy of the inventory depends upon the purpose it serves. One such purpose (inventory and configuration management) is related to managing PCs as a system to reduce costs and improve security. The County is managing desktop services using best practices with this type of inventory.

PC inventory as "asset management" is performed from a business and procurement perspective. IT currently has no inventory of County PCs for this purpose. Asset management provides financial accountability and allows IT to recover all costs for managing County PC systems. An inventory for asset management would reflect purchases, installation and location, custodial responsibility, and disposition when the asset is discarded. The County has an asset management system administered

by the Finance Division; however, it includes only assets with individual values of over \$5,000. Personal computers fall below this value.

Asset management is a new role for IT Desktop Services. Prior to IT centralization, asset management was a department responsibility and was managed differently by each department. For example, the Department of Community Justice (DCJ) maintained an asset inventory for all computers, servers, printers, and other related equipment. DCJ's inventory included purchases, installation and location, custodial responsibility, and disposition for all computers. Some other departments had lists of computers, but these did not include all the information that would be expected for asset management.

IT accounts for PCs in two ways. One is from the use of specialized software (SMS) and the other is through the Flat Fee Program.

- SMS is software used to discover, inventory, and configure PCs. It can track and provide useful information on all County PCs that are connected to the County network. This information includes hardware configurations, computer operating systems, installed software, and usage statistics for software.
- The Flat Fee Program charges departments annually to accrue revenues to purchase PC replacements and for software licensing. It only charges for those PCs that the departments report to IT.

We compared the inventories from the Flat Fee Program to the actual count using SMS. Using this software we were able to identify computers by department. However, SMS has some restrictions as it can only detect and report on computers when they are logged into the LAN. PCs such as laptops and stand-alone computers may not be included. For example, if an employee is on vacation or does not use his or her computer, it will not be detected by SMS. According to IT, there is a great deal of change in the County's PCs due to reorganizations, staff changes, computer upgrades, and replacements.

IT used the number of PCs in the Flat Fee Program as the principal basis for billing desktop services when IT became centralized. We found the inventory count used for PC replacement to be unreliable. Over 6% of the computers we found on the SMS inventory were not included in the Flat Fee Program. As a result, \$470,000 in Desktop Services may not be billed to the correct departments because of underestimates of the number of computers being managed.

There are several reasons for the difference between the PC count in the Flat Fee Program and the actual numbers. Many departments do not include all PCs in the Flat Fee Program because they were purchased through grants or other funding sources or because they do not intend to replace them. Non-profits operating in County buildings have PCs which are serviced by IT Desktop Services, but have not been included in the Flat Fee Program. Some departments may mistakenly underestimate the number of PCs, causing fewer dollars to be available for replacement and money to be spent from their operating budget. One department in

particular had large variances in PCs included in Flat Fee Program from year to year.

The County needs to create and maintain an inventory to improve accountability for its PCs and to provide an accurate count for cost recovery for desktop services charged to departments. IT management stated that inventory control is complicated for the County because there is a great deal of movement of both employees and computers. It is for this very reason that an asset management system is important. We also recognize that this formerly was a department responsibility. However, we believe managing the County's PCs as a Countywide system would be more efficient. IT Desktop Services is in a better position to manage the PC inventory than individual departments.

Although an asset inventory system may be complex, there are a number of software products designed for this. The system created by DCJ would also be a reliable model. The most important feature of such a system is that all computers are included regardless of funding source or whether the computer is to be replaced. This system could then be a reliable source for both accountability and also for accurate billing for desktop services.

County software is not used efficiently

County employees regularly use software to complete their work whether it is producing written documents, accounting for expenditures, or tracking the delivery of services. We analyzed what software was installed on County computers as well as how often some of the software was being used. As part of the audit we also reviewed a list of all applications installed on County PCs and generally found no suspicious software that may be unauthorized.

The County could save money by managing software on a Countywide basis rather than departmentally and could improve compliance with licensing restrictions. We sampled 29 software packages. Most were analyzed for a ten month period; a few were analyzed for a three month period. We estimated the value of the unused licenses for this sample to be about \$160,000. Redistributing unused software to other users could also result in savings if software was managed as a Countywide resource. Further savings might result if IT could purchase multi-user licenses and distribute them as needed.

With the exception of DCJ, the County is lacking an inventory of its software as well as its PCs. Historically, software was purchased individually by departments. More recently, IT has done purchasing and installation of software for departments. An accurate inventory is essential for managing the County's software and taking advantage of saving dollars by sharing and reusing licenses whenever possible.

It is also becoming more important to have an accurate inventory because software companies are increasing audits to insure that all software is licensed. During our audit, we found nearly 500 computers with software which may not be licensed. We referred the matter to IT management, which is working to remedy the situation. We believe licensing compliance should be a priority for the County and that the

Return to Table of Contents

IT not always consulted on departments' software use

solution would be to purchase the necessary licenses, redistribute licenses from unused PCs or remove the software from these computers as soon as possible.

The County's IT organization is responsible for providing information technology hardware, software, and services to departments. Staff can use the array of tools IT makes available in any way that works to fulfill their responsibilities. Departments can also independently purchase or develop specialized software and run it on the County's network.

We found that the extent to which program staff consult with IT staff regarding the appropriateness or compatibility of new software or expanded use of existing software varied. The extent to which these decisions affected larger department and County IT priorities also varied. In some cases, it appeared that programs (and departments) were not taking into account the full effect of these decisions and the result was increased costs and decreased system efficiency.

Microsoft (MS) Access-based applications are a good example of the sort of application that has been developed by program staffs on their own. MS Access is popular with County employees for a variety of reasons:

- MS Access is installed on all County computers, so building databases using Access does not require resources beyond staff time.
- Access is useful for many County programs that need to manage data.
- Many County employees have skills necessary to build databases in Access without requiring technical assistance from IT. Moreover, because it is so commonly used, it is relatively easy for many different people to use.
- It is easy for the County to help or receive help from other jurisdictions and to share Access-based applications that work for particular tasks.

The decision to create an Access-based application may also be the result of the limited number of practical alternatives for program staff. For example, the data and analysis tools staff need to do their job may be available with larger, more sophisticated applications that the County already owns, such as the enterprise-wide management system SAP, but most program staff do not have the expertise to use it properly. Additionally, departments may not have the resources to either purchase the necessary IT support or provide the necessary training for their staff. Knowing that the job must be done, Access-based applications may appear to be the best alternative, even though they may create higher costs in the future.

Departmental use of Access databases can affect IT resources

Because Access is relatively easy to use and data management is such a large part of many County program activities, it is not uncommon for Access databases to become central to a program's success. We found thousands of Access databases on the County network. In the

Health Department alone, we found at least 40 databases that were critical to a program completing its work, contained sensitive data, or both. Examples of these include the Communicable Disease surveillance and the Environmental Health food safety databases.

While MS Access can be a powerful tool for data management, it also has some significant technical limitations.

- MS Access-based applications do not work well when they are shared across the wide-area network, which limits their usefulness and limits access to the data.
- Access-based applications are not very secure. There is no logging or audit functionality that would allow data entries and modifications to be tracked. Such a limitation may prove to be a violation of Health Insurance Portability and Accountability Act (HIPAA) security requirements for electronic health information.
- Microsoft's long-term plans for supporting MS Access are unclear. The company recommends that Access only be used to create simplistic systems for use by an individual or small work group.

With IT resources essentially being fixed, there is a risk that the additional support needed to keep some of these applications running could drain resources from higher priority projects within the department. The severity of the risk posed by these applications depends on a variety of factors, such as the level of documentation and the overall complexity.

- Because Access is easy to use, it can be modified by any number of employees and changes, as well as the original design, are frequently not documented. The knowledge resides with the person that built it and if that person leaves the County, it will be difficult to fix problems.
- Databases built by contractors cause many of the same problems – lack of documentation of the original development as well as undocumented changes – and frequently posed an additional problem in that they tend to be more complex.
- Departments have not always upgraded applications in a timely manner, if at all. Not upgrading increased the complexity of regularly scheduled upgrades of the department's other software and hardware.

For example, IT delayed an upgrade to the Windows XP operating system in one department due to the number of employees using Access databases that were built and run on an older version. This delay slowed the County's efforts to create consistency and uniformity in its software and hardware. Moreover, the computers running the older software in addition to the County's standard MS Office suite require two MS Access licenses instead of just one.

Departments and IT can alleviate some of the problems caused by using Access by moving the application to a different program or replacing it altogether. However, conversion or replacement may prove to be costly.

According to IT, it took about 120 hours to perform a conversion of the data tables of one relatively simple Access-based application, which translated into a cost of approximately \$3,600. More complex conversions or replacements are significantly more expensive. For example, IT staff is currently working on replacing an Access-based system at Land Use and Transportation with a commercial off-the-shelf package. While the two systems are not perfectly comparable—the new application has a greater scope of function than the system it is replacing—the cost of the project is estimated to be around \$75,000.

[Return to Table of Contents](#)

Recommendations

1. To better understand the needs of computer users in the County, IT should work with the departments to document business needs, user requirements, and who is using County PCs.
2. To better manage and account for computer hardware, the County should create an inventory that includes the following:
 - Purchase date and cost
 - Physical custody and responsibility
 - Physical location
 - Disposition
3. To improve security and accountability, the County should document computers owned or used by non-profits or contractors located in County buildings that have access to the County's LAN, including whether IT support is provided to those computers.
4. To better manage software and licensing, the County should create an inventory of software and a means to share software Countywide.
5. To improve the quality of database management, IT and department management should adopt minimum standards for database applications.
6. IT and department management should work together to identify high priority Access-based applications and use a cost-benefit approach to determine where it is appropriate to develop a plan for conversion or replacement.

[Return to Table of Contents](#)

Responses to the Audit



Diane M. Linn, Multnomah County Chair

501 SE Hawthorne Blvd., Suite 600
Portland, Oregon 97214
Phone: (503) 988-3308
Email: mult.chair@co.multnomah.or.us

September 28, 2005

Suzanne Flynn
Multnomah County Auditor
501 SE Hawthorne, Room 601
Portland, OR 97214

Dear Suzanne:

I have reviewed your audit of the County's Software and would like to thank you and your staff for your hard and valuable work. We are interested in ways to improve our oversight of software and this audit will assist us in that effort.

Multnomah County's Information Technology management is responsible for efficiently managing nearly 4,800 computers at over 100 locations. It is extremely important that the County continue to strive for improvement and efficiencies in managing our investment in technology.

As you have detailed in this audit, the need to better understand the needs of computer users and managing the personal computer inventory will assist us in purchasing and managing software licenses and improving the quality of database management. You have made recommendations that should help our staff to manage these investments more effectively.

I have discussed the audit and your recommendations with our Chief Financial Officer and Chief Information Officer and we agree that you have outlined some excellent suggestions in this audit.

Once again, I appreciate your continuing efforts in helping us identify ways to improve the operations of Multnomah County.

Sincerely,

Diane Linn
Multnomah County Chair

c: Board of County Commissioners
Dave Boyer, Chief Financial Officer
Becky Porter, Chief Information Officer

**Department of County Management****MULTNOMAH COUNTY OREGON****Becky Porter, Chief Information Officer****501 SE Hawthorne Blvd, Suite 400
Portland, Oregon 97214
503-988-5110****Suzanne Flynn, Multnomah County Auditor
501 SE Hawthorne, Room 601
Portland, OR 97214**

Dear Suzanne,

I appreciate the opportunity to respond to the Software Audit that was recently conducted by you and your staff. Thank you for your acknowledgement of the progress that has been made in Information Technology over the last several years. The issues that have been raised are insightful and actionable. I would like to respond to the specific concerns below.

Software license compliance

It is essential that Multnomah County's software licenses be managed accurately. After your initial concern was raised in June regarding potential non-compliance, a team was assembled to ensure that Multnomah County is in compliance by September 30, 2005. The non-compliance involves PCs which run both old and current versions of MS Access simultaneously. For each PC with multiple versions of Access installed, requirements are being evaluated and the following actions taken:

- Determine whether the business need for an MS Access database can be met by other available business applications, such as SAP, EPIC, or Raintree. If so, the Access databases are removed from the PC and users are educated on alternative ways of accessing the required information
- Upgrade the MS Access database to the current version, if possible, before September 30
- Purchase additional licenses where neither option above is feasible

IT will provide confirmation of compliance after September 30.

Asset Management of PCs and software

Pending approval by the Board of County Commissioners on September 29, IT will proceed with a project to migrate the current PC inventory to thin client architecture. This architecture will address many of the concerns

noted about hardware and software tracking and utilization, both within the county and with business partners. A detailed analysis of each end user will be conducted to determine their personal computing needs and will provide an accurate baseline from which to manage our PC and software inventories moving forward. A determination will need to be made about the most effective way to track assets on an on-going basis that balances the investment required with the value of the items being tracked.

Use of distributed databases

Multnomah County currently uses thousands of MS Access databases. Access is being used for both transactional and analytical purposes. A detailed analysis of the business requirements driving the proliferation of these databases will be done to understand whether other applications and/or Business Intelligence solutions could meet the business needs with less cost and less risk than Access. Duplication of data is one contributor to a 65X growth rate in data storage requirements in the past 4 years at Multnomah County. Hitachi Consulting is currently engaged to do a baseline assessment of Multnomah County's portfolio of IT applications and services to identify and prioritize opportunities. A final report is due on October 31.

Kind Regards,

Becky Porter
Chief Information Officer