CITY OF DALLAS

Office of the City Auditor

Audit Report

AUDIT OF MAINFRAME UTILIZATION
(Report No. A07-009)

March 30, 2007

City Auditor

Craig D. Kinton, CPA

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Executive Summary

This report presents the results of the audit[1] of mainframe utilization. Our review determined that operational planning and monitoring of mainframe operations is inadequate. Although the needed software is present, monitoring and measuring techniques are not routinely used by management for short and long range computer resource planning. Due to a lack of usage data, we were unable to determine the mainframe utilization over time.

The City's mainframe computer continues to support mission critical applications, such as public safety, and merits continued operation at this time. However, the trend to server-based applications may reduce the continued use of the mainframe. Additionally, alternatives to using the mainframe to process applications may provide similar functionality at a reduced cost.

Recommendations Summary

We recommend that the Chief Information Officer (CIO):

1) Direct mainframe operations personnel to gather and routinely report performance and utilization measurements.

2) Develop and implement a system to measure and monitor the effectiveness of mainframe operations in providing service to the City.

3) Perform analysis regarding applications running on the mainframe to determine the appropriate computational and operational environment for the application.

4) Develop, document, publish and implement a plan that integrates mainframe operations into CIS service delivery strategy.

Management's Response Summary

The Chief Information Officer agrees with the four recommendations and is taking corrective actions to timely address the issues identified in this report.

Management's complete response is included as Appendix III to this report.

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[1] Audit conducted under authority of Dallas City Charter, Chapter IX, Section 3.

Audit Results

Management has not routinely measured and monitored the performance and utilization of the mainframe.

Performance and utilization reports for the mainframe are not routinely produced or reviewed by management. CIS has installed and maintains several software applications with the capability to monitor, measure, and report on mainframe performance and utilization, but has not used them. The annual maintenance costs for this software is approximately $30,000. Without performance data, management's ability to perform short-range and long-range computer resource planning may be impeded by not addressing:

- Operational commitments to the citizens to meet public safety and quality of life objectives. These commitments rely upon mainframe-based software applications to attain objectives.

- The responsibility to provide City departments with the necessary resources to enable successful accomplishment of their missions. This requires an in-depth knowledge of the demand and growth of client data processing to strategically plan for the acquisition of additional resources, or reduction of resources, to meet current and future departmental needs.

- The reliance on LINC, a limited-use, special-purpose operating system. Several server-based applications rely upon data hosted on LINC. If LINC were to fail due to a lack of available computing resources, the City may be unable to provide the necessary processing capabilities for essential applications.

- Changes in the operational computing environment of managed resources. Summary statistics, such as processing cost per processing hour, percent of disk space used, and response time, are typical measurements used to report on the condition of the CIS operations.

Additionally, the vendor of the mainframe's hardware component has decided not to extend hardware maintenance agreements on the mainframe past March 2009. CIS has approximately two years to locate, select, and acquire additional computing resources or alternate processing facilities. Migration plans should be constructed to account for one or more of the following:

- Replacement of the mainframe hardware component
- Use of alternative technology for applications
- Outsourcing applications to Application Service Providers
- Elimination of services

Finally, as applications are removed from the mainframe (and associated departments are no longer charged for the use of the mainframe), each

remaining department will bear an increased proportion of the operating costs of the mainframe. To ensure that processing is reasonably priced, resources should be downsized. As the computing resource capability is reduced, the software application costs normally are reduced as well.

The City's technology strategy is focused on the use of server-based technology as a replacement for mainframe-based applications. Management has emphasized implementation of this strategy by allocating staff and resources to the technology. This emphasis by management may have been a contributing factor to the lack of oversight of the mainframe computing environment.

The fieldwork phase of this audit was extended multiple times to allow CIS the opportunity to retroactively recreate utilization statistics. However, CIS did not provide adequate data to accomplish the audit objective.

Recommendations:

We recommend that the Chief Information Officer (CIO):

1) Direct mainframe operations personnel to gather and routinely report performance and utilization measurements.

2) Develop and implement a system to measure and monitor the effectiveness of mainframe operations in providing service to the City.

3) Perform analysis regarding applications running on the mainframe to determine the appropriate computational and operational environment for the application.

4) Develop, document, publish, and implement a plan that integrates mainframe operations into CIS service delivery strategy.

Management's Response:

1) The CIS Data Center Operations Department applied the CIMS software to the Mainframe System on February 1, 2007 to routinely collect and report on a daily, weekly, and monthly basis.

2) The CIS Data Center Operations Department applied the Data Collection Programs on February 1, 2007 to measure disk and tape usage, print usage, CPU transactions, CPU hours per application, LINC transactions, and LINC hours per application.

3) The CIS Data Center Operations Department applied the Utilization Data Collection programs on February 1, 2007 to measure application support, mainframe application batch jobs and notifications (monitor jobs, review

notifications, address ABENDS), monitor server batch jobs (monitor jobs, review notifications, address problems).

4) CIS management will develop a timeline outlining the service computing strategy and budget proposals by September 30, 2007 for migrating remaining legacy applications operating on the mainframe computer to more modern client/server technology platforms.

Complete management's response is included as Appendix III to this report.

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Appendix I

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Background, Objective, Scope and Methodology

Background

The City of Dallas Communications and Information Services (CIS) Department operates the mainframe as an internal service to other departments within the City. The mainframe supports two processing environments called operating systems: z/OS and LINC. z/OS is a commercial product offering of IBM and is an operating system that supports batch processing, the Customer Information Control System (CICS), and other non-LINC applications. LINC is a commercially non-supported operating system that supports teleprocessing activities. LINC-based applications supporting City operations include the 311/911 Dispatch System, the Building Inspection System, the City Secretary System, and the Courts and Detention Services (CDS) Regional Wanted Persons system.

Operating costs for the mainframe readily exceed $1.5 million. Information made available by CIS indicates that the City maintains a staff of 14 full-time FTEs and six part-time FTEs to support mainframe operations. Current staffing levels require approximately $880,000 in salary and benefits. Information from CIS indicates that at least 27 different system software applications are installed on the mainframe. The maintenance agreements for these system applications cost approximately $650,000 per annum.

The mainframe supports the information processing needs of City departments. The following departments are the largest users of the mainframe:

- Office of Financial Services (OFS)
- Courts and Detention Services (CDS)
- Dallas Fire-Rescue (DFR)
- Dallas Police Department (DPD)
- Communications and Information Services (CIS)
- Dallas Water Utilities (DWU)

Major applications used by these departments include:

- Advantage2/RESOURCE
- Courts Case Management System
- Courts/DPD Regional Wanted Persons
- Courts Imaging System
- Fire Mobile Digital Device (MDD) Client
- Police MDD Client (Mobile and Network)

- DWU 3-1-1 Service Order Reporting
- DWU Automated Payments (AutoPay)
- DWU StormWater
- DWU Water Stores/Inventory
- DWU CIABS

Objective, Scope and Methodology

The objective of the audit was to determine whether the mainframe computer was being sufficiently utilized.

The audit was conducted in accordance with generally accepted government auditing standards and included tests and other procedures that we considered necessary in the circumstances. The audit period covered January 1, 2005 through December 31, 2005, although we examined certain events and transactions occurring before and after that period.

We interviewed City managers and staff to develop an understanding of relevant internal controls and controls within CIS. To determine the utilization level of the mainframe, our audit program included the following tasks:

- Analyzing the mix and prioritization of departmental jobs
- Reviewing the resources required to support each job
- Reviewing the status of job processing

The audit plan also included a review of CIS short and long-range objectives regarding mainframe operations.

Appendix II

Major Contributors to this Report

Paul T. Garner, Assistant City Auditor
Mark Bolten, CISA, Project Manager
Tony Aguilar, CISA, Auditor

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Management's Response to the Draft Report

Memorandum

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CITY AUDITOR'S OFFICE

CITY OF DALLAS

DATE: March 8, 2007

TO: Craig Kinton
City Auditor

SUBJECT: Audit of City's Mainframe Utilization

This response is to address the recommendations in the Audit of the City's Mainframe Utilization.

Audit Result: Management has not routinely measured and monitored the performance and utilization of the mainframe.

We recommend that the CIO:

1. Direct mainframe operations personnel to start gathering and routinely report performance and utilization measurements.

   CIS Response: *The CIS Data Center Operations Department applied the CIMS software to the Mainframe System on 02/01/2007to routinely collect and report on a Daily, Weekly, and Monthly basis.*

2. Develop and implement a system to measure and monitor the effectiveness of mainframe operations in providing service to the City.

   CIS Response: *The CIS Data Center Operations Department applied the Data Collection Programs on 02/01/2007 to measure Disk and Tape Usage, Print Usage, CPU Transactions, CPU Hours per Application, LINC Transactions and LINC Hours per Application.*

3. Perform analysis regarding applications running on the mainframe to determine the appropriate computational and operational environment for the application.

   CIS Response: *The CIS Data Center Operations Department applied the Utilization Data Collection programs on 02/01/2007 to measure Application Support, Mainframe Application Batch Jobs and Notifications (Monitor Jobs, Review Notifications, Address ABENDS), Monitor Server Batch Jobs (Monitor Jobs, Review Notifications, Address Problems).*

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4. Develop, document, publish, and implement a plan that integrates mainframe operations into CIS service delivery strategy.

   CIS Response: *CIS management will develop a timeline outlining the service computing strategy and budget proposals by September 2007 for migrating remaining legacy applications operating on the mainframe computer to more modern client/server technology platforms.*

Should you require additional information, please let me know.
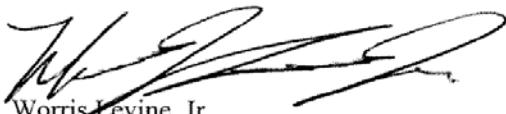
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