PERFORMANCE AUDIT
OF THE

MANAGEMENT INFORMATION DATABASE

DEPARTMENT OF INFORMATION TECHNOLOGY

May 2004

"...The auditor general shall conduct post audits of financial transactions and accounts of the state and of all branches, departments, offices, boards, commissions, agencies, authorities and institutions of the state established by this constitution or by law, and performance post audits thereof."

– Article IV, Section 53 of the Michigan Constitution

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Michigan
Office of the Auditor General
REPORT SUMMARY

Performance Audit

Management Information Database (MIDB)

Department of Information Technology (DIT)

Report Number:
07-560-02

Released:
May 2004

MIDB is a data warehouse consisting of data from the State of Michigan's accounting, purchasing, and human resources systems. MIDB was designed specifically to respond to a manager's need for information. MIDB provides ad hoc queries and reports and removes traffic from the transaction databases on the mainframes. MIDB is maintained, updated, and managed by DIT's Enterprise Application Services Division.

Audit Objective:
To assess the accuracy, timeliness, and completeness of MIDB.

Audit Conclusion:
DIT ensured the accuracy, timeliness, and completeness of MIDB.

Noteworthy Accomplishments:
In fiscal year 2001-02, the State adopted an accelerated year-end closing of its financial statements. In response to the accelerated closing, the Enterprise Application Services Division created special Statewide Relational Standard Accounting and Reporting System (R*STARS) accounting event views on MIDB, which were updated with new transactions daily. These tables were made available to agencies from September through November 2002. State agencies were able to retrieve information from MIDB daily, which greatly reduced the time necessary to close their financial records.

We conducted a survey of MIDB users to obtain information regarding users' experience and satisfaction with MIDB. The survey disclosed that most users were satisfied with MIDB and found MIDB data to be reliable and timely.

Reportable Condition:
DIT had not established formal policies and procedures for maintaining and updating the MIDB data dictionaries (Finding 1).

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Audit Objective:
To assess the effectiveness of DIT's internal control over MIDB.

Audit Conclusion:
DIT's internal control over MIDB was generally effective.

Reportable Conditions:
DIT had not performed a security risk assessment of the security and

configuration of the MIDB database and operating system (Finding 2).

DIT had not completely implemented access controls over MIDB (Finding 3).

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Agency Response:
Our audit report contains 3 findings and 3 corresponding recommendations. DIT's preliminary response indicated that it agreed with our findings.

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AUDITOR GENERAL

May 7, 2004

Ms. Teresa M. Takai, Director
Department of Information Technology
Landmark Building
Lansing, Michigan

Dear Ms. Takai:

This is our report on the performance audit of the Management Information Database (MIDB), Department of Information Technology.

This report contains our report summary; description of system; audit objectives, scope, and methodology and agency responses; comments, findings, recommendations, and agency preliminary responses; a description of survey and summary of survey responses, presented as supplemental information; and a glossary of acronyms and terms.

Our comments, findings, and recommendations are organized by audit objective. The agency preliminary responses were taken from the agency's responses subsequent to our audit fieldwork. The *Michigan Compiled Laws* and administrative procedures require that the audited agency develop a formal response within 60 days after release of the audit report.

We appreciate the courtesy and cooperation extended to us during this audit.

AUDITOR GENERAL

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MANAGEMENT INFORMATION DATABASE (MIDB)
DEPARTMENT OF INFORMATION TECHNOLOGY

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Description of System

The Management Information Database* (MIDB) is a component of the Michigan Administrative Information Network* (MAIN). MIDB is a data warehouse* consisting of data from the State of Michigan's accounting, purchasing, and human resources systems. MIDB was designed specifically to respond to a manager's need for information. MIDB provides ad hoc queries and reports and removes traffic from the transaction databases on the mainframes.

MIDB contains history, totals, detail transactions, and group summaries. Unlike the transaction databases, MIDB does not allow users to enter or change data. MIDB data is refreshed from its mainframe sources on a weekly, biweekly, or monthly basis. Historic data is maintained on MIDB for up to three years. This allows the user to look at and compare the data across many periods to gain a historical perspective.

MIDB contains data from the following systems:

a. Relational Standard Accounting and Reporting System* (R*STARS). R*STARS is the State's comprehensive information system that provides for accounting and financial reporting within MAIN Financial Administration and Control System* (FACS).

b. Advanced Purchasing and Inventory Control System* (ADPICS). ADPICS is the State's procurement and materials management system.

c. Human Resources Management Network* (HRMN). HRMN is the State's integrated human resources system that processes personnel, payroll, and employee benefits data.

d. Data Collection and Distribution System* (DCDS). DCDS is the State's client/server system that records, allocates, and distributes payroll costs within the accounting system for MAIN Human Resource System* (HRS).

See glossary at end of report for definition.

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MIDB is maintained, updated, and managed by the Data Warehouse and Database Administration Unit of the Enterprise Application Services Division, Department of Information Technology (DIT). The Data Warehouse and Database Administration Unit is responsible for defining MIDB information requirements, enhancing and maintaining MIDB, developing MIDB queries and reports, and providing support to State agencies in the use of software tools to access data from MIDB. Approximately 1,800 State employees from the executive, legislative, and judicial branches of government have access to MIDB.

Audit Objectives, Scope, and Methodology
and Agency Responses

Audit Objectives

Our performance audit* of the Management Information Database (MIDB), Department of Information Technology (DIT), had the following objectives:

1.   To assess the accuracy, timeliness, and completeness of MIDB.

2.   To assess the effectiveness* of DIT's internal control* over MIDB.

Audit Scope

Our audit scope was to examine the information processing and other records of the Management Information Database. Our audit was conducted in accordance with *Government Auditing Standards* issued by the Comptroller General of the United States and, accordingly, included such tests of the records and such other auditing procedures as we considered necessary in the circumstances.

Audit Methodology

Our methodology included examination of DIT's information technology and other records for MIDB for the period October 2000 through March 2003. Our audit fieldwork was performed from May through November 2002 and from April through May 2003. To accomplish our audit objectives, our audit methodology included the following phases:

1.   Preliminary Review and Evaluation Phase
     We conducted a preliminary review of MIDB to identify the data stored on MIDB, the purpose and uses of MIDB, and the number of MIDB users. We conducted a survey to obtain information regarding users' experiences and satisfaction with MIDB (see summary of survey responses, presented as supplemental information). We obtained an understanding of procedures for updating MIDB data.

See glossary at end of report for definition.

2. Detailed Analysis and Testing Phase
   We performed an assessment of internal control pertaining to the accuracy, timeliness, and completeness of MIDB and the effectiveness of internal control over MIDB. Specifically:

   a. Accuracy, Timeliness, and Completeness of MIDB:

      (1) We reviewed DIT's policies and procedures for extracting data from the legacy systems* and placing the data on MIDB.

      (2) We reviewed, observed, and tested DIT's procedures for reconciling MIDB to the legacy systems. We performed a reconciliation of selected MIDB data to the legacy systems data.

      (3) We analyzed the data on selected MIDB tables to assess its accuracy and completeness.

      (4) We assessed the procedures for developing and testing MIDB queries and scripts that users use to create MIDB reports.

   b. Effectiveness of Internal Control Over MIDB:

      (1) We evaluated the configuration and security of MIDB's operating system and database.

      (2) We evaluated controls over access to MIDB tables and views.

      (3) We evaluated the completeness of MIDB system documentation.

3. Evaluation and Reporting Phase
   We evaluated and reported on the results of the detailed analysis and testing phase.

Agency Responses
Our audit report contains 3 findings and 3 corresponding recommendations. DIT's preliminary response indicated that it agreed with our findings.

* See glossary at end of report for definition.

The agency preliminary response that follows each recommendation in our report was taken from the agency's written comments and oral discussion subsequent to our audit fieldwork.   Section 18.1462 of the *Michigan Compiled Laws* and Department of Management and Budget Administrative Guide procedure 1280.02 require DIT to develop a formal response to our audit findings and recommendations within 60 days after release of the audit report.

COMMENTS, FINDINGS, RECOMMENDATIONS, AND AGENCY PRELIMINARY RESPONSES

ACCURACY, TIMELINESS, AND
COMPLETENESS OF MIDB

COMMENT

Background: Some of the primary components of a data warehouse are the operational or legacy systems that are the sources of data for the warehouse; programs that extract data from the legacy systems to the warehouse; meta data*, which is data about the warehouse, including a data dictionary; and software tools to access the data in the warehouse.

Audit Objective: To assess the accuracy, timeliness, and completeness of the Management Information Database (MIDB).

Conclusion: The Department of Information Technology (DIT) ensured the accuracy, timeliness, and completeness of MIDB.   We determined that the data stored on MIDB was an accurate representation of the data on the source systems. We also determined that DIT had procedures and controls to ensure that it extracted data from the legacy systems and put the data into MIDB in a timely and complete manner. In a few instances, we identified inaccurate or missing data on MIDB.   In these instances, the source data was inaccurate or missing.

We noted a reportable condition* related to the MIDB data dictionaries (Finding 1).

Noteworthy Accomplishments: In fiscal year 2001-02, the State adopted an accelerated year-end closing of its financial statements. In response to the accelerated closing, the Enterprise Application Services Division created special Statewide Relational Standard Accounting and Reporting System (R*STARS) accounting event views on MIDB, which were updated with new transactions daily. These tables were made available to agencies from September through November 2002. State agencies were able to retrieve information from MIDB daily, which greatly reduced the time necessary to close their financial records.

* See glossary at end of report for definition.

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We conducted a survey of MIDB users to obtain information regarding users' experience and satisfaction with MIDB. The survey disclosed that most users were satisfied with MIDB and found MIDB data to be reliable and timely.

FINDING

1.   MIDB Data Dictionaries

DIT had not established formal policies and procedures for maintaining and updating the MIDB data dictionaries. As a result, the data dictionaries were not complete and current.

To help ensure that MIDB users select correct data from MIDB, data dictionaries should be as complete and current as possible.

The purpose of the MIDB data dictionaries is to provide users with information about MIDB data, including how to find data in MIDB, the source of the data, what the data means, who is responsible for the data, and how the data was derived. Data dictionaries help facilitate and improve the retrieval of information from MIDB.

Our review of 8 MIDB data dictionary tables disclosed that all 8 were missing multiple fields of information.

RECOMMENDATION

We recommend that DIT establish formal policies and procedures for maintaining and updating the MIDB data dictionaries.

AGENCY PRELIMINARY RESPONSE

DIT agreed with the finding and will work to achieve full compliance in updating all columns, tables, and views by June 1, 2004. DIT informed us that its staff has made updates to the columns and tables related to this finding. In addition, DIT will also establish formal procedures for maintaining and updating the MIDB data dictionaries any time that columns, tables, and/or views are added or modified.

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EFFECTIVENESS OF INTERNAL CONTROL
OVER MIDB

COMMENT

Background: Internal control over MIDB includes controls to ensure proper access to and security of data. These controls include operating system and database security, access to the data, and backup and recovery of data.

Audit Objective: To assess the effectiveness of DIT's internal control over MIDB.

Conclusion: DIT's internal control over MIDB was generally effective. However, we noted reportable conditions related to security risk assessment and access controls (Findings 2 and 3).

FINDING

2.   **Security Risk Assessment**

DIT had not performed a security risk assessment of the security and configuration of the MIDB database and operating system. Conducting a security risk assessment would help identify threats that could adversely impact the security of MIDB data. Conducting a security risk assessment would also help ensure that weaknesses in the security and configuration of the database and operating system have been identified and, if necessary, corrective measures taken.

Our review disclosed:

a.   DIT had not completely restricted access permissions to database system directories, groups, and accounts. For example, we identified users with unnecessary membership in the database group and instances in which excessive permissions had been granted. This could result in the inadvertent or intentional use of system privileges to change the database system files. In addition, DIT did not use built-in database software features to help control access and monitor database activity. These features would control the amount of idle time and concurrent sessions allowed for each user. DIT should assess the risk of not using these built-in features of the database software.

After we brought this to management's attention, DIT removed the unnecessary members from the database group.

b. DIT had not fully established controls for operating system configuration. The operating system should be installed with a minimal service configuration to reduce the risk of network intrusion and the exploitation of well-known operating system vulnerabilities. Our review of the configuration of the MIDB operating system identified vulnerable operating system configurations.

RECOMMENDATION

We recommend that DIT perform a security risk assessment of the security and configuration of the MIDB database and operating system.

AGENCY PRELIMINARY RESPONSE

DIT agreed with the finding and will work to achieve full compliance by August 31, 2004. DIT will perform a security risk assessment of the security and configuration of the MIDB database and operating system.

FINDING

3. Access Controls

DIT had not completely implemented access controls over MIDB.

Failure to establish sufficient access controls could result in unauthorized users gaining access to confidential and security-sensitive data.

To obtain access to MIDB, a user must complete the MIDB access request form and obtain approval from his/her supervisor, the agency security administrator, and other authorities as indicated on the form. The form is used to identify the "roles" on MIDB to which the user is requesting access. These roles control which MIDB data a user can access.

Our review disclosed:

a. DIT did not ensure that MIDB users had access to only authorized roles.

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In a sample of 78 users, we noted 33 (42%) who had been granted access to MIDB roles for which they were not authorized. As a result, users may have access to data they are not authorized to view. We also noted 3 (3%) users who had not been granted access to MIDB roles for which they had been authorized.

b. DIT did not delete usercodes of all MIDB users who had terminated employment. We identified 17 MIDB usercodes that belonged to former employees. Allowing usercodes of former employees to remain active increases the risk of unauthorized access to MIDB.

DIT creates and distributes a quarterly report of MIDB users to all State agencies. State agencies are responsible for notifying DIT of users who have terminated employment with the State.

RECOMMENDATION

We recommend that DIT completely implement access controls over MIDB.

AGENCY PRELIMINARY RESPONSE

DIT agreed with the finding and will work to achieve full compliance by July 1, 2004. DIT informed us that it is performing a comprehensive review of all access to MIDB. DIT will establish access controls to revoke access to users in agencies in which the agency security administrator has not completed the quarterly confirmation of continued authorization.

SUPPLEMENTAL INFORMATION

Description of Survey

We developed a survey to assist in our audit of the Management Information Database (MIDB). The purpose of the survey was to obtain information regarding users' experience and satisfaction with MIDB. The survey responses assisted us in evaluating the effectiveness and overall efficiency* of MIDB.

We e-mailed the survey to 175 MIDB users. We received 64 responses to our survey, which are summarized in the following summary of survey responses. The survey responses indicated that most MIDB users were satisfied with MIDB and the reliability and timeliness of the data. The survey responses, including narrative responses, also indicated that most MIDB users liked the ease of use of MIDB and the ability to use pre-defined scripts to generate reports quickly. Additionally, the narrative responses disclosed that most users found the Enterprise Application Services Division and the Michigan Administrative Information Network (MAIN) Help Desk staff effective in answering questions.

In the summary of survey responses, the total number of responses for each item may not agree with the number of responses noted above because some respondents provided more than one response to an item and other respondents did not answer all items. The numerical sequence of questions is broken because we did not include in our report the questions that prompted the respondent for a narrative response. These narrative responses were not included in our summary of survey responses but were provided to the Department of Information Technology management in summary form.

See glossary at end of report for definition.

MANAGEMENT INFORMATION DATABASE (MIDB)
Department of Information Technology
Summary of Survey Responses

Number of surveys distributed   175
Number of responses   64
Response rate   37.0%

1.   How often do you use MIDB?

      a.   3   Annually
      b.   9   Monthly
      c.   21   Weekly
      d.   27   Daily
      e.   4   Never

2.   What type of data do you normally view on MIDB? (Please check all that apply.)

      a.   34   ADPICS data
      b.   31   Budget data
      c.   34   DCDS data
      d.   1   Demographics
      e.   43   HRMN data
      f.   23   HRS data
      g.   41   R*STARS data
      h.   5   Security data
      i.   5   Other type of data

3.   Do you feel that MIDB helps you meet your agency's business needs?

      a.   57   Yes   95.0%
      b.   3   No   5.0%

4.   If you are not a daily or weekly user of MIDB, please indicate why you do not use MIDB more often. (Please check all that apply.)

      a.   11   I do not have a need to use MIDB more often.
      b.   2   I do not know how to use MIDB.
      c.   0   MIDB does not have the data I need.
      d.   1   MIDB is too difficult to use.
      e.   6   Other

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5. In the past two years, have you encountered an instance in which a central server script provided you with results other than what you expected?

    a.   11   Yes   25.6%
    b.   32   No   74.4%

6. Do you feel that MIDB has adequate documentation to explain what information the central server scripts will provide?

    a.   32   Yes   80.0%
    b.   8   No   20.0%

7. Do you write your own query scripts to obtain data from MIDB?

    a.   42   Yes   70.0%
    b.   18   No   30.0%

8. Has lack of clarity in the data dictionaries ever caused you to make an error in choosing a column for a script, resulting in an inaccurate report?

    a.   9   Yes   20.5%
    b.   35   No   79.5%

9. Do you feel that MIDB data dictionaries, which are found on the Michigan Administrative Information Network Web page or in MIDB, provide you with adequate explanations of tables, views, and columns to assist you in developing your queries?

    a.   33   Yes   78.6%
    b.   9   No   21.4%

10. Have you ever noticed discrepancies between the columns listed on the MIDB data dictionaries and the columns actually appearing in the MIDB views?

    a.   3   Yes   6.8%
    b.   41   No   93.2%

11. For the data you use, do you know which columns in MIDB are calculated or derived?

    a.   21   Yes   40.4%
    b.   31   No   59.6%

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12. Does your agency do any formal downloads of MIDB data to an agency application system?

    a.   17   Yes   38.6%
    b.   27   No   61.4%

13. When you query financial data from MIDB, do you routinely reconcile the data back to the official financial books of the State?

    a.   35   Yes   68.6%
    b.   16   No   31.4%

14. Have you ever encountered an instance in which the data obtained from MIDB did not match the official financial books of the State?

    a.   11   Yes   26.8%
    b.   30   No   73.2%

15. Do you use MIDB data to develop and provide your agency with its official financial reports?

    a.   29   Yes   53.7%
    b.   25   No   46.3%

16. In your opinion, how reliable is MIDB data?

    a.   46   Very reliable   85.2%
    b.   6   Somewhat reliable   11.1%
    c.   2   Somewhat unreliable   3.7%
    d.   0   Very unreliable

17. In your opinion, is MIDB data updated frequently enough to meet your needs?

    a.   32   Yes   60.4%
    b.   21   No   39.6%

18. Is there any data that is not in MIDB that you would like to see included?

    a.   11   Yes   22.9%
    b.   37   No   77.1%

If you answered "Yes" to question 18, from the following list please identify the type(s) of data that you would like included.

(a)   3   ADPICS data
(b)   2   Budget data
(c)   1   DCDS data
(d)   1   Demographics data
(e)   3   HRMN data
(f)   1   HRS data
(g)   2   R*STARS data
(h)   1   Security data
(i)   3   Other type of data

19. When you run queries in MIDB, is the response time reasonable for the query you are running?

     a.   17   Always reasonable   29.8%
     b.   40   Usually reasonable   70.2%
     c.   0   Rarely reasonable
     d.   0   Never reasonable

20. Have you identified any ways in which MIDB could be improved?

     a.   11   Yes   23.9%
     b.   35   No   76.1%

21. How effective have the MAIN Help Desk staff been in answering your questions and providing you with solutions to MIDB-related issues?

     a.   38   Effective   70.4%
     b.   6   Somewhat effective   11.1%
     c.   0   Somewhat ineffective
     d.   1   Ineffective   1.9%
     e.   9   No opinion   16.7%

22. How effective have Enterprise Application Services Division staff been in answering your questions and providing you with solutions to MIDB-related issues?

     a.   38   Effective   71.7%
     b.   3   Somewhat effective   5.7%
     c.   0   Somewhat ineffective
     d.   0   Ineffective
     e.   12   No opinion   22.6%

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GLOSSARY

Glossary of Acronyms and Terms

Advanced Purchasing and Inventory Control System (ADPICS)

The State's procurement and materials management system that is fully integrated with R*STARS in supporting the purchasing, receiving, payment process, and inventory management within State agencies.

Data Collection and Distribution System (DCDS)

The State's client/server system that records, allocates, and distributes payroll costs within the accounting system for MAIN HRS.

data warehouse

A very large database designed for fast processing of queries, projections, and data summaries, normally used by a large organization.

DIT

Department of Information Technology.

effectiveness

Program success in achieving mission and goals.

efficiency

Achieving the most outputs and outcomes practical with the minimum amount of resources.

Human Resources Management Network (HRMN)

The State's integrated human resources system that processes personnel, payroll, and employee benefits data for MAIN HRS.

internal control

The organization, policies, and procedures adopted by agency management and other personnel to provide reasonable assurance that operations, including the use of agency resources, are effective and efficient; financial reporting and other reports for internal and external user are reliable; and laws and regulations are followed. Internal control also includes the safeguarding or agency assets against unauthorized acquisition, use, or disposition.

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legacy systems	The primary sources of data for the data warehouse. For MIDB, the legacy systems are R*STARS, ADPICS, HRMN, and DCDS.
MAIN Financial Administration and Control System (FACS)	The financial management component of MAIN, consisting of R*STARS, ADPICS, and the Report Management Distribution System (RMDS).
MAIN Human Resource System (MAIN HRS)	The component of MAIN that contains both the Human Resource Management Network (HRMN) and the Data Collection and Distribution System (DCDS).
Management Information Database (MIDB)	The database component of MAIN designed to allow managers to develop ad hoc queries and reports for needed information. Data is extracted from R*STARS, ADPICS, and MAIN HRS.
meta data	Information about data within the data warehouse. This includes descriptions of the sources for the data, the description of each field, the procedures required to move the data from operational systems to the warehouse, and other operational information, such as the history of the migrated data, what organizational unit is responsible for a given field, what happens to the data during migration, what data has been purged, what data is due to be purged, and who is using the data and how they are using it.
Michigan Administrative Information Network (MAIN)	The State's fully integrated automated administrative management system that supports the accounting, payroll, purchasing, contracting, budgeting, personnel, and revenue management activities and requirements. MAIN consists of four major components: MAIN Enterprise Information System (EIS); MAIN Financial Administration and Control System (FACS); MAIN Human Resource System (HRS); and MAIN Management Information Database (MIDB).

performance audit	An economy and efficiency audit or a program audit that is designed to provide an independent assessment of the performance of a governmental entity, program, activity, or function to improve public accountability and to facilitate decision making by parties responsible for overseeing or initiating corrective action.
Relational Standard Accounting and Reporting System (R*STARS)	The State's comprehensive financial information system that provides for accounting and financial reporting within MAIN FACS.
reportable condition	A matter that, in the auditor's judgment, represents either an opportunity for improvement or a significant deficiency in management's ability to operate a program in an effective and efficient manner.