



THE UNIVERSITY OF TEXAS AT DALLAS

OFFICE OF AUDIT AND CONSULTING SERVICES
800 W. CAMPBELL RD. SPN 32, RICHARDSON, TX 75080
PHONE 972-883-4876 FAX 972-883-6846

December 13, 2018

Dr. Richard Benson, President,
Ms. Lisa Choate, Chair of the Institutional Audit Committee:

We have completed an audit of the Data Warehouse as part of our fiscal year 2018 Audit Plan. The objective of our audit was to determine if adequate controls exist over the Data Warehouse to ensure the accuracy of financial information. The report is attached for your review.

Overall, we found that adequate controls exist over the Data Warehouse to ensure the accuracy of financial information, though there are opportunities to improve in the areas of patch management, change management, and records retention. Management has reviewed the recommendations and has provided responses and anticipated implementation dates. Though management is responsible for implementing the course of action outlined in the response, we will follow up on the status of implementation subsequent to the anticipated implementation dates.

We appreciate the courtesies and considerations extended to us during our engagement. Please let me know if you have any questions or comments regarding this audit.

A handwritten signature in blue ink that reads 'Toni Stephens'.

Toni Stephens, CPA, CIA, CRMA
Chief Audit Executive



Executive Summary

Audit Objective and Scope

To determine if adequate controls exist over the Data Warehouse to ensure the accuracy of financial information.

Conclusion

Overall, we found that adequate controls exist over the Data Warehouse to ensure the accuracy of financial information, though there are opportunities to improve in the areas of patch management, change management, and records retention.

Audit Recommendations by Risk Level

Recommendation	Risk Level	Estimated Implementation Date
(1) Ensure Windows Servers Are Up to Date	Medium	Implemented During Audit
(2) Formalize Process for Tracking Changes to Reports	Medium	Implemented During Audit
(3) Determine Records Retention Requirements	Medium	12/31/2019

Responsible Executive

Dr. Richard Benson, President

Responsible Parties

- Dr. Lawrence Redlinger, Executive Director for Strategic Planning and Analysis
- James Michalek, Director, University Data Warehouse

Staff Assigned to Audit

Project Manager: Rene Herrera, CISA, CFE, IT Audit Manager

Project Leader: Chris Robinette, IT Staff Auditor

Report Distribution

Members of the UT Dallas Institutional Audit Committee

External Members

- Ms. Lisa Choate, Chair
- Mr. Gurshaman Baweja
- Mr. Bill Keffler

- Ms. Julie Knecht

UT Dallas Members

- Dr. Richard Benson, President
- Dr. Hobson Wildenthal, Executive Vice President
- Dr. Kyle Edgington, Vice President for Development and Alumni Relations
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- Dr. Inga Musselman, Provost and Vice President for Academic Affairs
- Dr. Joseph Pancrazio, Vice President for Research
- Mr. Terry Pankratz, Vice President for Budget and Finance
- Mr. Timothy Shaw, University Attorney, ex-officio

Responsible Parties

- Dr. Lawrence Redlinger, Executive Director for Strategic Planning and Analysis
- Jim Michalek, Director, University Data Warehouse

External Agencies

The University of Texas System

- System Audit Office

State of Texas Agencies

- Legislative Budget Board
- Governor's Office
- State Auditor's Office
- Sunset Advisory Commission



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Background

With the implementation of PeopleSoft in FY11, UT Dallas did not have an effective process for internal and external reporting of information. As a result, UT Dallas developed a Data Warehouse that aggregates data directly from PeopleSoft.

These reports are utilized by the University for planning, performance assessment, and policy decisions. The Office of Strategic Planning and Analysis (OSPA) provides accurate, timely information and analytical support to the University community. In addition, reports which include information ranging from student, faculty, courses, degrees awarded and facilities utilization provide information are provided to the State Legislature, the Texas Higher Education Coordinating Board, Department of Education, and other state and federal agencies.

Examples of Data Warehouse Reporting

- Applicants and Admitted Students
- Orientation Summary - Freshmen
- Course Grade Distribution - All

The responsibility for managing data warehouse processes and reporting within the database falls under the Office of Strategic Planning and Analysis.

Audit Objective

To determine if adequate controls exist over the Data Warehouse to ensure the accuracy of financial information.

Scope and Methodology

The scope of this audit was FY18, and our fieldwork concluded on October 31, 2018. To satisfy our objectives, we performed the following:

- Gained an understanding of data warehouse operations and the PeopleSoft infrastructure environment
- Tested user access controls for user accounts and administrative access to both the operating systems and the databases
- Tested data import process controls for accuracy and completeness of information flow between the source and OSPA servers
- Tested the report change management process
- Evaluated the patch management process for applying security updates to data warehouse servers and databases



We conducted our examination in conformance with the guidelines set forth in The Institute of Internal Auditor’s *International Standards for the Professional Practice of Internal Auditing*. The *Standards* are statements of core requirements for the professional practice of internal auditing.

Additionally, we conducted the audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Audit Results and Management’s Responses

Strengths and Controls Noted During the Audit
An effective process exists to determine when user access needs to be terminated due to a change in employment status. Automatic reports identify any change in employee status and job titles, and access is then terminated by the OSPA team.
Default administrative accounts within the database were appropriately locked as recommended by Oracle, and default passwords were either changed following installation, or the account was locked.
Critical servers and databases are backed up.
Controls are in place to identify changes in the PeopleSoft database prior to the importation of data into the warehouse.

As outlined below, opportunities exist to strengthen controls around report change management, patch management, and records retention. Risk levels are defined in the Appendix.

Observation and Risk Level	Risk/Effect	Recommendation	Management’s Response and Action Plan
(1) Ensure Windows Servers Are Up to Date (Medium Risk) The report repositories are housed on Windows application servers, which are required by Texas Administrative Code (TAC) 202 and University of Texas System (UTS) 165 (state and UT System security	Without up-to-date patching, crucial security holes can be left open, leaving servers housing data exposed to security vulnerabilities	Establish a process to patch OSPA servers periodically directly from Microsoft Update.	Weekly the on-call person checks each of the four servers for updates from Microsoft and install them. Annual BIOS health check by OIT. Estimated Date of Implementation: 8/22/2018 (already implemented)



Observation and Risk Level	Risk/Effect	Recommendation	Management's Response and Action Plan
<p>laws and requirements) to be regularly patched.</p> <p>OSPA elected to manage patching in-house and their servers were not flagged by OIT to receive patches from the centralized patch process.</p>			<p>Person Responsible for Implementation: James Michalek, Director, University Data Warehouse</p>
<p>(2) Formalize Process for Tracking Changes to Reports (Medium Risk)</p> <p>TAC 202 requires that configuration changes be managed through a central process to ensure that changes are not implemented without approval.</p> <p>We found the following:</p> <ul style="list-style-type: none"> • OSPA did not have a formal process for report change management, and did not run routine checks to identify any changes made to report scripting. While most changes are made by a single staff member, multiple employees have the ability to implement scripting changes to reports. As a result, changes could be implemented without the approval of the Director of the Data Warehouse. • During the course of the audit, OSPA incorporated new processes to track 	<p>If the report change requests are not tracked, changes could be made without documentation or authorization.</p> <p>In addition, changes made without awareness could produce report inaccuracies.</p>	<p>OSPA should establish a process to track changes to reports to ensure changes are authorized and approved.</p>	<ul style="list-style-type: none"> • Expanded use of JIRA Issue Tracking software by Atlassian Corporation to document all projects that result in modifications to the database schema structures (includes report and processing logic). JIRA issues are opened, assigned and closed by the director. The assigned individuals document the proposed changes and obtain approval prior to making them. • Create schema comparison routines to automatically produce daily reports (or on demand) that document changes in the schemas (includes report and processing logic). <p>Estimated Date of Implementation: 8/02/2018 (already implemented)</p> <p>Person Responsible for Implementation: James Michalek, Director, University Data Warehouse</p>



Observation and Risk Level	Risk/Effect	Recommendation	Management's Response and Action Plan
<p>changes in report scripting/coding. The process reviews and compares the report logic daily and identifies changes.</p> <ul style="list-style-type: none"> Some changes are tracked through the university's JIRA issue tracking system, based upon the projected workflow to complete the task. A formal process to track report changes is not defined. Changes may not be fully documented with approval prior to implementation. 			
<p>(3) Determine Records Retention Requirements (Medium Risk)</p> <p>OSPA does not have a record retention process to review data and ensure that it is purged per guidance from the UTD Records Retention Schedule. Currently all daily reports ran by OSPA are maintained in archives indefinitely.</p>	<p>Maintaining information longer than required will result in noncompliance with the State of Texas and UTD record retention guidelines. In addition, noncompliance will result in excess OSPA records that could be subject to data loss or compromise.</p>	<p>OSPA should work with Environmental Health and Safety to determine which components of the Records Retention schedule apply to data maintained by the Data Warehouse. Additionally, OSPA should develop a policy requiring an annual review to ensure that the appropriate documents are deleted in accordance with the schedule.</p>	<p>UT Dallas had a report archival system called E-PRINT that was used to store reports generated from Human Resources, Budget, Finance and Student Information System applications. The UT Dallas Data Warehouse (UTDDW) performs a very similar function as E-PRINT. Data is extracted from systems of record and reports are generated and stored in the DW Report Archive. Below are the current record retention schedule, items for E-PRINT data:</p> <p>3.1 66 HUMAN RESOURCE SYSTEM (HRS) E-PRINT ELECTRONIC REPORTS – Permanent Record</p>



Observation and Risk Level	Risk/Effect	Recommendation	Management's Response and Action Plan
			<p>4.5 135a BUDGET INFORMATION SYSTEM (BIS) E-PRINT ELECTRONIC REPORTS – Fiscal Year End + 3 Years</p> <p>4.5 135b FINANCIAL REPORTING SYSTEM (FRS) E-PRINT ELECTRONIC REPORTS – Fiscal Year End + 3 Years</p> <p>774 STUDENT INFORMATION SYSTEM(SIS) E-PRINT ELECTRONIC REPORTS – Permanent Record</p> <p>Create a proposal to amend THE UNIVERSITY OF TEXAS AT DALLAS RECORDS RETENTION SCHEDULE along the lines of what has been documented for E-PRINT. If the schedule is amended to make all of these reports “Permanent Records” then this action will be complete. If these records (or some of them) are deemed to not be “Permanent Records” then UTDDW will be modified to classify the non-permanent records and create a structure and process for purging expired information. We consulted with both the UT System Associate Vice Chancellor and CIO David Crain and the Vice Chancellor for Strategic Initiatives Stephanie Huie as well as component IR directors.</p>



Observation and Risk Level	Risk/Effect	Recommendation	Management's Response and Action Plan
			<p>It was acknowledged that Data Warehouse operations are generally designed to retain information indefinitely and that there is no official System position as of this time on retention. Thus, each component should address retention issues locally.</p> <p>Estimated Date of Implementation: 12/31/2019</p> <p>Person Responsible for Implementation: James Michalek, Director, University Data Warehouse</p>

Conclusion

Based on the audit work performed, we conclude that while opportunities exist to enhance controls surrounding changes to reports, records retention, and patching, there are sufficient controls in place to ensure the accuracy of financial information.

We appreciate the courtesy and cooperation received from the management and staff in the Office of Strategic Planning and Analysis as part of this audit.



Appendix

Definition of Risks

Risk Level	Definition
<p style="text-align: center;">Priority</p>	<p>High probability of occurrence that would significantly impact UT System and/or UT Dallas. Reported to UT System Audit, Compliance, and Risk Management Committee (ACRMC). Priority findings reported to the ACRMC are defined as <i>“an issue identified by an internal audit that, if not addressed timely, could directly impact achievement of a strategic or important operational objective of a UT institution or the UT System as a whole.”</i></p>
<p style="text-align: center;">High</p>	<p>Risks are considered to be substantially undesirable and pose a moderate to significant level of exposure to UT Dallas operations. Without appropriate controls, the risk will happen on a consistent basis.</p>
<p style="text-align: center;">Medium</p>	<p>The risks are considered to be undesirable and could moderately expose UT Dallas. Without appropriate controls, the risk will occur some of the time.</p>
<p style="text-align: center;">Low</p>	<p>Low probability of various risk factors occurring. Even with no controls, the exposure to UT Dallas will be minimal.</p>