



Texas Department
of Motor Vehicles

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Registration and Titling System (RTS)
Refactoring and Single Sticker Post-
Implementation Review Audit Report
17-2

Internal Audit Division
April 2017

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Registration and Titling System (RTS) Refactoring and Single Sticker Post-Implementation Review, 17-2

Executive Summary

WHY AND WHAT WAS REVIEWED

In April 2015, the Registration and Titling System (RTS) legacy report tool was replaced with the Cognos enterprise reporting application. The Cognos application provided a modern platform to better analyze the RTS data and also provided the agency with the ability to conduct ad-hoc reporting. The RTS data is used by key divisions, specifically the Vehicle Titles and Registration and Finance & Administrative Services divisions, to make strategic and operational decisions.

The audit objective was to determine whether Cognos reports provide management and staff with complete and accurate information from RTS.

WHAT WE RECOMMENDED

The Information Technology Services (ITS), Finance & Administrative Services (FAS), and Vehicle Titles & Registration (VTR) work together to develop and provide training for internal agency Cognos users on the application’s method of data processing and the reporting limitations it inherently creates.

The Department should perform a detailed review of Cognos reports structure to understand the exact mechanics of the reports.

WHAT WE DETERMINED

The Cognos application is pulling data accurately according to its design. However, users were skeptical of Cognos data reliability and completeness, leading them to spend additional time and effort verifying Cognos report output to RTS source data to ensure reports’ accuracy.

User training did not cover the differences in data processing between the RTS reporting tool and the Cognos reporting application. The training provided consisted of tutorials on the mechanics of the user interface for application navigation and generating reports and exposure to Cognos reporting cubes during the User Acceptance Testing (UAT) phase.

The UAT exposure did not allow the user to see how the Cognos reporting application would be used once it was implemented. Further, the testing did not allow for validation of Cognos output with the underlying source data since the testing consisted of comparing the developed Cognos reports and the RTS reports to ensure the calculated results matched.

MANAGEMENT RESPONSE

Management agrees that training and report review will provide additional insight into how the system operates.

The Information and Technology Services Division will create and conduct a training curriculum and work with the Vehicle Title and Registration and Financial and Administrative Services divisions to review Cognos report structures by fiscal year end 2018.

Overall Conclusion

Maturity Assessment

3: Defined Process Level - The process has been standardized, documented, communicated, and is being followed. The process, however, may not detect any deviation due to the process not being sufficiently evaluated to address risks.

Other possible ratings and definitions can be found in Appendix 1, under Maturity Assessment Rating Definition.

Strengths

The Texas Department of Motor Vehicles' (TxDMV) development and implementation of Cognos included business requirement and design input from the intended end users. The Cognos reports and cube functionality was built according to the business requirements and design.

Improvements

The TxDMV needs to identify and communicate to Cognos users the Cognos application's data processing methods and the resulting considerations that users must make when interpreting Cognos report output.

Below are the audit results that further expand on these areas. The detailed audit results can be found under the Audit Results section of this report.

Audit Result #1: The Cognos Reporting Application Functioning Correctly Despite Lack of User Exposure into how Reports are Produced

Background

The Texas Department of Motor Vehicles implemented the Cognos enterprise reporting application in April 2015. The application replaces the Department's Registration and Titling System (RTS) reports throughout the Department, notably the Vehicle Registration and Title Division and the Financial and Administrative Services Division, rely upon the Cognos reporting application for business intelligence. The application allows Department users to generate ad-hoc reports on motor vehicle transaction and financial information. The Department uses Cognos to provide information to the public, oversight agencies, and its Board of Directors.

However, the reliability of the Cognos reporting application has been questioned by the Department as it continues to experience multiple, repeated instances of reported actual transactions not matching projections or other expected correlated data.

The Cognos application development consolidated approximately 900 RTS reports into 49 pre-built reports and 7 report cubes. The report cubes are capable of querying and filtering by multiple attributes of motor vehicle transactions simultaneously. The cubes provide a snapshot of motor vehicle transaction data available at the time a query is run. Cognos analysis report cubes and 10 pre-built reports pull from data stored in data marts. These data marts consist of copied and aggregated motor vehicle transaction information from the RTS and the RTS Point-of-Sale application. The aggregated information includes vehicle attributes (make, model, year, color, county, etc.) but loses transactional detail (transaction ID number, document number, etc.). The data marts copy RTS and Point-of-Sale data weekly.

This audit was included in the Fiscal Year 2017 Audit Plan. We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards and in conformance with the Internal Standards for the Professional Practice of Internal Auditing. These 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.

The audit was performed by Derrick Miller (Senior Auditor) and Sandra Menjivar-Suddeath (Internal Audit Director).

In accordance with the Texas Internal Auditing Act, this report is distributed to the Board of the Texas Department of Motor Vehicles, Governor's Office of Budget, Planning, and Policy, Legislative Budget Board, State Auditor's Office, and the Sunset Advisory Commission.

Audit Results

The Cognos Reporting Application is Functioning Correctly Despite Lack of User Exposure into how Reports are Produced.

Condition

Department users were skeptical of Cognos data reliability and completeness, leading them to spend additional time and effort verifying Cognos report output to RTS source data to ensure reports' accuracy. However, the Cognos application is pulling data accurately according to its design.

Cause

The Vehicle Titles and Registration (VTR) Division has identified and experienced multiple instances of data reliability issues stemming from Cognos performance issues such as failure to populate report fields and errors in data loading that prevented transactions from getting into the vehicle titles reporting source tables.¹

The Cognos user training did not cover the differences in data processing between the RTS reporting tool and the Cognos reporting application. For example:

- Source data in the data marts may not account for all days in a month when a monthly reporting period ends during the work week. Data marts are batch updated every Friday. The data set may be missing some days from the reporting period, or include additional days outside of the reporting period.
- Cubes and reports using snapshot data are inherently incapable of producing historical information. Cognos reports and cubes operate using either transactional data or snapshot data. Transactional data is based on a count of the number of record creations, edits, and deletions that have occurred in a given period. However, snapshot data provides only the number of transactions contained within the system at the time of the query.

The training provided to users consisted of tutorials on the mechanics of the user interface for application navigation and generating reports and exposure to Cognos reporting cubes during the User Acceptance Testing (UAT) phase.

The UAT exposure did not allow the user to see how the Cognos reporting application would be used once it was implemented because the testing environment did not allow testing of cumulative transaction sets and instead used a separate transaction set for each specific testing element. Further, the testing did not allow for validation of Cognos output with the underlying source data since the testing consisted of comparing the developed Cognos reports and the RTS reports to ensure the calculated results matched.

Effect

Department staff spends additional time and effort, after creating reports, verifying Cognos output with RTS data attempting to ensure information is accurate and valid on a case-by-case basis.

¹ Cognos performance issues were not included within this audit's scope of work. The Department had a concurrent task force of Department staff, multiple vendors' staff, and Department of Information Resources staff analyzing re-emergent RTS issues, their root cause, and the methods taken to correct them.

Criteria

Best practice for the System Development Life Cycle should include a user training plan that accounts for the technical skills and knowledge end users will need to minimize productivity losses. The Department of Information Resources' project delivery framework also recommends testing of data contained within the system and data used by the system. Testing of data ensures that the item under test accepts or delivers all and only the data intended for that item, in the form, format, and frequency that is correct for that item.

Recommendations

The Internal Audit Division recommends:

- 1.1 The Information Technology Services (ITS), Finance & Administrative Services (FAS), and Vehicle Titles & Registration (VTR) work together to develop and provide training for internal agency Cognos users on the application's method of data processing and the reporting limitations it inherently creates.
- 1.2 The Department should perform a detailed review of Cognos reports structure to understand the exact mechanics of the reports.

Management's Response and Action Plan

The Vehicle Title and Registration (VTR) and Financial and Administrative Services (FAS) divisions agree that there should be training on the application method of data processing and the reporting limitations. Additional training on the functionality of cubes within the COGNOS application and a detailed review of Cognos report structures would be useful. Both VTR and FAS staff would participate in any future agency training. Furthermore, FAS staff who worked with legacy RTS data will consult with new COGNOS users to ensure the system's strengths and limitations are known.

The Information Technology Services (ITS) division will develop and present Cognos training for internal Department users. ITS will also work with VTR and FAS to conduct a detailed review of the Cognos reports to identify and communicate the reporting functionality to compare with business needs. The VTR or FAS divisions can assist in reviewing the documentation provided by the ITS to determine if the system and reports are performing as expected.

However, the VTR and FAS divisions do not have the technical expertise regarding how or when the information is being loaded into the system or the queries the system is using to create the reports, and therefore would not be able to assist in the development of the training curriculum.

Given the Department's priorities with multiple ongoing capital I.T. projects and the current legislative session, ITS expects to complete the Cognos training program by the end of 2nd quarter fiscal year 2018 (2/28/2018) and the Cognos report review by fiscal year end 2018 (8/31/2018).

Management Action Plan Owner: Eric Obermier, Chief Information Officer

Anticipated Completion Date:

Recommendation 1.1	2/28/2018
Recommendation 2.2	8/31/2018

Appendix 1: Objectives, Scope, Methodology, Maturity Assessment

Objectives

The objective of this audit was to determine whether Cognos reports provide management and staff with complete and accurate information from the Registration and Titling System.

Scope and Methodology

The scope of this audit included the Cognos report business requirement, development, and testing documentation prior to implementation of the Cognos application in April 2015, and Cognos related training materials provided prior to and upon implementation in April 2015.

We reviewed Cognos report structures and the data tables and data definitions queried by the reports to determine if the reports were pulling information accurately according to their design. We were unable to directly verify the report output against the RTS source data due to 1) data aggregation into data marts making one-to-one transaction verification impossible, 2) the snapshot nature of some report information made it impossible to reliably recreate reports based on a specific data set.

We reviewed Cognos application development documentation and user acceptance testing results to determine whether the Department approved adequate report design to produce the desired information. We also reviewed user training materials and presentations to assess whether crucial information in using Cognos reports was communicated to end users.

We did not perform root cause analysis for performance or data reliability issues, as these items were deemed out of scope. The Department had a concurrent task force analyzing re-emergent RTS issues, their root cause, and the methods taken to correct them.

Information and documents that we reviewed included the following:

- *Report 9522 Registrations by Class Description*
- *Current Vehicle Registration Report*
- *Registration by Class Code query*
- *Data definitions for query tables*
- *Workstream 3 (Cognos) requirements gathering sessions*
- *Design session attendance log*
- *Deloitte Enterprise Reporting Capability Transition Phase Software Specifications Report*
- *Cognos User Acceptance Testing results*
- *AVNet Academy Student Roster*
- *Registration and Titling System (RTS) Refactoring Project Workstream 3 Cognos Training presentation*
- *RTS Project Working with Cognos Reports and Cubes webinar presentation*
- *TxDMV RTS Training Guide for Working with Cognos Reports*
- *Cognos data architecture approach*
- *Interviews with Department division directors, staff-level report users, and development testing staff.*
- *Interview with Deloitte Cognos development personnel*

Maturity Assessment Rating Definition

The maturity assessment rating and information were derived from the Control Objectives of Information and Related Technologies (COBIT) 5 IT Governance Framework and Maturity Model and the Enterprise Risk Management (ERM) Maturity Model. The model was adapted for TxDMV assurance audit purposes and does not provide a guarantee against reporting misstatement and reliability, non-compliance, or operational impacts. Below are the definitions for each rating level.

- 0 - A rating level of 0, also known as a non-existent process level, is defined as no process has been defined or used.
- 1 - A rating level of 1, also known as an initial and ad-hoc process level, is defined as a standardized process has not been developed and an ad hoc approach is being used when issues arise.
- 2 - A rating level of a 2, also known as repeatable but intuitive process level, is defined as having developed standardized process to where similar procedures are being followed by several people.
- 3 - A rating level of a 3, also known as a defined process level, is defined as having a standardized, documented, communicated, and followed process. The process, however, may not detect any deviation due to the process not being sufficiently evaluated to address risks.
- 4 - A rating level of a 4, also known as a managed and measurable process level, is defined as having a standardized, documented, communicated, and followed process. Management monitors and measures compliance with process. Process is under constant improvement and provides good practice.
- 5 - A rating level of a 5, also known as refined level, is defined as having a good process (e.g., standardized, documented, communicated, and followed process) based on the results of continuous improvement and the use of technology. Information technology is used in an integrated way to automate workflow, providing tools to improve quality, and effectiveness.