Texas Department of Motor Vehicles
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MODERNIZING TEXAS' REGISTRATION & TITLING SYSTEM

Emerging and Innovative Technologies

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Texas Department of Motor Vehicles (TxDMV)

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EXECUTIVE SUMMARY

In 2013, the Texas Department of Motor Vehicles (TxDMV) had just begun a series of modernization initiatives. Mission critical applications developed over a number of years and on a variety of complex technology platforms were costly to maintain, inflexible, and lacking analytic capabilities the agency needed to draw insights from data and improve business operations. The Registration and Titling System (RTS), built on ADABAS/Natural, had been online since 1994. The COBOL-based vehicle identification system had been active for almost as long. For the most part the systems were reliable and contained valuable business rules that had been developed and refined over a number of years. However they were becoming costly and challenging to maintain and their lack of agility impeded significant business process improvements.

THE SCALABLE, AFFORDABLE INNOVATIVE CHANGE THE DEPARTMENT NEEDED

"It was as if our system was driving our processes rather than the other way around. We realized that - in order to make the changes needed to serve our customers better - we were going to need a more agile system."
- Whitney Brewster, TxDMV Executive Director

While the need for modernization was clear, it had to be accomplished in a manner that didn't impede the daily operations of TxDMV and its stakeholders. In addition to TxDMV staff, RTS is used by approximately 3,000 users, including locally elected tax assessor-collectors (TACs) and their staff, across all 254 counties in the state. RTS is used to record the registration and titles of more than 24 million vehicles in Texas each year. Law enforcement submits close to 9,000 queries to the system every hour. Simply put, RTS is critical to TxDMV's mission and that of its stakeholders including counties, law enforcement, and the motoring public. Exhaustive end user training, extended downtime, and a code freeze related to implementation of a new system were not viable options.

TxDMV launched a core modernization initiative designed to update critical systems, address technology costs, and help extract more value from long-standing IT investments by making them more agile. Agency leaders decided to refactor the code base to a new Java-based platform that featured revamped relational data models to facilitate new business functionality and the desire for enhanced reporting. In collaboration with Deloitte, TxDMV refactored RTS in just over two years and went live on November 23, 2015. The automated refactoring approach used by Deloitte to modernize the system enabled 700+ screens, 1.4 million lines of code, 3,000 batch jobs and 120 ADABAS Database System files in RTS to be refactored to modern technologies in only 24 months. The refactoring project was accomplished with minimal training of county users, manageable code freeze, and down time for transition from the legacy system to the refactored system was limited to one weekend. Because the refactored application code is similar in nature

to the legacy application code, TxDMV IT staff is actively engaged in the ongoing enhancements and modernization of the refactored RTS. In fact, developers that were previously Natural developers are learning java and re-tooling their skillset.

With the core mainframe data structures refactored to a relational structure in DB2, TxDMV gained significant enhancements to their enterprise reporting capabilities with the implementation of the modern IBM Cognos reporting platform as well as the creation of an enterprise data warehouse using Informatica PowerCenter. County and state users had previously relied on hard copy paper reports spooled to printers by the mainframe each day. Now new tools such as multidimensional data cubes, on-demand canned reports and user-friendly ad-hoc queries have exposed data so that users can make more informed and timely business decisions.

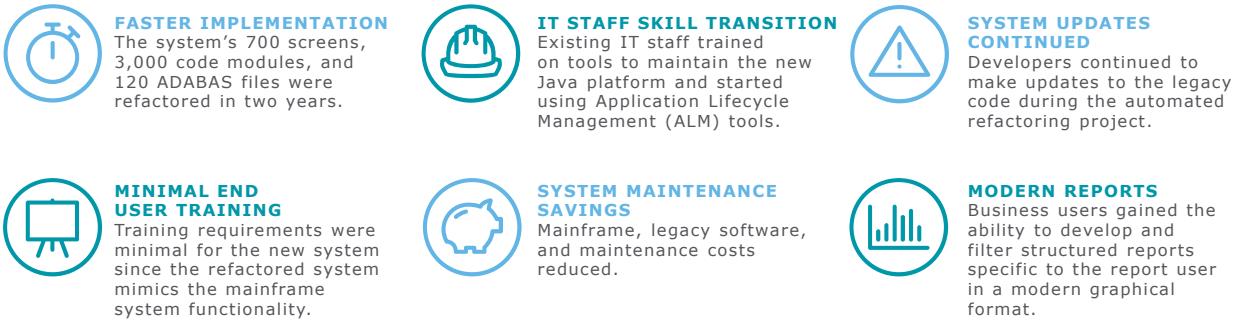

Figure 1: Key Benefits of Automated Refactoring

The move off the mainframe and elimination of costly legacy licenses has resulted in software and infrastructure savings that better allow TxDMV to continue investing in system improvements. Since go-live in November 2015, TxDMV has been incrementally modernizing the refactored RTS using an iterative, quarterly release schedule that allows business and IT stakeholders to prioritize ongoing enhancements based on business and legislative needs.

A first-of-its-kind in the motor vehicle market, the automated refactoring approach allowed TxDMV to meet its system modernization objectives, minimized disruption to operations and stakeholders during transition, and was delivered well within the three year timeframe originally required for the refactoring project. TxDMV's use of this innovative, transformative technology makes it an excellent candidate for recognition by NASCIO for Emerging and Innovative Technologies.

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CONCEPT

TxDMV was keenly aware that a number of motor vehicle agency modernization projects across the county failed in prior years. Faced with technical challenges and rapidly changing business needs but unwilling to take on operational risks and saddle taxpayers with the cost of a ground-up rebuild or customized package implementation, TxDMV chose automated refactoring as the solution to modernizing RTS. This approach focused on keeping what works and focusing effort on the areas requiring improvement. To get there, the technology required refactoring first, followed by incremental modernization. "One-to-one" refactoring moved the legacy application user experience, code, and data to a modern architecture but retained existing processes and business logic.

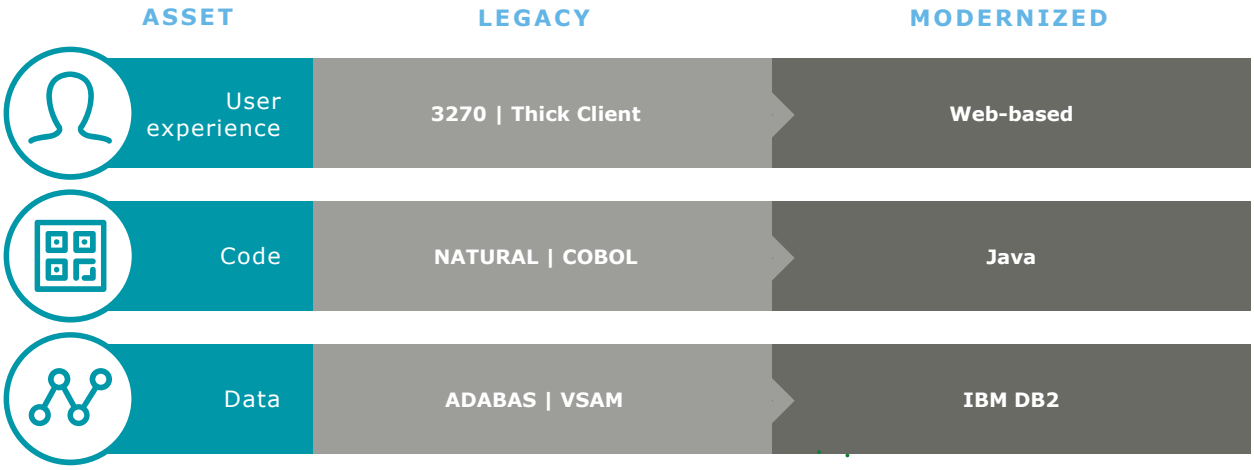

Figure 2: Automated Refactoring Moved RTS Assets from Legacy to the Modern Architecture

This approach allowed TxDMV to verify the refactored application running on the modern architecture worked exactly as the legacy application did. Once the refactoring step was complete and the application verified, TxDMV was able to move on to enhancements prioritized by agency leadership. This approach minimized risk, accelerated delivery, and provided the business benefits the state desired relative to moving to a modern, flexible architecture.

SIGNIFICANCE

Following a number of unsuccessful DMV modernization projects across the country, TxDMV selected a first-of-its-kind approach to system modernization in the DMV

market. The project not only successfully migrated the legacy platform to the new Java-based platform and established a common enterprise architecture, the department also achieved its project goals incrementally with manageable risk, transitioned IT resources to the new technology more seamlessly, and started allocating more budget for new enhancements rather than increasing legacy maintenance.

IMPACT

In IT terms, the DMV's Application Modernization project satisfied the project's technical objectives. But "IT for IT's sake" is not the reason organizations invest in a process like this. As a result of the refactoring project, TxDMV and its stakeholders have realized a number of tangible business benefits:

ENHANCED CUSTOMER-CENTRIC CAPABILITIES WITH MINIMUM ORGANIZATIONAL IMPACT

The department's end users include county based elected Tax Assessor Collectors and their staff. Minimizing downtime and up front training requirements was critical to the success of the modernization of RTS. The refactoring stage of the project achieved that goal by maintaining legacy system functionality. Shortly following go-live of the refactored system, high priority enhancements were implemented. For example, in the legacy system, end-users could only search for a number (VIN) but not by the owner's name or address. Using the new modern Java-based architecture and modernized screens, the refactored system allows RTS users to search by name, receive search results, select the person, and even drill down to view additional details. This capability has improved the customer experience and results in fewer customers being turned away at the counter when they do not have their license plate or VIN information.

IMPLEMENTATION OF LEGISLATIVE CHANGES

During the refactoring project, the Texas State Legislature enacted a single-sticker system that combined proof of registration and inspection into one sticker versus separate inspection and registration stickers. Because refactoring is fully automated, the technology allowed these major system changes to be made in the legacy environment and refactored to Java as they were implemented by TxDMV. Had an extensive code freeze been required during modernization, this significant single sticker change could not have been absorbed or would have created a delay in the project. Instead, the changes made to the legacy system were automatically

refactored and deployed in time to meet the statutorily required date for implementation.

AUTOMATION OF BUSINESS PROCESSES

TxDMV's registration and titling system relies on imaged and indexed paper forms in a content management system. The legacy interface required "screen scraping" with a third party tool that was no longer supported. Application Modernization replaced that function with a modern interface that reduced human intervention while providing data validation and error handling.

ENHANCED AGENCY REPORTING

A priority for TxDMV in the first year of modernization was to enhance its abilities relative to financial reporting. Deloitte used the IBM Cognos reporting platform to decommission or condense more than 1,000 legacy reports primarily written in COBOL into 27 customizable, parameter-based reports, easing the overall maintenance load and directly providing the business flexibility to the end user. As a result, TxDMV has changed the way it accounts for money collected at local offices and addressed issues related to possible fraud and misconduct.

ENHANCED SYSTEM ARCHITECTURE

The DMV's system was moved from a mainframe to a modern, scalable, Linux-based environment that allowed the department to incorporate open source third-party products, integrate with cloud-based applications, and to set up its application lifecycle management structure in a way that supports iterative releases.

ROADMAP FOR THE FUTURE

What modernization needs will emerge next for TxDMV? This project laid the foundation for the future of the Registration and Titling System. Now that the system is on the java platform, segments of code can be upgraded and streamlined in place in an incremental fashion aligned with TxDMV's priorities. Repetitive code segments can be consolidated into reusable components, business rules can be extracted into a rules engine. Release planning provides the roadmap for the future by setting an iterative release schedule with TxDMV's prioritized enhancements in each release.

In summary, the RTS Refactoring project has allowed TxDMV and the State of Texas to modernize a mission critical system while avoiding significant downtime and minimizing the issues that have plagued unsuccessful efforts in other jurisdictions. This innovative, risk-reducing approach is a model for other

organizations in Texas and nationally, and therefore makes it an excellent candidate for recognition by NASCIO for Emerging and Innovative Technologies.