Appendix 2-02

REVENUE INFORMATION SYSTEM REPLACEMENT PLAN

State of Wyoming
Department of Transportation
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Contents

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1. Introduction & Executive Summary

1.1 About This Report

Mathtech, Inc. was engaged by the Wyoming Department of Transportation (WYDOT) to assist in creating a plan for modernizing its primary computer systems known as the Revenue Information System (RIS). This included:

- Review and Evaluation of Current and Future Business Needs
- Assessment of Current Environment
- Review of Similar Modernization Projects and Available Approaches
- Development of a Strategic Plan for RIS Modernization

This document is the final Strategic Plan for RIS Modernization and it was developed in collaboration with senior leadership and user groups representing the following business functions:

- Driver Services
- Motor Vehicle Services
- Driver History Management
- Highway Patrol
- County Clerks & Treasurers
- Information Technology
- Financial Services
- Wyoming Enterprise Technology Services
- Wyoming Attorney General's Office

1.2 Executive Summary

1.2.1 Project Background

Modernization Goal

WYDOT operates with a substantially antiquated computer system, the Revenue Information System (RIS), and sought to begin the planning process to modernize this system. Modernization projects are complex and include enterprise technology planning, business process modernization, and large-scale system development and implementation. In short, large modernization projects are complex and an opportunity to transform the organization.

Mathtech – Planning Vendor

WYDOT engaged Mathtech, Inc. to conduct a planning engagement. Mathtech has a 50-year history serving clients with complex projects. Mathtech is active in the AAMVA (American Association of Motor Vehicle Administrators) community and has experience planning and implementing motor vehicle system modernization projects working with jurisdictions including PA, NJ, NY, MN, WA, WI, MD, and others. Mathtech started work with WYDOT in April 2018 and delivered this final report in October 2018.

The project included working with the team on-site and off-site to complete this modernization plan deliverable including:

- Limits of the current RIS system
- Modernization Options Analysis
- Desired New Functionality
- Recommendations for Next Steps

1.2.2 Status of the Current WYDOT RIS System

The Revenue Information System (RIS) is a 40+ year old COBOL/CICS mainframe system that supports WYDOT's key driver licensing and vehicle functions. The RIS system is completely outdated and difficult to maintain because of the technology, its design, and the limited number of staff who still understand and can support the system. Small changes and large ones require a substantial amount of time, resources, and risk to implement.

WYDOT finds itself "frozen in time" and unable to modernize operations or provide new services such as online transactions because the system cannot accommodate such enhancements and the burden of ongoing maintenance is a distraction.

System Deficiencies – Some of the RIS system deficiencies include:

- **Difficult to Support New Legislation or Customer Service Improvements** – Because of the difficulty in changing or enhancing the system
- **Poor Support for County Motor Vehicle Operations** – including insufficient access, poor data synchronization, and data quality problems
- **Poor Support for Law Enforcement** – Including out-of-date vehicle information, missing driver photos, unclear driver history information, and no temporary vehicle registration data
- **Limited Data Analysis and Reporting Capabilities** – Due to of outdated technology, limited analytical tools and limited data
- **No Support for Business Licensing** – Transaction are performed manually and no business licensing data is provided to consumers
- **Forces WYDOT into Paper-Centric Operations –** Due to the age of the systems and the inability to enhance them or interface them with newer technologies
- **Insufficient Data Management** – The system does not collect or manage the wide range of information needed by WYDOT and its dependent stakeholders

Lack of Stability

The RIS system is one of the most high-profile systems in the state. It is also an aging system with a complex combination of programming logic, software, data, and hardware – all of which are designed to work together. Changes to any part of any component must account for the dependencies on the other components and an improper change or enhancement can crash the entire system impacting Driver Licensing, Commercial Drivers, Law Enforcement, Voter Registration, Titling, and Registration services.

In the past year WYDOT has experienced multiple outages.

Very Limited Support

As is typical with older mainframe systems, there are resource challenges that make supporting and enhancing the system difficult and risky. This is the case for WYDOT and ETS as well.

There are only two resources with the knowledge to support the system and respond to outages, one of which is a contractor resource with a planned retirement in about 2 years.

1.2.3 System Scope

A modernized RIS system must support all of the WYDOT operational areas as they are all interconnected through common customer and vehicle information. This includes back-office operations, field office operations, and web based services made available to customers and partners. This scope includes the following:

- **Driver Licensing Services** – driver and commercial license issuance, medical, vision, knowledge and road tests, learner permits, graduated driver licensing, identification cards, organ donor, and disabled parking placards

- **Driver History Services** – suspensions, restorations, driving record maintenance, and ignition interlock tracking
- **Vehicle Services** – collection and consolidation of titling and registration, title searches, specialty plates, abandoned vehicles, lien filing, and compliance data from county processing
- **Business Licensing Services** – full licensing tracking and management of businesses such as rental companies, dealers, and salvage yards
- **Revenue Management functions** – collection, consolidation, and tracking of customer transaction financials and payments and integration with the Oracle Financial System

1.2.4 Vision for Moving Forward

A modernized RIS system would not only address deficiencies but offer new capabilities to improve customer service and operational efficiencies and offer a stable, supportable technical platform. Important new capabilities should include:

- **Modern, Integrated, Flexible Systems** – Provides current, supported technologies and tools that offer enhanced features that promote easier maintenance, reliability and security.
- **360 Degree View of Customer Information** – Provides a consolidated view of all customer information allowing for better customer service as well as fraud detection. As allowed, consolidated information could include a photo, list of issued products with expiration dates, interactions, alerts etc.
- **On-line WYDOT and Full Featured Web Site** - Provides new tools and capabilities for customers that will let them serve themselves, answer questions, and better understand DMV processes. As tools and processes improve, more functions can be offered online in a secure manner.
- **Improved Reporting and Financial Management** – Provides improved tools to access clean, accurate data to support analysis and reporting supporting planning and improved management
- **Improved Customer Service and Convenience** – Provides consistent guidance and information to staff to quickly provide customers answers ranging from automated assessments of driving records to comprehensive customer interaction logs.
- **Engage Partners and Customers for Self Service** – Allows partners and customers to complete transactions and perform self service functions to meet their needs and improve their experience.
- **Full Support for Counties & Law Enforcement** – Provides real time data for better decision making and accurate transaction processing across the entire state.

1.2.5 Market Assessment

Modernization efforts are large and complex. DMVs around the country have had mixed results in modernizing these complex systems; meaning many failed and some successful projects. Many vendors are no longer providing DMV solutions due to their inability to successfully deliver.

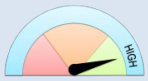
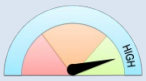
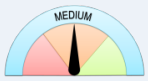
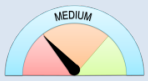
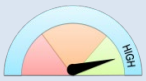
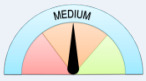
Currently, there are approximately six active vendors in the DMV marketplace pursuing new projects. Of these active vendors, there are varying degrees of successful implementations. Some vendors are general system integrators and others focus on very specific solutions or approaches.

Some vendors have chosen to use a custom approach to developing software which effectively means “starting from scratch”. Other vendors such as Tech Mahindra and IDEMIA (formerly MorphoTrust) have leveraged a customer management system from Microsoft (Microsoft Dynamics) as the foundation for their system development. One vendor, FAST Enterprises, offers a COTS product that can be configured and customized.

1.2.6 Options for Moving Forward

System Development Approach

As WYDOT assesses how to approach a modernization effort, there are many options to consider. Each option has strengths, weaknesses, cost, risk, and time considerations. Approach options are summarized below:

Approach	Success Rate	Ability to Meet Needs	Pro	Con
Pre-Built Configurable System (COTS) ✓ Preferred Approach	High 	High 	■ Ready to Use ■ Adaptable ■ Implements Best Practices ■ Ongoing Upgrades	■ Reliant on Vendor ■ Don't "Own" System ■ Some Process Changes May Be Required
Refactor (Code Conversion)	Med 	Low 	■ May Require Less Staff Participation ■ Gets Off Aging Hardware	■ No Real Enhancements in Functionality ■ Doesn't Solve Long Term Maintenance Challenge or Improve Staff knowledge of the system ■ Doesn't fix poor code structures and expects existing documentation
Custom Built	Med/ Low 	High 	■ Execute & Spend at Own Pace ■ Own All Software	■ Costs Not Always Manageable ■ Slow to Deliver ■ Very High Skill Sets Requirements ■ In-house Staffing Levels Not Typically Available
Transfer from Another DMV	Low? 	Med 	■ Possibly Own All Code ■ Possibly Less Expensive	■ Possibly Inheriting Another Mess
Do Nothing	Low 	Low 	■ Easy	■ Potential Software Failure and Inability to Support New Functions and Requirements

Hosting vs Onsite Considerations

In addition to the type of solution approach described above, WYDOT also needs to consider where the solution will reside and the support model. There are 2 options as described below:

Approach	Pro	Con
On-Site Systems	▪ Manage and Control Everything – Systems, Data, Infrastructure	▪ Requires Hardware and Software Investment ▪ Requires Maintenance Staff or Contract ▪ Requires Disaster Recovery Planning
Cloud Based Systems ✓ Preferred Approach	▪ Vendor Procures and Manages System ▪ Vendor May Have Cost Sharing Across Multiple Customers	▪ Requires Robust Infrastructure ▪ Systems and Data are off-site

1.2.7 Challenges & Risks

As WYDOT moves forward with modernization it must consider a range of challenges and preparation tasks which should be addressed to reduce risk.

- **County Autonomy for Vehicle Operations –** Variations in operations, data quality, and business processes complicate improvements as well as the time to receive and process county data into the statewide RIS system. A plan for consolidation or tighter integration must be developed.
- **Plate Numbering Scheme** – Wyoming will incur additional costs to maintain the current plate numbering system. Clear, accurate data and plate numbers which can be easily distinguished supports reporting, law enforcement and analysis. Modern systems with standardized rules and tracking will force a consistent, unique plate numbering scheme. While it is possible to implement a system that allows duplicate plate numbers across different plate types (backgrounds) it is not a practical or typical of a modern solution.
- **Data Quality** – Current data is accessible, but cleanup is required before implementing a new system. Some data quality problems are related to county operations and variations in standards. A data quality assessment should be planned, and a data management strategy should be developed with the counties so that moving forward with a new system does not bring along bad data or data management practices.
- **Available WYDOT Staff and Skills** – Current technology teams are spread thin and there are no in-house IT skills to support the RIS system which presents a business continuity risks when problems occur and a shortage of staff to support modernization preparation and implementation. WYDOT must assess their in-house project management expertise and if outside skills are needed to supplement state teams.

1.2.8 Potential Schedule

RIS modernization is not a single project. It should be broken down into subprojects that ultimately achieve the full modernization over a multi-year period. These subprojects include both preparation and procurement activities as well as the implementation. Preparation work is typically 6-12 months or more, procurement is typically 12-24 months and implementation is typically 36-48 months.

Key activities include:

- **Coordinating with County Operations** – WYDOT needs to determine how Counties will use the new system including the plate numbering scheme and getting agreements on how separate systems will work together or a consolidated system will be created. In either case WYDOT will need to plan and

implement a system that fully supports the full range of motor vehicle service offered to residents in the state.

- **Data, Process and Requirements Analysis** – WYDOT needs to assess the current status, gaps, and improvements needed in these areas so they can be addressed with a new system. Data cleansing before conversion to a new system is a best practice that takes time. A poorly designed process should be implemented in a new system without improvements. A full understanding of requirements can help select the appropriate solution and support model.
- **Infrastructure Analysis and Preparation** – WYDOT needs to assess the workstation configurations and network bandwidths to verify that these would support a new, more GUI/image-based transaction processing and start the process for upgrades if needed. Some of this work can begin now and some may need to wait until the needs of a selected solution are more clearly identified.
- **Procurement -** A comprehensive RFP must be developed to procure a new system. This includes defining functional requirements, technical requirements, hosting requirements, delivery requirements, and support requirements.
- **Functional Implementation –** Modernized systems are typically implemented in phases organized by functional areas. For example, Driver Licensing and Vehicles would be 2 phases, each implemented in 18-24 months.

1.2.9 Staffing Requirements

All modernization projects require participation from a broad set of skills and stakeholders. The future WYDOT system modernization team could be a combination of in-house and contractor staff and would be typically be at least 10 members of IT, Business and Project Management type staff.

An additional burden on staffing is the need to focus on the planning and development of the new systems while also maintaining the existing systems and, in some cases, expand the existing systems to meet legislative and other functional needs. Every state deals with this challenge. Some states leverage vendors and staff supplementation, some hire new project staff, and some hire new staff to make existing staff available.

The following represents a core team that WYDOT should assemble and prepare as the modernization team. Assembling this team also requires planning to backfill their daily responsibilities or otherwise support operations.

IT Staff – 4 technical staff would provide the core support for a variety of technical responsibilities including:

- Data analysis, interpretation, and conversion guidance
- Interface management and planning integration with other systems such as the Driver License production system
- Architecture planning and implementation
- Infrastructure preparations and support planning

Business Staff – 5 business/operations staff would provide the core of a functional team responsible for defining the operations of the system including:

- Defining business rules and calculations
- Defining process flows and transaction requirements
- Defining and designing new notices, products, and correspondence
- Assessing changes to current operations to fit the new system
- Approving all system functions
- Guiding and conducting acceptance testing

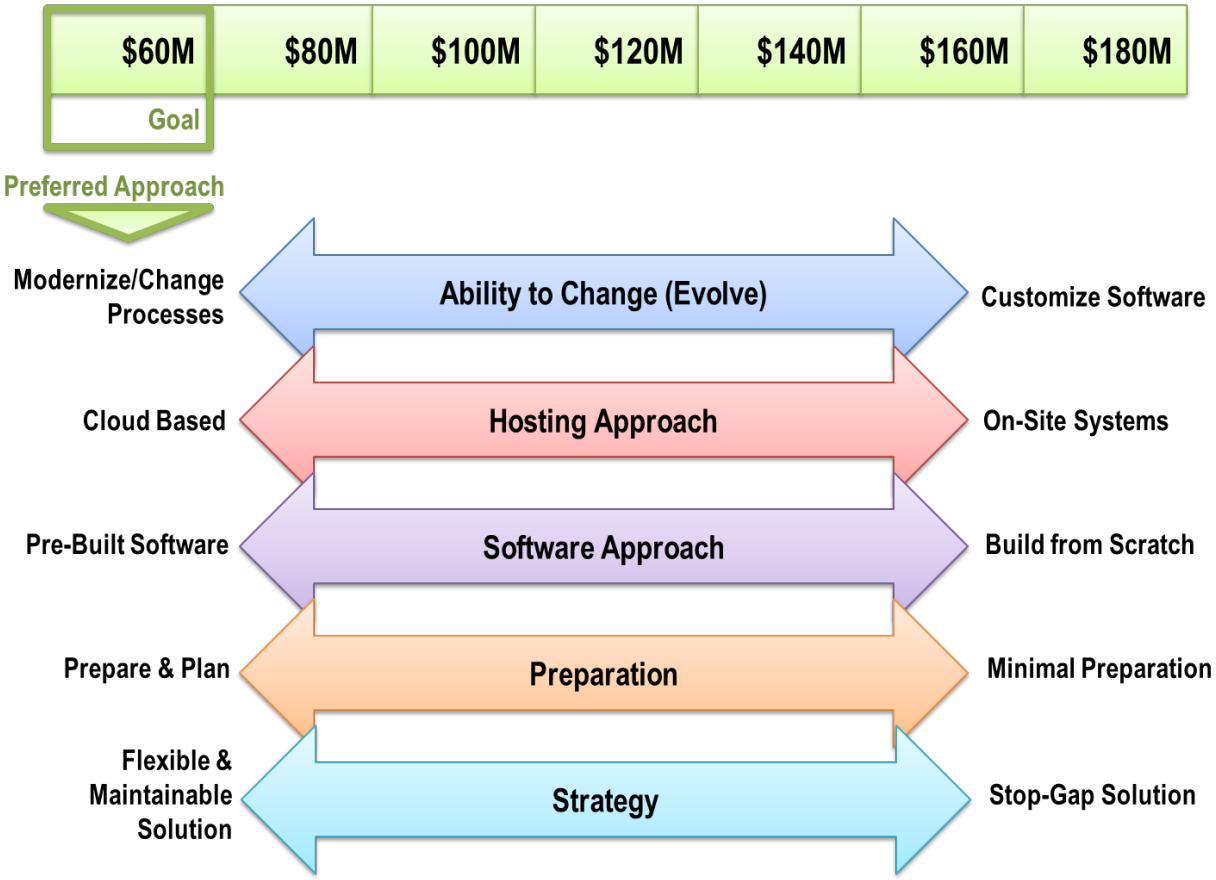
Project Management Staff – 2 project managers would lead and oversee the project for WYDOT. Their responsibilities would include:

- Coordinate WYDOT resources and ensure WYDOT commitments are met

- Oversee implementation vendor activities and approve deliverables and progress
- Coordinate with all stakeholders
- Coordinate and collaborate with supporting consultants such as a project management support vendor
- Manage project risk, engage governance, and overall project management

1.2.10 Estimate Project Costs & Funding

The related costs of a modernization project for WYDOT are significant and detailed planning is needed. An estimated 10 year overall total cost including approximately 5 years of implementation and 5 years of ongoing support is between $68 Million and $172 Million. This is a wide range and many factors impact the final costs. The costs and overall project expenses year to year will vary depending upon the approach and the report details some options. The chart below shows the factors that will impact the costs.



States use a variety of funding approaches for large projects including:

- **Capital & Operating Expenditure**
  - State "general" funding is a typical approach and this is the most common strategy used by states, even when confronting an up-front purchase.
- **Fee Increase**
  - Some states have used a technology fee which is added to customer transactions to fund the project.
  - A fee of $5 to $12 per transaction could cover the expected project costs.
- **Vendor Charge**
  - Some jurisdictions may allow for a convenience or transaction fee to be charged by the vendor implementing the system. This fee would need to apply to all transactions, not just web transactions.

1.2.11 Next Steps

There are clear preparation steps that WYDOT can move forward with and they have direct benefit to WYDOT regardless of the timing of modernization. This preparation work includes:

- Data Analysis & Preparation
- Interface Analysis & Preparation
- Requirements Analysis & Preparation
- Vendor Demonstrations and Investigations

Additionally, WYDOT needs to secure a support team for the RIS system that can understand and support the system both for maintenance and troubleshooting as well as enhancements as needed. The preparation projects will also support this objective.

2. Background

2.1 About Mathtech

Mathtech is a strategy and consulting services firm with offices in New Jersey, Virginia, and Arizona. With over 50 years of experience serving federal, state, and local government agencies, nonprofits, and commercial organizations, Mathtech has built a solid reputation for successfully completing projects and working collaboratively with our clients. Mathtech Inc. evolved as the strategy and consulting arm of Mathematica, Inc., a professional services firm located in Princeton, NJ. The company has been employee-owned since 1986. Mathtech leverages industry leading methodologies, staff expertise, and a wealth of best practices and tools to deliver consistently clear approaches and solutions for our clients' projects.

Mathtech has successfully serviced large and small projects across the country, from Washington State to Florida including large scale modernization efforts for Tax, Motor Vehicle, and Labor agencies.

Mathtech provides a full range of consulting services including:

- **Management Consulting** – Mathtech provides a wide variety of services such as Business Process Reengineering, Strategic Planning, and Organizational Change Management.
- **System Modernization Support** – Mathtech is a leader in modernization efforts and has helped agencies across the country transform systems and business processes.
- **IV&V/Project Management, PMOs, and Governance –** Mathtech provides project management support to any size project. Mathtech has developed a governance model to properly guide a project, handle strategic decisions, and connect a project or operations to the organization.
- **Project Assessments and Turnarounds –** Mathtech performs detailed analyses of projects, SDLCs, and project management operations as part of managing a project, establishing or improving a PMO, or turning around a struggling project.
- **Assessments and Planning –** Mathtech provides all levels of assessments and consultation to Boards, Executive Management, and Project teams for diagnosing and improving the effectiveness of projects and daily operations.
- **IT Strategy and Architecture** – Mathtech helps agencies develop a flexible strategy to meet technology objectives by leveraging existing technology and new technology as needed.
- **Requirements Analysis and RFPs** – Mathtech can develop detailed requirements, write RFPs, and assist in the bidding and evaluation process. We design our RFPs to create manageable, well-defined projects.
- **System Development** – Mathtech provides a full range of implementation services that allow agencies to provide more services quickly using industry standard methods and technologies.

2.1.1 Mathtech Experience

Mathtech leveraged a broad range of experience for this project.

Motor Vehicle Operations

Mathtech is the national leader in motor vehicle and licensing operations. Mathtech has worked with many jurisdictions including FL, MD, NJ, WA, WI, OR, RI, PA, NY, MN, Jamaica, and Ontario, and AAMVA. Mathtech's experience includes modernization planning and strategy, business process improvement, technology operations, and vendor management. Mathtech serves on AAMVA Committees and regularly present at regional and international conferences.

Motor Vehicle Vendor & Product Experience – Mathtech has managed vendors installing and maintaining Vehicle, Licensing, Card Production, Document Management, Inspections, and Queuing Systems. We understand the reality of vendor strengths and weaknesses, of support contracts, and procurement.

IT Operations

The Mathtech team supports a wide range of technology operations. Conversion to new methodologies, Project Management, Cost Allocation to Departments, Reorganizations and Redesign, Quality Assurance, Enterprise Architecture – Our team has supported both federal and state agencies and CIOs as well as the private sector. We leverage best practice models for managing IT operations and assessing maturity.

System & Process Modernization

The Mathtech team has worked on many modernization and transformation projects. These projects bring great improvements in both business processes and technology. But they are also very taxing on an agency in every area including business and IT. Outdated legacy systems are often accompanied by outdated legacy support and maintenance skills, processes, and tools. This makes any IT organization modernization more challenging.

Organizational Design

The Mathtech team has completed many organizational design projects for both IT and other operations. This includes planning, design, and implementation.

2.2 Project Approach

Mathtech worked with WYDOT over a five-month period from April to September 2018 to evaluate the current systems, processes, gaps and options for moving forward. The approach included the following:

- **Working Sessions** – Mathtech met with WYDOT business and IT staff along with ETS and representatives from other agencies and the counties. The goal was to understand how each group uses the current systems and each group's perspectives, concerns, and expectations for the future. Existing challenges and opportunities for the future were discussed as well as strengths and weaknesses of processes and systems.
- **Analysis and Planning** – As a follow-on to the initial working sessions, the Mathtech team worked with WYDOT to clarify and verify observations, develop options, and prepare a strategy for moving forward which clarified cost, schedule, and preparations.
- **Final Plans and Report** – Mathtech and WYDOT leadership worked together to finalize an approach and recommendations which were presented to the Legislative Joint Committee on Transportation, Highways & Military Affairs in June 2018 and resulted in this final report.

3. Status of the Current WYDOT RIS System

3.1 Technology & Status

The Revenue Information System (RIS) is a 40+ year old COBOL/CICS mainframe system that supports WYDOT's key driver licensing and vehicle functions. The RIS system has limited design documentation which is generally considered not current making it difficult for new staff to understand the system logic and programming. The system is supported by a very small contractor team which presents risks in business continuity since only contractors are supporting the system. Small changes may be accomplished quickly but complex changes can take significant time to complete.

Functions supported by the system include violations, suspension, insurance compliance, driver licensing, various ID cards, permits, and title and registration records processing. Counties provide vehicle data that they process but not always in a timely or reliable manner and data is not standardized across Counties which can cause problems when consolidating the data into RIS. RIS also supports a large number of business-critical interfaces which are also not well documented. Users find the system cumbersome to access and navigate.

WYDOT finds itself in a situation common to many government agencies. It is dependent upon an outdated computer system (RIS System) which is very difficult to maintain or enhance. As it ages the number of individuals who understand and can maintain the system is quickly dwindling and institutional knowledge is declining.

WYDOT and agencies in similar situations find themselves "frozen in time" and unable to modernize operations or provide new services such as online transactions because the system cannot accommodate such enhancements and the burden of ongoing maintenance is a distraction. Furthermore, mandatory enhancements to the system to maintain legislative or federal compliance is slow, time consuming, and continually introduces the risk of breaking the system.

3.2 System Deficiencies

The following is a summary of some of the most outstanding deficiencies of the RIS system.

- **Outdated and Inflexible Technology** – The RIS system was built using the COBOL programming language. This language was a mainstay of large transaction processing computer systems in the 1970s and 1980s. It is still used today but it is not considered a modern programming language and support for it has significantly diminished, mostly in the availability of programmers who are trained in the language. Furthermore, the design and logic of the RIS system is insufficiently documented which makes it difficult for any new programmers to learn. Modifications to the system by anyone who does not understand the entire system risks damaging the system and causing unknown errors or system outages. The system lacks modern technical functions to manage data and interface with other systems. It is difficult to implement new features such as online transactions. Any required modifications require substantial effort – much more than would be required of a modern computer system.
- **Difficult to Support New Legislation or Customer Service Improvement** – WYDOT faces continual challenges when it attempts to implement any changes to the RIS system. These changes, which are slow, costly, and risk system outages, include implementing new legislation, upgrades to support Federal programs, and improved customer service.
  - **State Legislation** – Legislation changes continually to address important public needs impacting driver licensing, vehicles, and businesses. This includes changing how young drivers are licensed as well as adding new license plate types.
  - **Federal Programs** – AAMVA, Congress, and the Department of Homeland Security are continually evolving programs and legislation to address homeland security, vehicle ownership fraud, and commercial driver safety. These programs are national requirements complied with by all U.S. jurisdictions. The RIS system causes WYDOT substantial challenges when trying to maintain compliance with these mandates.

- **Customer Service Improvements –** While other jurisdictions continually move forward with online transactions, better public access to services, increased fraud protection, and support for third party interfaces and collaboration, WYDOT is permanently held back from implementing many improvements because the RIS system is too difficult, costly, and high risk modify.

- **Poor Support for County Motor Vehicle Operations** – Wyoming delegates vehicle transactions to County operations but WYDOT remains the central authority for managing and consolidating all vehicle information in the state. Each county uses its own computer system and database to conduct vehicle transactions autonomously and the RIS system provides insufficient support for this function.
  - **Insufficient Access –** The RIS system is not easy to use or easily accessible by county staff. Functions to lookup vehicle information are cumbersome to use.
  - **Poor Data Synchronization –** Because each county maintains its own computer system and separate database each must synchronize and share data with the central WYDOT RIS System. This process happens on irregular schedules. The synchronization process also depends on accurate transmission and matching of vehicle records among RIS and the county systems and there are typically errors.
  - **Data Quality Problems –** Each county implements different codes and abbreviations when entering vehicle data. Counties also have different standards and tools to stop mis-spellings and other data entry errors such as misspelling the vehicle manufacture (Chevrolet v. Chevy). Poor data quality degrades all attempts to perform reporting and analysis and other support operations.
- **Poor Support for Law Enforcement** – Law enforcement depends upon accurate driver and vehicle data when performing many critical functions. Inaccurate data can endanger lives and thwart enforcement activities.
  - **Vehicle Data Is Incomplete and Out-Of-Date** – When law enforcement accesses the RIS system it receives incomplete vehicle data because the RIS system is not updated in real time when a country transaction is performed. Some county transactions may be delayed for over a week and others may take more time due to errors in the data exchange.
  - **Driver Data Missing Photo and Unclear Driver History Information** – RIS is the primary system providing driver information to Law Enforcement. This includes driver information and driving status. RIS is incapable of providing a Driver Photo to Law Enforcement which is obviously critical when encountering fraudulent license documents or drivers without their license. Other information provided by RIS is stored and provided in a cryptic manner including the driver's driving record.
  - **Temporary Vehicle Registration Not Shared with Law Enforcement –** The RIS system provides no support for temporary vehicle registration and does not track temporary registrations that are issued by dealers or Counties. Temporary vehicle registration information is not stored in RIS and therefore not available to law enforcement via their mobile data computers.
- **Limited Data Analysis and Reporting Capabilities** – The RIS system was not designed to significantly support reporting and analysis. The database is built on an older technology which does not directly support modern analytical tools though adapters and gateways are available. The system suffers from a lack of tools and an inherent lack of capturing all of the desired data. WYDOT has built an external database which partially extract data from RIS into a modern database for use with reporting tools.
- **No Support for Business Licensing or Other Agencies** – An important aspect of WYDOT's driver and motor vehicle operations is the licensing of various businesses such as car dealerships and salvage yards. RIS provides no support for these licensing operations and WYDOT has had to develop a variety of spreadsheets and small systems which are not integrated into driver and vehicle information to meet basic operational requirements. Most DMV operations around the country use integrated systems that allow the tracking of vehicles and drivers as they interact with licensed businesses providing a variety of tools to improve customer service, track fraud, and enforce business process compliance.

- **Manual Transactions** – WYDOT has minimal support for licensing, renewals, reporting and oversight, and issuance of dealer plates.
- **No Consumer License Information** – The RIS system provides no web-based capability for sharing business license information with consumers. This prevents consumers from easily checking the credentials and license of a business.

- **Paper-Centric Operations** – The RIS system's limited functionality and inability to expand to support modern operations results in WYDOT being constrained to outdated, paper-centric operations. While other jurisdictions and agencies can modernize to support electronic transactions and online services WYDOT remains paper-centric. Paper-centric operations are not only less efficient, but they also pose a security problem because electronic information is much easier to secure than paper forms which can be left on desktops or in unlocked file cabinets.
- **Inability to Match Drivers and Vehicle Owners –** The RIS system does not have the capability to match drivers with vehicle owners. This results in a driver's license being issued to "James M. Smith" while a vehicle is titled to "Jim Smith", possibly with different addresses. The disconnection results in a variety of operational deficiencies which including poor customer service, poor enforcement of vehicle registration rules, greater opportunity for fraud, incorrect address information, and reduced enforcement capabilities.
- **Enforcement of Business Rules –** The RIS system does not enforce many detailed business rules that are important to ensuring that transactions are conducted completely and accurately. The RIS system depends upon WYDOT staff to know and enforce rules and ensure that all transactions a valid. While WYDOT staff are very capable, most agencies depend upon modern systems to strictly enforce all applicable business rules for every transaction which improves reliability and data quality, fights fraud, and makes training and staff onboarding easier.
- **Weak Correspondence Management –** The RIS system lacks modern capabilities to create, update, and manage customer correspondence and notices. The system generates over 300 different letters and notices for driver licensing and the system has minimal capabilities to update the text of these items to improve readability or clarity.
- **No Support for Specialty Plates –** RIS does not provide support for Specialty Plate issuance or tacking resulting in the use of spreadsheets and other tools by WYDOT staff.

3.3 Data Deficiencies

The current system includes a variety of data management deficiencies that a modernized system should address. Key data issues include lack of consistency in data, lack of standardization and validation, lack of access, untimely consolidation and availability of data.

- **Vehicles** – Vehicle transactions are processed by 23 counties with no uniform set of rules or standardization. Examples include missing lien information at WYDOT level, difficulty linking drivers to vehicle (D. Lopez, Deb Lopez, Debbie Lopez) and inconsistent data (FRD vs FORD). This situation results in incomplete and untimely data aggregated by WYDOT. Non-uniform data does not support accurate reporting or transaction processing. The plate numbering scheme that allows the same plate number to be printed on different specialty plates should be addressed so that plates have unique numbers to support notifications and law enforcement activities.
- **Driver Licensing** – The current system is not well integrated with other data such as photos and vehicle data. The system has limited capabilities to capture new information and data which would support new legislative mandates. Law enforcement would like to see more complete data with more detailed information such as medical information.
- **Driver History** – This system does not retain extended historical data, perform real time data validation, or offer streamlined data correction functions which result in a lack of data integrity. The ability to make changes is also difficult due to lost institutional knowledge and the fact that individual data fields have been redefined over time for new purposes.

- **Business Licensing** – Most of this work is currently manual with no system support. As a result, data related to Business licensing is in many places and not easily viewed cohesively (ex: plates in RIS, license in Excel). Enforcement and tracking is also hampered by lack of easy access to full data by Law enforcement.
- **Law Enforcement** – There are several key data gaps that if addressed would provide significantly improved function and effectiveness for law enforcement including: consistency of data, availability of photos, improved lookups for firearm license/permits, partial plate and name only searches, and improved plate numbering schemas.
- **Finance** – Many functions today require manual entry and reconciliation. County fee data cannot be verified. The ability to balance and create reports and invoices are impacted by the timing and availability of complete data.

3.4 RIS System Stability

3.4.1 Potential for System Failure

The RIS system is an aging system and like any large computer system it is a complex combination of programming logic, software, data, and hardware – all of which are designed to work together. Changes to any part of any component must account for the dependencies on the other components and an improper change or enhancement can crash the entire system.

- **Software Modifications** – The RIS system contains many COBOL programs that interact with the database and depend upon each other. Changes to one programming module must understand the relationship to and impact on every other module. In other words, an enhancement to one module can break another.
- **Mainframe System Changes** – All of the RIS software runs within the mainframe computer's operating system and there are a number of dependencies between the system programming and the mainframe operating system. These include user security, database management, data interfaces, task scheduling, and system performance. Changes to any part of the mainframe system environment that are not planned and executed to be compatible with the RIS software can cause the system to crash or partially fail.
- **Hardware and Network Changes –** Any changes to the mainframe hardware, network, or addressing schemes could impact the system. This continues to highlight the delicate nature of the system.

3.4.2 Impact of System Failure

RIS is one of the most high-profile systems in the state and impacts a wide range of operations. Each of these systems and operations are supported by one or more specific interfaces. Changes to either system, the interface, or the supporting technologies could impact the support for these operations with an outage of operations or could simply result in incomplete or erroneous information being silently passed to the other operation. Operations which would be impacted by a RIS failure include:

- Issuing and Renewing Driver Licenses
- Verification of WY Driver Licenses and Identities
- Licensing of Commercial Drivers
- Operational Data for Law Enforcement
- Support for Voter Registration
- Data for Insurance Companies Issuing Vehicle Insurance
- Data for Family Service Attempting to Serve Families
- Support for Other States attempting to Title Wyoming Vehicles
- Courts Adjudicate Traffic Violations

3.4.3 Background on Recent System Failures

The RIS system has recently experienced several outages, ranging from a few hours to almost a full day which impacted customer services and law enforcement queries. Driver licensing functions such as license issues, testing, ID card processing, and disability placards were unavailable during the outage.

3.5 Risk of Not Addressing Modernization Needs

The RIS system is a key component of WYDOT motor vehicle and driver licensing operations. WYDOT's operational needs grow every day to address legislative needs, Federal requirements, security challenges, customer service requirements and many others which cannot be ignored.

If the need to modernize the RIS system is unaddressed, WYDOT and other stakeholders will be "stuck in time" with a potential for software failure and an inability to support changes in any of the following areas:

- **Inability to Support Federal Requirements Changes** – AAMVA makes continual improvements and offers new functions to improve security and features for licenses and titles for all states. States need to "keep up" with these changes to avoid being the weak link in these national systems and checks. Prolonged non-compliance could result in substantial remediation and planning oversight from the Federal perspective and the possibility of losing Federal funding.
- **Inability to State Legislation Changes** – State DMV agencies are a favorite topic for legislative changes given their broad interactions with most citizens. WYDOT should expect to get new requirements each legislative session that must be addressed in a timely manner. These changes often come in addition to all other workloads and necessary changes.
- **Inability to Provide Better Customer Service** – As private sector companies continue to offer improved customer services, these experiences become the expected level of business support by citizens. State agencies must be aware of and plan for these types of customer experiences as they become the expected standards. Furthermore, as legislators and executive branch leadership strive to demonstrate competency and effective management of public operations there will be a continued push for customer service improvements.
- **Inability to Address Surrounding Technology Changes** – COBOL was the leading technology 40 years ago. Technology changes and the rate of change has only been increasing. As the work force ages, new workers are trained in new technologies. Software companies that offer new software solutions and tools leverage the new technologies and state agencies need to learn and leverage new technologies to best use these solutions and attract quality workers. WYDOT has certainly leveraged new technologies but the RIS system remains anchored in the past.
- **Inability to Better Detect and Prevent Fraud** – Fraudulent titles and licenses impact individuals and businesses as well as state agencies. The impact of fraud includes time and money for all parties involved to identify and fix it. The better WYDOT can prevent the fraud up front, the less impact and cost it will have for all parties.
- **Inability to Implement Security Enhancements** – Security enhancements support fraud prevention, data theft, and associated impacts. These enhancements include both improved processes and improved technologies and tools – all designed to help WYDOT detect and prevent fraud and data theft.
- **Limited Ability to Protect Personal Identity Information** – Personally Identifiable Information (PII) is high value data and everyone wants it. The sophistication of hackers continues to improve. WYDOT must leverage better processes and tools to protect this highly sought-after data and maintain its citizen's confidence in the agency.
- **Limited Ability to Support Law Enforcement** – WYDOT and Law Enforcement are key partners who work together every day. Better access to accurate data allows Law Enforcement to support the State and WYDOT by promoting safe roads, insured vehicles, and properly licensed drivers. Modern systems that collect complete data, promote automatic data verifications, and are more easily accessed support this partnership.

- **Inability to Improve Operational Efficiency** – More with less. This is a common theme for state agencies with decreased revenues and pressures to hold costs in check. Leveraging better processes and technologies that support more automation allows agencies to be more efficient with the staff, operations, and system support.

3.6 WYDOT & ETS Support Capabilities

As is typical with older mainframe systems, there are resource challenges that make supporting and enhancing the system difficult and risky. This is the case for WYDOT and ETS as well. Operational realities include:

- **Very Limited Resources** – WYDOT and ETS are down to the smallest possible team with experience to support the system, oversee it, make modifications, and respond to outages. At this time, it appears to be a team of two resources.
  - One ETS resource
  - One contractor resource with a planned retirement in approximately two years.
- **Limited Documentation** – The available documentation is significantly lacking making it difficult if not impossible for a new person to learn the new system.

This support capability is extremely limited and indicates the need to assess the system, catalog its data, and better document the current state in support of a thoughtful modernization and transition effort.

3.7 ETS Mainframe Hosting Transition

RIS is a mainframe-based system and it runs on the mainframe computer system operated by the Department of Enterprise Technology Services (ETS). The mainframe system hosts a number of large state computer systems including RIS and systems from other departments including the Department of Family Services, Department of Workforce Services, and the Secretary of State.

Transition to a Vendor Hosted System – The mainframe system is an expensive, specialized, and capable platform that requires a range of technical skills to maintain. Mainframe systems are most cost effective when they are used at full capacity. ETS has begun a transition from an ETS owned and operated mainframe to a vendor owned and operated mainframe. This allows ETS to pay for needed capacity and avoid paying for hardware, software, and support resources that are not needed. Effectively, ETS is renting the mainframe service rather than owning it. This provides an option to scale down costs and commitment to the platform as systems are modernized and migrated off of the mainframe to newer systems.

Mainframe Migration is Not RIS Modernization – The migration of the RIS system from an ETS mainframe to a vendor supplied mainframe does not change any of the concerns or significant deficiencies of the RIS system including the following:

- **Supportability** – The inner workings of the RIS system are still only known to a very small number of developers and the migration does not change that number.
- **Functionality** – The RIS software does not provide the range of functionality needed to support motor vehicle and driver licensing operations and the migration does not change the RIS software's functions.
- **Expandability** – The RIS system is not positioned or really capable of incorporating new functionality using any modern approach and the transition to the same tools on a different mainframe does not change that.

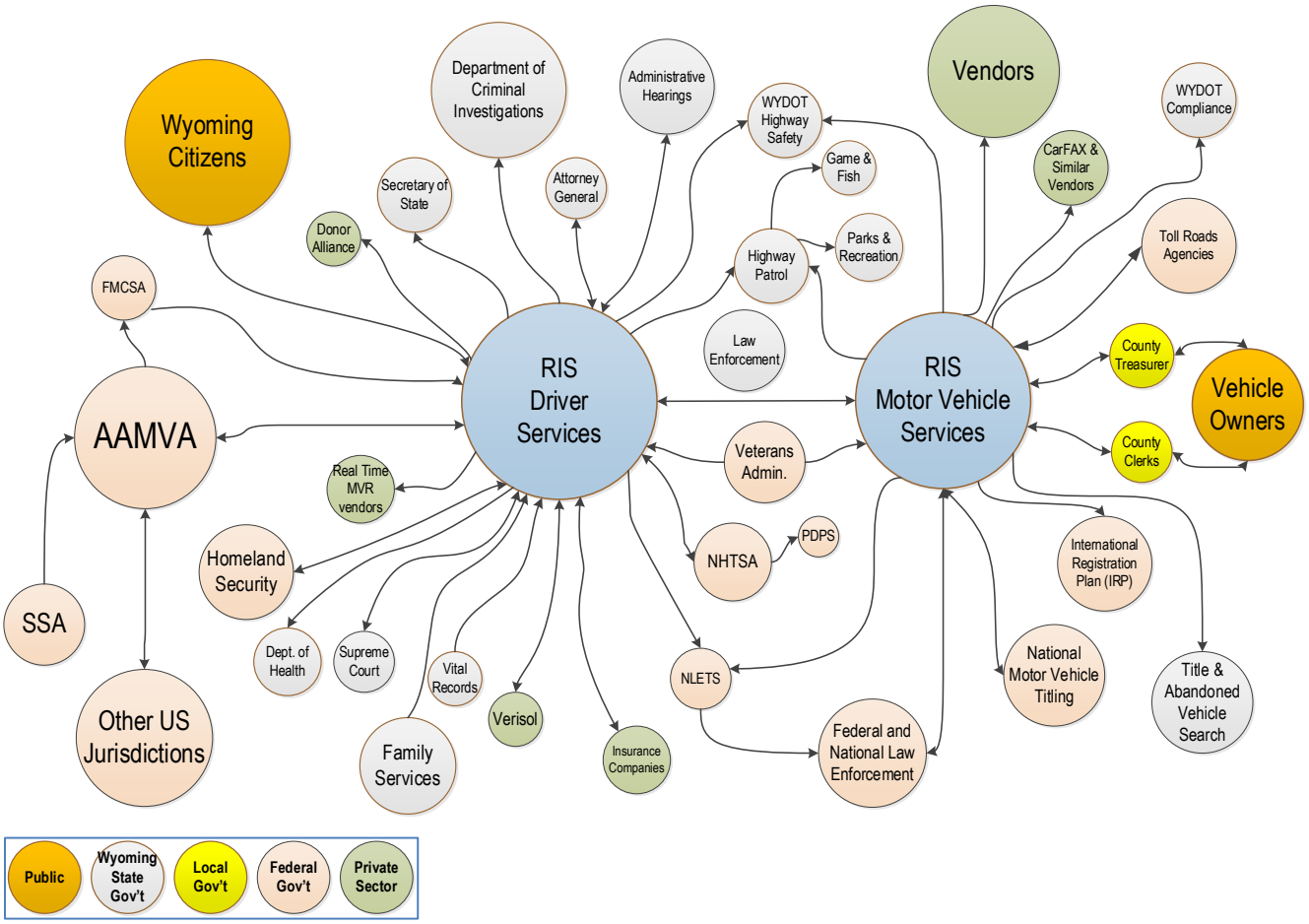
4. System Scope

The RIS system currently supports driver licensing and vehicle services and supports the management of financial transactions. This section describes the scope of the RIS System.

4.1 RIS Interactions with other Agencies and Stakeholders

The following diagram depicts the wide range of stakeholder that are dependent upon the RIS system. They include:

- State Agencies
- Federal Agencies
- Local Government
- Public
- Private Sector



4.2 Driver Licensing

WYDOT's Driver Services program administers and maintains Wyoming's driving records system, tests, and issues and processes all classes of driver licenses, commercial driver licenses, learner permits, graduated driver licensing, and identification cards. WYDOT functions include:

- Personal and Commercial Driver Licensing
- Driver License Renewal
- Medical and Vision Screening
- License Update
- Identity Theft

- Organ Donor Information
- Commercial
- Insurance Verification
- Disabled Parking Placards
- ID Cards
- Contact Driver Services
- Motorcycle Safety Class

4.3 Driver History

Driver Services maintains driver history records, including convictions for motor vehicle offenses and crashes, and administers the process of withdrawing and reinstating driving privileges. The RIS system supports the full range of driver history and enforcement activities including:

- Driving Record Maintenance and Sharing
- Suspensions & Restorations
- Driver Education Tracking
- Ignition Interlock Tracking

4.4 Vehicle Services

WYDOT's Motor Vehicle Services handles title searches, specialty plates, abandoned vehicles and other services. The system can perform the full range of vehicle transactions, but a majority of the public transactions are conducted by county operations and county computer systems. The RIS system collects and consolidates all transaction data from the counties and creates a central database of all vehicle information that supports a variety of functions including law enforcement. Functions supported by WYDOT include:

- Titles, Plates and Registrations
- Specialty Plates
- Title Search
- State Assigned VIN
- Government Exempt Plates
- Vehicle Registrations
- Titles and Lien Filings
- Imported Vehicles
- Multipurpose Vehicles
- Abandoned Vehicles
- Salvage Vehicles
- Bonded Titles
- Compliance

4.5 Business Licensing

WYDOT has responsibility for licensing and overseeing a variety of businesses related to drivers and vehicles including:

- Vehicle Rental Companies
- Dealerships
- Salvage Yards

Licensing operations include:

- Initial Licensing
- Renewals
- Inspections
- Collection of Periodic Vendor Reports
- Compliance Investigations
- Issuance of Dealer Other Plates

The RIS system provides little to no support for any business licensing functions but a new system must include them.

4.6 Revenue Management

The RIS system is responsible for consolidating and tracking the financial aspects of customer transactions as well as payment collection which is then transferred to the Oracle Financials System.

5. Vision for Moving Forward

Plans to modernize the RIS system focus both on deficiencies that need to be corrected as well as new capabilities which will increase operational efficiencies and enhance customer service. The development of this plan has highlighted expectations for a new system that would greatly enhance WYDOT's mission.

5.1 New Functionality

The following is important new functionality that should be addressed by modernizing the RIS system.

- **360 Degree View of Customer Information** – Provides a consolidated view of all customer information allowing for better customer service as well as fraud detection. As allowed, consolidated information could include a photo, list of issued products with expiration dates, interactions, alerts etc.
- **On-line WYDOT and Full Featured Web Site** - Provides new tools and capabilities for customers that will let them serve themselves, answer questions, and better understand DMV processes. As tools and processes improve, more functions can be offered online in a secure manner.
- **Better Financial Management & Reporting** – Provides full Revenue Management with fully tracked transactions and payments for detailed level daily reconciliation and bank deposits.
- **Effective Enterprise Reporting & Analysis Capabilities** – Provides staff with a suite of tools to access clean, accurate and well-defined data to create reports and perform analysis for the "what if" questions that support planning and improved management.
- **Smart Systems That Enforce Business Rules** – Provides enforcement of business rules for consistent operations at each location, data verification upon entry, complete transaction verification and appropriate security enforced.
- **Easy to Understand** – Provides consistent navigation and screen layouts that make it easy for users to learn and remember and guides users through the transaction steps and processes.

5.2 Improved Services & Capabilities

- **Improved Customer Service and Convenience** – Provides consistent guidance and information to staff to quickly provide customers answers ranging from automated assessments of driving records to comprehensive customer interaction logs.

- **Eliminate Paper** – Provides reduced or eliminated reliance on paper documents for transactions and any negative impact on efficiency and security such as mobile licenses, e-titles and online insurance cards.
- **Engage Partners and Customers for Self Service** – Allows partners and customers to complete transactions and perform self service functions to meet their needs and improve their experience.
- **Full Support for Counties & Law Enforcement** – Provides real time data for better decision making and accurate transaction processing across the entire state.

5.3 Better Technology

Better technology will allow WYDOT and ETS to better respond to changing needs in an efficient and effective manner. Newer, modern systems can be substantially easier to implement, maintain, and enhance.

- **Modern, Integrated, Flexible Systems** – Provides current, supported technologies and tools that offer enhanced features that promote easier maintenance, reliability and security.
- **Real Time Data Updates** – Provides a single system that collects and validates data real time, so all users and partners have access to the latest information.
- **Secure, Cloud Based** – Provides a proven, protected environment that promotes business continuity and disaster recovery features.

6. Market Assessment

Motor Vehicle and Driver Licensing Systems are extremely complex computer systems and often underestimate by those without large scale government system experience. DMVs around the country have had mixed results in modernizing these complex systems. This section describes the market and background of system modernization.

6.1 Market Background

6.1.1 History of Failed Projects

Large modernization projects, especially for state DMV agencies, don't have a great track record over the last 10 years. Many vendors have tried and exited the market. Examples of failed modernization projects include the following.

- HP has 5 failed implementations including New Jersey, Vermont, Minnesota, Michigan and New Mexico. HP did complete the Rhode Island project. At this point, they have effectively exited the market.
- 3M has 4 failed implementations including Kansas, Kentucky, Idaho, and Delaware. 3M is still working to implement in Montana though they have effectively exited the market.
- Deloitte, which has 1 failed implementation in Massachusetts did complete modernization work in Texas and is now working with Pennsylvania.
- Tech Mahindra failed an implementation in Nevada but successfully completed a system for New Hampshire.

All of these projects were over budget and behind schedule. These projects invested years of time with little or no new functionality deployed before cancelling the projects. Both 3M and HP have stated they are no longer in the modernization market.

6.1.2 Current Vendors

Currently, there are approximately 6 active vendors in the DMV marketplace pursuing new projects. Of these active vendors, there are varying degrees of successful implementations. Some vendors are system integrators and others are solution specific vendors. Recent wins include: Deloitte in Pennsylvania, FAST in MD, Minnesota, and Michigan, and Accenture in Florida.

Some vendors have chosen to use a custom approach to developing software which effectively means "starting from scratch". Other vendors such as Tech Mahindra and MorphoTrust have leveraged a customer management system from Microsoft (Microsoft Dynamics) as the foundation for their system development. Tech Mahindra was successful with this approach in New Hampshire.

FAST Enterprises has emerged as a unique player in the market. They have developed a Driver Licensing, Motor Vehicle, and Business Licensing system that was built on their previously successful Tax System. FAST has had a string of successful projects using this approach.

6.2 Vendor Landscape

This table includes notable projects conducted by vendors and also includes some state-run modernization projects in the last line.

Vendor	Approach	Jurisdiction
Accenture	■ Custom Software	■ Florida (DL, MV) (ongoing)
Deloitte	■ Custom Software ■ Refactoring of Old Software	■ Texas (MV) (completed in 2016) ■ Pennsylvania (MV, DL started in Jan 2018)
FAST Enterprises	■ Prebuilt Configurable System	10+ States including: ■ North Dakota (MV) (completed in 2016) ■ New Mexico (MV) (completed in 2016) ■ Washington (DL, MV) ■ Colorado (DL, MV) (completed in 2018) ■ Maryland (DL, MV) ■ Massachusetts (DL) ■ Minnesota (DL)
Infosys	■ Custom Software	■ Ontario (completed in 2016)
MorphoTrust	■ Prebuilt + Custom Software	■ Mississippi (DL) ■ North Carolina (DL) ■ Alabama (DL)
Tech Mahindra	■ Prebuilt + Custom Software ■ Customer Software	■ New Hampshire (DL) (completed in 2017)
BIS	■ Prebuilt + Custom Motor Vehicle Solution	■ Tennessee (MV)
State-Run	■ Custom Software	■ Florida ■ Kentucky

Florida is a combination of a State-run project with substantial vendor support.

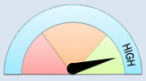
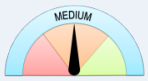
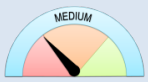
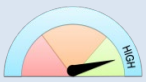
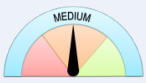
7. Options for Moving Forward

This section discusses WYDOT's options when planning modernization of the RIS system. There are both software modernization approaches and hosting options to consider.

7.1 Modernization Approaches

Each modernization approach has strengths and weaknesses including cost, risk, complexity, and amount of time required to deliver.

- **Pre-Built Configurable System** – This approach leverages a Commercial Off-The-Shelf (COTS) solution that is configured and minimally customized to deliver the required functions. This solution typically provides basic "out-of-the-box" functionality including AAMVA integration and a configurable design to allow each agency to add their specific business rules and requirements. A COTS system typically has annual updates which allow the agency to stay current with federal and AAMVA requirements and may provide new features based on advancements. This type of solution requires the agency to be flexible in setting up their business processes within the COTS structure and pay an annual license for the base system. The agency configured parts of the solution may be supported by the vendor for additional costs or by state staff. Some states want their own custom solution and do not want to be held constrained by a vendor or obligated to pay annual fees while other agencies see this path as an opportunity to leverage professionally developed functionality that simplifies maintenance and support, even if the approach has built-in support and licensing costs.
- **Refactor** – This approach takes the existing system code and uses a tool to translate the programming language into a newer technology. It also creates documentation of the logic flow of the system and can better organize the old code. It typically does not deliver any real improvements to the programming logic or database, or provide new functions. Furthermore, the approach implements the same business rules. Users will often not notice much of a difference though the screen cosmetics may be updated. The state will still need to address underlying process, business rule, documentation, database, and operational consistency issues. In some cases, this approach can be combined with custom programming to start a series of enhancement projects using the new code as a start.
- **Custom** – This approach builds a new system from scratch with newer technologies. Custom development best describes the software approach currently used at the WYDOT and many other jurisdictions around the country. All functionality is custom designed and coded. Custom development takes a long time to construct and test new functions. Custom software is historically designed "from scratch", although some vendors now are using COTS Customer Relationship Management (CRM) packages as a foundation for custom development. These solutions don't typically have a regular release or update schedule with functionality updates as would a commercial software product. In this approach, many standard functions such as inventory or financial management, reporting, and other functions can be better and more easily implemented by using commercial off the shelf (COTS) products
- **Transfer** – This approach takes another state's custom solution and uses it as a base to build a solution. The original system may be a "work of art" or a "sloppy workaround". The original system built for the prior State may in fact work, but software standards may not have been structured to be flexible enough to accommodate the needs of other States. The process of "ripping apart" and reworking an existing system contains many risks that impact the quality of the project and the resulting system.

Approach	Success Rate	Ability to Meet Needs	Pro	Con
Pre-Built Configurable System	High 	High 	■ Ready to Use ■ Adaptable ■ Implements Best Practices ■ Ongoing Upgrades	■ Reliant on Vendor ■ Don't "Own" System ■ Some Process Changes May Be Required
Refactor (Code Conversion)	Med 	Low 	■ May Require Less Staff Participation ■ Gets Off Aging Hardware	■ No Real Enhancements in Functionality ■ Doesn't Solve Long Term Maintenance Challenge or Improve Staff knowledge of the system ■ Doesn't fix poor code structures and expects existing documentation
Custom	Med/ Low 	High 	■ Execute & Spend at Own Pace ■ Own All Software	■ Costs Not Always Manageable ■ Slow to Deliver ■ Very High Skill Sets Requirements ■ In-house Staffing Levels Not Typically Available
Transfer	Low? 	Med 	■ Possibly Own All Code ■ Possibly Less Expensive	■ Possibly Inheriting Another Mess
Do Nothing	Low 	Low 	■ Easy	■ Potential Software Failure and Inability to Support New Functions and Requirements

In the past few years, pre-built configurable systems have had the greatest success.

7.2 Hosting & On-Site Considerations

The previous section described different approaches for building and implementing the system. This section describes two important approaches for hosting the system – or where and how to locate and maintain the system once it is operational.

7.2.1 Overview

On-Site System (Buying a System) – On-Site Systems have been the standard for public sector and private sector systems for many decades. They consist of computer systems that are installed at local locations either in an office operation or the organization's own data center. Even systems which are maintained in one building and used by staff in other buildings are still considered on-site solutions as they are still owned and maintained by the organization that uses the system.

Cloud Based or Externally Hosted System (Buying a Service) – Externally Hosted Systems may be thought of as a "rented computer system". Organizations in need of computer functionality use a computer system that is owned and maintained by a Hosting Company. Much like renting an apartment from a landlord, the renter is not required to perform maintenance on the property. Hosting Companies maintain the computer system at their own location and the organization using the system is freed from many typical computer maintenance and support tasks. Hosted systems are also referred to as Cloud Based Systems because they are available via the cloud of the Internet.

On-Site v. Cloud Based Comparison

On-Site System (Buying a System)	Cloud Based System (Buying a Service) ✓ Preferred Approach
■ Servers located in State's data center	■ Servers located in vendor's data center
■ State owns the servers	■ Vendor owns the servers
■ State maintains servers	■ Vendor maintains servers
■ State upgrades all software	■ Vendor upgrades all software
■ State owns all costs	■ Vendor can share costs across many customers
■ Large upfront costs	■ Monthly, Annual, or Usage Based Payments
■ Requires more internal staff	■ Vendor staff manage systems

Preferred Approach – *Less Resource Intensive and More Cost Effective*. The Cloud Based System is the preferred approach for WYDOT for RIS system modernization. WYDOT and ETS have limited capacity to maintain large complex computer systems and many agencies are finding that their IT resources add much more value when they are directly supporting the users and the operations rather than performing maintenance and analyzing the computer systems. Additionally, by not "owning" the computer system, the upfront costs are significantly less. Again, renting or buying a home is a very similar analogy and while each has pros and cons some approaches are much more desirable for some customers. The cost-effectiveness of the Cloud Based System is in part due to a Hosting Company's ability to spread maintenance and support costs across many rented systems with a well-trained and dedicated team that individual customers may not be able to easily replicate. Cloud Based Systems typically will address other system requirements such as disaster recovery, data backups, and security.

Hybrid Approaches – *Many Combinations Are Possible* – In reality, every combination between On-Site Systems and Cloud-Based Systems are possible. For example, it is possible to purchase a computer system and have it placed in a remote hosted data center where a third party provides maintenance services. It is also possible to own an On-Site System and hire a maintenance operation to support the system. As WYDOT moves through the planning and procurement process these variations may appear as options.

Approach	Pro	Con
On-Site Systems	▪ Manage and Control Everything – Systems, Data, Infrastructure	▪ Requires Hardware and Software Investment ▪ Requires Maintenance Staff or Contract ▪ Requires Disaster Recovery Planning
Cloud Based Systems ✓ Preferred Approach	▪ Vendor Procures and Manages System ▪ Vendor May Have Cost Sharing Across Multiple Customers	▪ Requires Robust Infrastructure ▪ Systems and Data are off-site

8. Challenges & Risks

As WYDOT moves forward with modernization it must consider a range of challenges and preparation tasks which should be addressed to reduce risk.

- **Available WYDOT Staff** – Current technology teams are spread thin and there are no in-house IT skills to support the RIS system which presents a business continuity risks when problems occur and a shortage of staff to support modernization preparation and implementation.
- **County Autonomy for Vehicle Operations –** Variations in operations, data quality, and business processes complicate improvements as well as the time to receive and process county data into the statewide RIS system. A plan for consolidation or tighter integration must be developed.
- **Business Process Readiness** – Any modernization effort will replace the current RIS system and replace the support for all current business processes. WYDOT must fully understand the current processes and business rules and how they will be improved in the future. Reviews and assessments of current process is a necessary planning step and outdated process should not be automated.
- **Data Quality** – Current data is accessible, but cleanup is required before implementing a new system. Some data quality problems are related to county operations and variations in standards. A data quality assessment should be planned, and a data management strategy should be developed with the counties so that moving forward with a new system does not bring along bad data or data management practices.
- **Interface Management** – If the RIS system is modernized then the impact to all parties exchanging data must be assessed. WYDOT must identify and understand all interfaces and collaborate with all partners to understand their needs as the modernization process moves forward. Any interfaces changes, additions, or improvements must be planned with adequate time to be implemented on both sides.
- **Available Project Management Expertise** – WYDOT does not appear to have the skill sets for large scale project management and oversight and this is typical of most government agencies. Large projects are often a "once in a career" event for state staff (as evidenced by a 40-year-old RIS system) so outside skills must be considered to supplement state teams.
- **Plate Numbering Scheme** – Wyoming will incur additional costs to maintain the current plate numbering system. Clear, accurate data and plate numbers which can be easily distinguished supports reporting, law enforcement and analysis. Modern systems with standardized rules and tracking will force a consistent, unique plate numbering scheme. While it is possible to implement a system that allows duplicate plate numbers across different plate types (backgrounds) it is not a practical or typical of a modern solution.

8.1 Consideration of a Common System Across All Counties Operated By WYDOT

Wyoming faces two unique challenges which impact the planning and implementation of a modernized RIS system. These challenges create unique operational inefficiencies and will result in higher costs for the project. Additionally, they negatively impact law enforcement.

As WYDOT moves forward with planning, it must consider how to consolidate all county vehicle transactions on to one common computer system. This plan must address:

- Current county investments in individual systems
- County staff training
- Data conversion for each county system
- County system integration with county financial operations

Autonomous County Vehicle Operations and Computer Systems

Wyoming, like some other states, dictates that vehicle transactions be conducted by county operations and this is not a significant operational challenge. However, unlike any jurisdiction which Mathtech has encountered,

Wyoming has each county owning and operating its own vehicle registration and titling computer system and separate database. Each system and database are separate from the other counties and only loosely linked to WYDOT's RIS system and database. This presents unique problems.

- **Data Quality** – Each county collects data, performs transactions, and operates its systems differently. This results in data quality problems because there is inconsistent enforcement of rules and different approaches to entering data. In all other states data is managed more consistently because there is only one system (whether new or old) and one set of operational policies. Poor data quality impacts subsequent transactions, exchange of data, and analysis and planning.
- **Operational Consistency** – The use of different computer systems dictates different procedures which could result in different levels of thoroughness in conducting transactions among county operations for vehicle transactions which should be consistent across the state.
- **Linkage to National Databases** – National databases such as NMVTIS (National Motor Vehicle Title Information System) are designed to be accessed by each state's central computer system, not by 23 systems in one state. These systems are becoming more critical as they become part of completing all vehicle transactions in real-time. Wyoming's approach of using different county systems could be a significant problem in the future with respect to interfacing with national systems.
- **Timeliness of Data** – County systems provide data to WYDOT's RIS system on individual, periodic schedules ranging from days to weeks. This means that data from a county vehicle transaction may take days to weeks to be transmitted to the RIS system which feeds law enforcement, investigations, reporting, and planning. This approach is significantly deficient compared to other states which use one common system.
- **Customer Transaction Inefficiencies** – A bulk of any registration or title transaction is data entry and document review. This is a time-consuming process, especially the first time a vehicle is entered into the vehicle management system. This burden is reduced when a vehicle is registered or retitled a second time because the vehicle is already entered into the computer system. However, in Wyoming, if a vehicle is titled in one county, but then moved to another county and titled to a new owner the new county must reenter all of the vehicle's data because it was entered into the system from the first county, and now must be reentered into the system of the second county. The separate databases are inefficient but also allow for data entry errors or differences that likely make it difficult to track the life of the vehicle across multiple owners. Vehicle tracking supports many needs including fraud detection, law enforcement, and planning.

Non-Unique License Plate Numbering System

Wyoming's plate numbering scheme includes a 1 or 2-digit County Number followed by unique license plate sequence which together create unique plates across the state. Specialty plates (e.g. Pearl Harbor Survivor, Radio Amateur, Native American Tribes) use a numbering system without the County Number and the same number sequence can be used for different Specialty Plates. Because the same unique plate number can be issued on each of every different Specialty plate type offered in the State it is difficult to identify a vehicle. Law enforcement, toll collectors, and other service providers must identify the exact plate type or color and the sequence number.

Effectively, this results in non-unique license plate numbers in the system which is problematic both for technical data management reasons and for operational identification purposes. Some DMV computer systems may require customization at additional cost to support a system with non-unique plates. Of course, the numbering scheme in general requires an owner to get a new license plate when they move to another county.

9. Potential Schedule

This section describes a potential schedule and the subprojects required for a typical modernization project and one that would address WYDOT and the State's needs.

9.1 Modernization Subprojects and Activities

RIS modernization is not a single project. It should be broken down into subprojects that ultimately achieve the full modernization over a multi-year period. These subprojects include both preparation and procurement activities as well as the implementation.

9.1.1 Ongoing Planning & Coordination

Coordinating with County Operations – WYDOT needs to determine how Counties will use the new system including the plate numbering scheme and getting agreements on how separate systems will work together or a consolidate system will be created. In either case WYDOT will need to plan and implement a system that fully supports the full range of motor vehicle service offered to residents in the state.

Infrastructure Analysis and Preparation – WYDOT needs to assess the workstation configurations and network bandwidths to verify that these would support a new, more GUI/image-based transaction processing and start the process for upgrades if needed. Some of this work can begin now and some may need to wait until the needs of a selected solution are more clearly identified.

9.1.2 Preparation Projects

Data Analysis & Preparation

Poor data quality can derail a functioning system. Preparation activities start with cataloging the sources of data that will be replaced by the new system. The next focus is to collect the documentation about that data and create documentation that is missing and will be needed to support data conversion and migration. Tasks include creating and verifying the data models and dictionaries and finalize a staging database, which WYDOT has already partially created. Once data documentation is secured, data quality assessments can begin. Remediation plans and actual remediation can begin and continue through the implementation phase. This effort can begin immediately as the analysis of the data and staging it in a more accessible database provides immediate benefit and supports any future modernization approach.

Interface Analysis & Preparation

Interface Management is one of the higher risk areas in a modernization project. Interfaces are an external dependency that is not under complete control of the project. Early communications with interfaces partners is a key to managing that risk and understanding approaches that will work for both sides and allow the project to move forward. Preparation includes identifying and cataloging interfaces with specifications and contact information, analyzing and documenting characteristics (ex: frequency, volumes and technologies), gathering specifications, and developing a management approach for moving forward.

Requirements Analysis & Preparation

WYDOT needs to understand and define all requirements and expectations of the new system. It must know which processes will be supported and what features it expects from the new system. These expectations should link to WYDOT's plans to enhance customer service and improve operational efficiency.

A process and requirements catalog is a tool for capturing such requirements and expectations. An analysis and planning effort will be needed to organize functional user groups, define transactions and expectations, and begin cleanup and preparations for evaluating and procuring a new system. As part of this effort, existing forms, correspondence, reports, and other artifacts can be documented and reviewed to understand how they will change, be consolidated, or improved in the new system.

Gaps in the current operations and RIS system must be identified so that can be addressed from both the technical

and functional perspective.

Vendor Demonstrations and Investigations

Before an RFP is issued, vendor demonstrations will help WYDOT understand the range of solution options available including: functional options (ex: is inventory or IRP included), support and pricing models, configurability, and hosting alternatives.

9.1.3 Procurement

RFP Development

A comprehensive RFP must be developed to procure a new system. This includes defining functional requirements, technical requirements, hosting requirements, delivery requirements, and support requirements. The team will leverage the preparation activities to develop the RFP. RFPs are critical for successful project and critical to obtaining the desired pricing and pricing model.

More than anything, a well written RFP can protect the State and lay a foundation for a successful, realistic project that manages risk.

RFP Review and Approval

Review and collaboration is time consuming and varies by State. Sufficient time should be planned to move from final draft to published procurement.

Vendor Bidding Period

The vendor bidding period must provide sufficient time for vendors to prepare their bids, ask questions, and for the State to respond with answers, amendments, and strategy updates as necessary.

Evaluation and Award

Evaluations must balance the needs of the project and procurement along with State procurement standards and processes. They can range across qualitative and quantitative assessments. Each proposal received will be large, complex, and contain many assumptions that must be assessed and understood. The analysis should include demonstrations and interviews with the bidders. The final effort may include negotiations and reworking of the scope to bring the procurement to conclusion.

9.1.4 Driver Services System Implementation

The Driver Licensing System implementation would include both personal and commercial driver licensing functions as well as the Driver History function that track violations, suspensions, and restorations. This would naturally be the first phase of the implementation because driver management will be the foundation for customer management. Driver services are also the primary function used by WYDOT as most vehicle services are performed independently by the Counties.

9.1.5 Business Licensing System Implementation

After assessment of transactions, this functionality may be partially implemented with the Driver and Vehicles implementations. Currently, WYDOT has very limited tools to support Business Licensing and the implementation of a new, comprehensive business licensing system would not require the retirement of current systems and the data conversion may be less complicated.

9.1.6 Vehicle Services System Implementation

WYDOT maintains the State's consolidated database of all titled and registered vehicles but it only performs a small number of vehicle transactions related to specialty plates and some other transactions. The majority of the State's title and registration transactions are performed by the Counties using their own independent computer systems. In

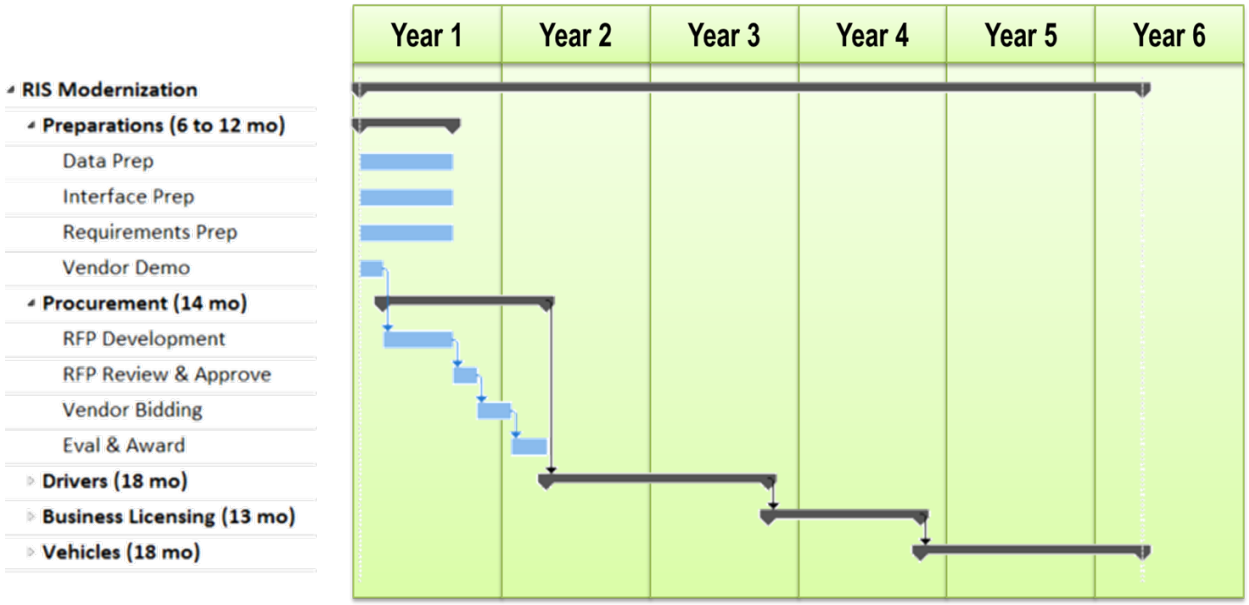
the end, WYDOT still needs a complete system that supports all available vehicle services.

The new system must either consolidate transactions from all Counties as is currently done or the new system must become the primary system for all vehicle transactions performed by WYDOT and all of the Counties. If a consolidated system is implemented, then the effort must include appropriate financial and operational interfaces for each county as well as data migration from each of the 23 databases.

9.2 Potential Schedule

The following represent the best-case scenario for a multi-year modernization of the RIS system. This is a realistic schedule that is dependent upon a high level of dedicated resources and collaboration among agencies to focus and move through the project. Vendor approaches will also impact the duration of the implementation phases.

The schedule shown here depicts the implementation of a pre-built COTS (Commercial Off-The-Shelf) solution ideally procured as a hosted Cloud-Based System.



10. Staffing Requirements

A technology team is required to support the modernization project. WYDOT's staff is spread thin and the project will require moving staff from operational assignments.

WYDOT can engage consultants to supplement the team and bring specific modernization skills.

10.1 Staffing Skill Sets

All modernization projects require participation from a broad set of skills and stakeholders. The future WYDOT system modernization team will need to include the following:

IT Staff – IT staff will require retraining and supplementation to participate on parts of the project using new technologies. Some aspects of the modernization will focus on interfacing new systems with existing systems. In these cases, the existing staff will have the required expertise.

Business Staff – Business staff generally have the expertise required to describe current and future business operations. An implementation vendor cannot substitute for this role though consulting staff can be brought in early in the project to assist with requirements analysis and planning and they can usually continue to support the project through implementation and support or supplement internal business staff.

Project Management Staff – State staff may not have the skills or experience necessary to manage such a large project or to oversee vendors. Training in project management, quality management and other skills may be

necessary but may not substitute for large project experience.

10.2 Basic Staffing Expectations

As WYDOT moves forward with modernization it will need a dedicated internal team to lead the project, make operational and technical decisions, and collaborate with the implementation vendor and other consultants or stakeholders.

The following represents a core team that WYDOT should assemble and prepare as the modernization team. Assembling this team also requires planning to backfill their daily responsibilities or otherwise support operations.

IT Staff – 4 technical staff would provide the core support for a variety of technical responsibilities including:

- Data analysis, interpretation, and conversion guidance
- Interface management and planning integration with other systems such as the Driver License production system
- Architecture planning and implementation
- Infrastructure preparations and support planning

Business Staff – 5 business/operations staff would provide the core of a functional team responsible for defining the operations of the system including:

- Defining business rules and calculations
- Defining process flows and transaction requirements
- Defining and designing new notices, products, and correspondence
- Assessing changes to current operations to fit the new system
- Approving all system functions
- Guiding and conducting acceptance testing

Project Management Staff – 2 project managers would lead and oversee the project for WYDOT. Their responsibilities would include:

- Coordinate WYDOT resources and ensure WYDOT commitments are met
- Oversee implementation vendor activities and approve deliverables and progress
- Coordinate with all stakeholders
- Coordinate and collaborate with supporting consultants such as a project management support vendor
- Manage project risk, engage governance, and overall project management

10.3 Staffing – Dual Burden

An additional burden on staffing is the need to focus on the planning and development of the new systems while also maintaining the existing systems and, in some cases, expand the existing systems to meet legislative and other functional needs.

This issue must always be a consideration when planning and funding the modernization effort and every state deals with this challenge. Some states leverage vendors and staff supplementation, some hire new project staff, and some hire new staff to make existing staff available. In all cases, staffing must be attended impact early in the project and it is critical to minimize or completely freeze changes to the existing system.

10.4 Staff Roles

The project approach will impact the staffing needs and preliminary costs have been included in the cost model. The team will require:

Role	Description	Minimum Skills
Project Director	■ Serve as primary point of contact and Executive Liaison ■ Take accountability for delivery of the project and contract management ■ Resolve issues that are escalated ■ Act as the designated interface between the Contractor and WYDOT	■ Prior leadership involvement on a legacy modernization project of similar size and scope that completed on time and on budget
Project Managers	■ Provide day-to-day project co-ordination, planning, management and control responsibilities ■ Maintain communication with stakeholders ■ Liaise with senior executives when required ■ Maintain accountability for all project management Deliverables ■ Maintain responsibility for developing and maintaining the detailed project schedule (including specific project scope, time, quality and resources) ■ Maintain responsibility for the ongoing maintenance of the detailed, schedule ■ Manage and coordinate reviews of schedules, plans, estimates and deliverables ■ Proactively monitor and report on all project Deliverables against schedules, scope and resources ■ Manage critical analyses of deviations from schedules and facilitate resolutions to return the project to baseline schedule ■ Report on all agreed upon performance metrics according to the agreed upon schedule	■ At least 3 years of experience managing the implementation of systems: ■ for large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects; ■ in the development of system modernization strategies, plans, and schedules; ■ 3 years of prior experience with iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment;

Role	Description	Minimum Skills
Technical Architects	■ Establish the technical direction Enterprise IT Standards and shall ensure that all technical designs align with industry standards and maintain technology decision accountability ■ Maintain accountability for the technology management of all phases the Project: ■ Provide leadership and direction to the technical team on a day to day basis, to completion of all their Deliverables within agreed upon timeframes and to the agreed upon quality ■ Strategically align technology policies and schedules for the project to plans and schedules ■ Resolve strategic and escalated technology issues	■ At least 5 years of experience fulfilling similar responsibilities ■ At least 3 years of experience: ■ Overseeing and monitoring the application of architecture & integration tools and methodologies, best practices and knowledge bases for large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects ■ In the development of system modernization strategies, plans, and schedules; ■ Prior experience with iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment;

Role	Description	Minimum Skills
Data Architects	■ Maintain responsibility for the data architecture, design, development and management of all information, structured and unstructured data, database and content management components of the new Solution ■ Oversee all strategies of the information, data and content management processes ■ Ensure that all information, data, database and content management solution components promote the integrity, security and confidentiality of all Personally Identifying Information (PII) and other sensitive citizen and state data ■ Lead the design and development of data security, masking, encryption and other similar solution elements and components to ensure the security and confidentiality of citizen and state data ■ Lead the design and development of information lifecycle management strategies, processes and solution components ■ Lead the logical and physical data modeling and data model documentation ■ Lead the design, development, implementation, performance tuning and optimization of relational database solution components, including instances, databases, schemas, tables, views, procedures, data files, backup/recovery, etc. ■ Ensure that all information, data, database and content management solution components meet the needs of the transactional, operational and analytical needs of the solution	■ At least 5 years of experience fulfilling similar responsibilities ■ At least 3 years of experience: ■ for large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects; ■ in the development and execution of information and data architecture strategies, plans, and schedules; ■ Prior experience with iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment ■

Role	Description	Minimum Skills
Business Analysts	■ Coordinate the detailed business analysis ■ Identify and translate high level, conceptual user requirements and specifications ■ Facilitate completion of project Deliverables ■ Define business strategies for the application of the new technology ■ Participate in business process reengineering activities ■ Participate in requirements management and traceability	■ At least 3 years of experience in a similar role implementing systems: ■ For large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects; ■ In the development and execution of business analysis strategies, plans, and schedules; ■ Prior experience with iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment
Subject Matter Leads	■ Provide DMV domain expertise ■ Provide strategic driver and vehicle advice to the team ■ Provide leadership and direction to the technical team on a day to day basis, on any industry/domain clarifications that might be needed for requirement clarification ■ Ensure that all business decisions align with the best industry practices and lessons learned from successful implementations ■ Develop and enforce methodologies and driver and vehicle best practices for the development, extraction and documentation of requirements from business subject matter experts, Policy & Directives, other available documentation and other sources ■ Facilitate and manage workshops with business subject matter experts (business & IT) to extract and develop system and detailed business requirements	■ At least 3 years of experience in a similar role: ■ For large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects; ■ Demonstrated Motor Vehicle and Driver License domain experience; ■ Prior experience with iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment

Role	Description	Minimum Skills
Subject Matter Experts	■ Provide DMV domain expertise ■ Provide clarifications to the technical team on for requirement clarification ■ Understand and explain driver and vehicle Policy & Directives, other available documentation and other sources ■ Support and participate in workshops to extract and develop system and detailed business requirements	■ At least 3 years of experience in a similar role: ■ For large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects; ■ Demonstrated Motor Vehicle and Driver License domain experience; ■ Prior experience with iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment
Testers	■ Support planning for the testing phases of the project ■ Support the creation and execution of test strategies and plans ■ Execute testing, assist in training according to the project schedule ■ Ensure full requirements / design / architecture traceability throughout the entire software development life cycle ■ Support and maintain the overall defect management process – triage, entry and resolution ■ Support and maintain test status reporting	■ At least 3 years of experience in a similar role: ■ For large, complex, multi-year, multi-tier, multi-stakeholder integrated business and IT projects including large-scale legacy modernization projects; ■ In the development and execution of testing strategies, plans, and schedules; ■ Experience testing for iterative projects ■ Superior communication (oral and written), presentation and interpersonal skills; ■ Superior leadership and consulting skills, with demonstrated ability to work independently; and in a team/multi-stakeholder enterprise environment

11. Estimate Project Costs & Funding

This section describes the overall cost of the project including cost components, factors impacting the cost, and funding options.

11.1 Estimated Budget

The budget is divided into Implementation Costs and Annual Costs and developed to present a 10-year overall total cost including approximately 5 years of implementation and 5 years of ongoing support. This total cost includes a fairly wide range and the factors impacting the cost are described later in the discussion.

The total 10-year cost is especially important as WYDOT seeks to plan for the cost of a hosted Cloud-Based solution.

11.1.1 Summary

Implementation Cost Summary			
Category	**Description**	**$ Low Range**	**$ High Range**
Preparation Costs	First year costs to prepare project and conduct procurement	$910,000	$2,250,000
Hardware & Software*	Component costs if purchased for on-site system	$16,500,000	$42,000,000
Implementation Services*	Professional services to implement the system and manage the project	$20,180,000	$53,700,000
Internal Staff Support	Backfill or engage project staff	$5,040,000	$7,920,000
		$42,630,000	**$105,870,000**

Annual Costs			
Category	**Description**	**$ Low Range**	**$ High Range**
Annual Software License/Maintenance	Annual cost for software updates and support	$2,325,000	$5,775,000
Annual Hardware Maintenance	Annual cost for hardware maintenance and support	$150,000	$525,000
		$2,475,000	**$6,300,000**

10 Year Total Cost			
Category	**Description**	**$ Low Range**	**$ High Range**
Initial Implementation Costs	Preparation, Hardware & Software, Implementation Services	$42,630,000	$105,870,000
Hardware Refresh	After 5 years	$1,000,000	$3,000,000
Annual Costs	x 10 years	$24,750,000	$63,000,000
		$68,380,000	**$171,870,000**

Average Annualized Cost		**$6,838,000**	**$17,187,000**

Does not include workstation or network infrastructure costs. Does not include internal staff costs.

**Included in the 2013 Cost Estimate*

11.1.2 Detailed Cost Estimate

Preparation Costs				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
Requirements Analysis and Process Improvement	Approximately 1 year to review current processes, collect documentation and prepare for process improvements	$240,000	$720,000	
Interface Analysis	Approximately 1 year to review current interfaces and plan for new ones	$180,000	$360,000	
Data Quality Analysis	Approximately 1 year to review data, assess quality, prepare for migration	$240,000	$720,000	
RFP Development	Approximately 6 months to prepare RFP for release	$250,000	$450,000	
		$910,000	**$2,250,000**	

Hardware & Software				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
Hardware	Servers, Storage, Workstations, Network Equipment	$1,000,000	$3,000,000	
Peripherals	New workstation peripherals as necessary including barcode readers, scanners, and signature pads	$0	$500,000	May have these already and can leverage with new applications
System Software	Operating Systems, Support Tools, Database Management Software, Workflow, Rules Engine	$500,000	$5,000,000	Custom vs COTS will determine how much is bundled into the proposed costs
Application Software	DMV software	$15,000,000	$25,000,000	Custom vs COTS will determine how much is bundled into the proposed costs
	Point of Sale Software	$0	$500,000	Could leverage existing?
	Imaging and Document Management Software	$0	$1,000,000	Could be bundled in COTS or leverage the existing system which may require enhancements.
	Inventory Software	$0	$1,000,000	Could be bundled in COTS

	Financial Software	$0	$5,000,000	Could be bundled in COTS. The existing Oracle Financials Suite would generally suffice.
	Reporting, Business Intelligence and Data Warehousing Software	$0	$1,000,000	Could be bundled in COTS product
		$16,500,000	**$42,000,000**	

All Workstations and Network Infrastructure not included in estimate

Implementation Services				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
System Implementation	Development, Configuration, Installation of application software typically performed by the system integration vendor	$15,000,000	$35,000,000	Cost will depend upon how much WYDOT would change business process to match the software or require the software to be customized to WYDOT's existing operations.
County Implementation	Costs for Integration with County Financial System ($100K to $500K/County)	$2,300,000	$11,500,000	Replace existing systems? Requires training and rollout effort.
Project Management & Oversight Services	Third Party support for managing and guiding project and overseeing the implementation vendor.	$2,880,000	$7,200,000	
		$20,180,000	**$53,700,000**	

Internal Staff Support				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
Technical Staff	Database, Interface, architecture activities	$1,440,000	$2,880,000	
Functional Staff	Process, operations, business rule, and testing activities	$2,160,000	$3,600,000	
Managers	Project management activities	$1,440,000	$1,440,000	
		$5,040,000	**$7,920,000**	

Implementation Cost Summary				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
Preparation Costs	First year costs to prepare project and conduct procurement	$910,000	$2,250,000	
Hardware & Software	Component costs if purchased for on-site usage	$16,500,000	$42,000,000	
Implementation Services	Professional services to implement the system and manage the project	$20,180,000	$53,700,000	
Internal Staff Support	Backfill or engage project staff	$5,040,000	$7,920,000	
		$42,630,000	**$105,870,000**	

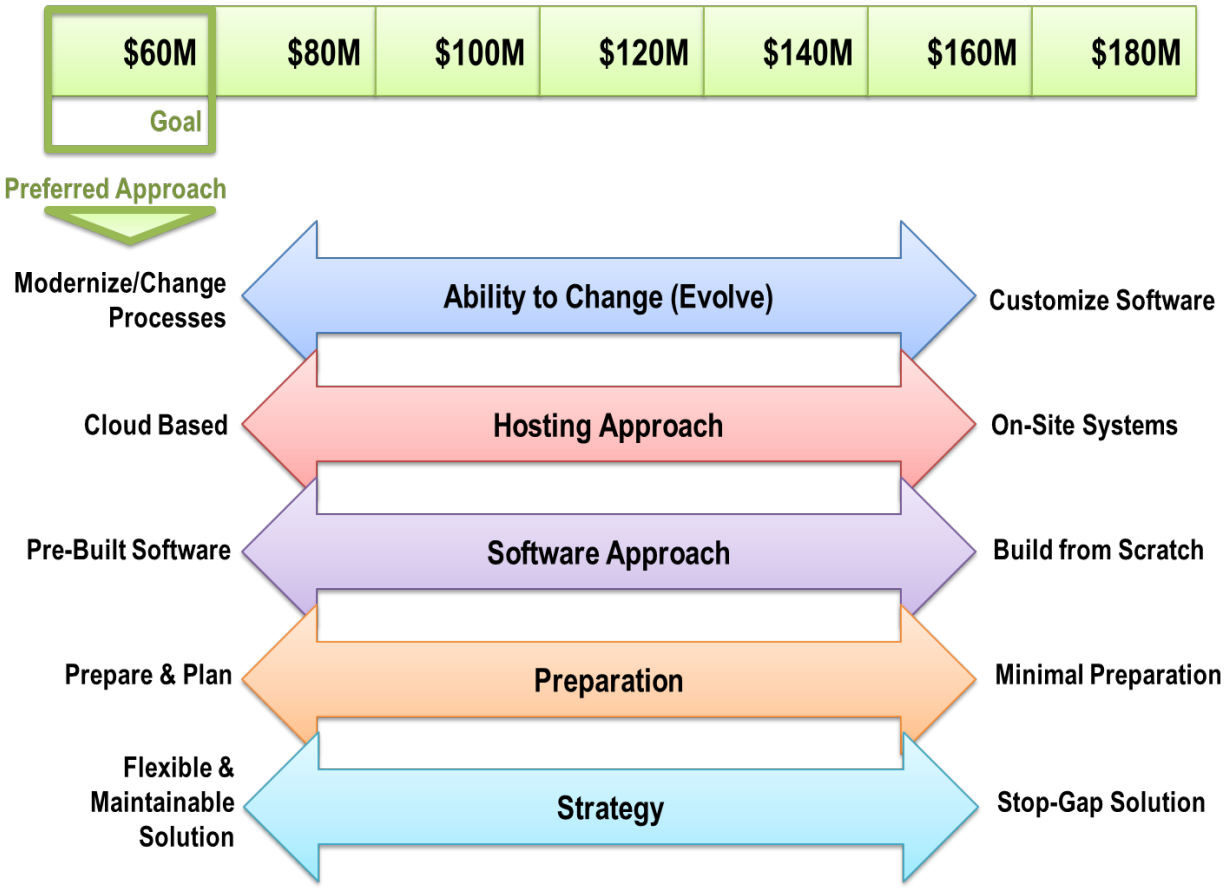
Annual Costs				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
Annual Software License/Maintenance	Annual cost for software updates and support	$2,325,000	$5,775,000	Level of support will impact annual cost - ranging from release updates to full support services.
Annual Hardware Maintenance	Annual cost for hardware maintenance and support	$150,000	$525,000	
		$2,475,000	**$6,300,000**	

10 Year Total Cost				
Category	**Description**	**$ Low Range**	**$ High Range**	**Considerations**
Initial Implementation Costs	Preparation, Hardware & Software, Implementation Services	$42,630,000	$105,870,000	
Hardware Refresh	After 5 years	$1,000,000	$3,000,000	
Annual Costs	x 10 years	$24,750,000	$63,000,000	
		$68,380,000	**$171,870,000**	

Average Annual Cost	**$6,838,000**	**$17,187,000**	

11.2 Factors Impacting the Estimated Cost Range

The estimated project costs presented in this section have a significant range from approximately $70M to over $170M. This is obviously a wide range and many factors impact the outcome.



Ability to Change (Evolve)

WYDOT must assess and understand it current operations and processes. Some activities are driven by state legislation, other by operational needs, and others because "they have always been done that way." WYDOT should work with staff and prepare for changes and improvements to current processes and operations. Some agencies refuse to change and demand that the new system adapt to current operations. This is typically costly and misses opportunities for improvement. Forcing the software to adapt is especially costly when a pre-built solution is being considered because the project must incur the cost of changes and the cost of testing the changes.

The more WYDOT can leverage out of the box COTS functions and configurations, the more costs can be controlled

Hosting Approach

Cloud Based and On-Site Systems are described earlier in this document. For this project, they may cost the same over a 10-year period but a Cloud Based solution could level out cash flow and reduce the need for a large up-front procurement. In the long run (greater than 10 years) the Cloud Based approach may be more cost effective. The industry's ability to provide long-term sustainable hosting solutions to DMV clients will impact the long-term cost.

Software Approach

Pre-Built Software (Commercial Off-The-Shelf/COTS) v. Custom (Build from Scratch) will have a substantial impact on cost. While building from scratch will not require WYDOT to change or adjust, it may not be the best approach. Leveraging ideas from other DMVs in a COTS product can provide ideas for more efficient transaction processing with less effort. In general, pre-built solutions that are flexible, tested, and proven are of substantially less risk and cost.

Preparation

Preparation is critical to a successful project that manages risks and costs. Data cleansing can be a large undertaking

but doing the work upfront will limit impacts on transaction processing times and overall customer service. For example, if data is cleansed after go-live with each transaction, it could add several minutes to each transaction which could increase overall wait times and lower customer satisfaction.

Business Process Analysis is critical to understanding the range of WYDOT's needs, critical expectations, and non-critical options. Analysis and planning will also allow the WYDOT team to move quickly and accurately with an implementation vendor to specify, implement, and testing all operational requirements without needed to unnecessarily uncover or be surprised by last minute requirements throughout the implementation and testing.

Strategy

All project approaches must be understood as:

- short term stop-gap solutions to an aging system that perpetuate the costly maintenance of the system compared to
- long term solutions that address both current needs and future ongoing costs to maintain and enhance the system.

Staying with the current system as well as some of the solutions that may be proposed could be much costlier in the long run of owning and maintain the system. WYDOT should be prepared to understand these options and assess the short term and long-term costs, maintainability, and flexibility of each potential solution. The RFP and project strategy should address this as much as possible and as early as possible in the process.

11.3 Pricing Model Considerations

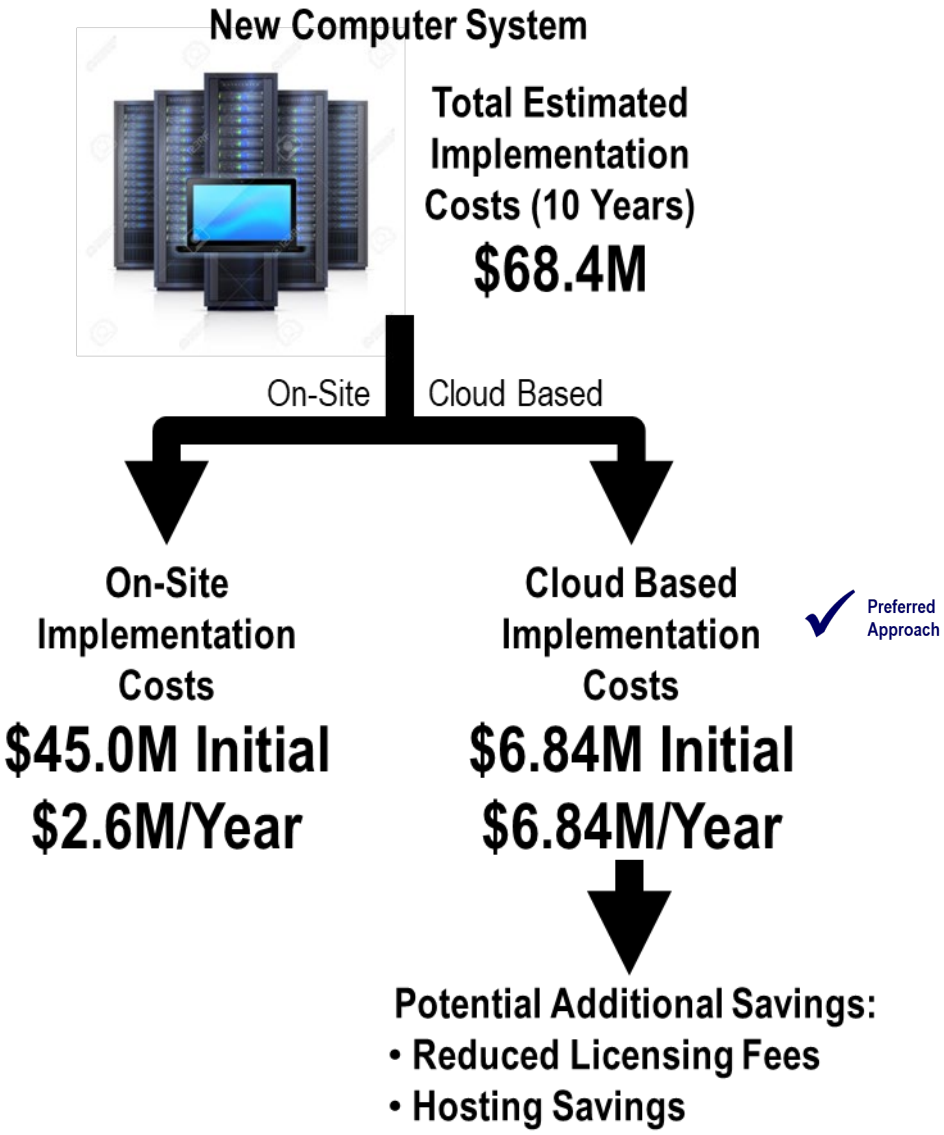
This report has focused on the logistical and cost advantages of a Cloud Based solution. Cloud Based system services are typically rented or leased for a period of time and in this case would include the option to renew services. While it is easy to review the pricing and options for services such as cloud-based email, accounting systems, or customer management systems, there are currently no available, pre-priced DMV solutions. Any available option would come from a current vendor of on-site systems maturing to provide a cloud-based option. Given the availability of hosting services it would not be difficult for them to develop a cloud-based solution.

Cloud based solutions will spread out General Fund expenditures and allow the State to avoid the effort associated with infrastructure and data center setup along with ongoing maintenance and software upgrades. Other expectations for cloud based pricing include the following:

- Cloud based costs will likely align with the total estimated system costs as Cloud Based Driver and Vehicle solutions are not yet common.
- Savings should be realized as vendors will leverage established hosting infrastructures.
- Wyoming's size may result in decreased licensing costs for some vendors and may not impact the overall effort and costs for other vendors. For example, a vendor who proposes to build a new solution will incur a similar effort whether building the system for Wyoming or California. A vendor who has already built a system could reinstall and configure it with less effort and be positioned to charge less for the system given the reduced transaction, data, and financial volumes.

The following diagram shows how the overall 10-year total cost of the system might be paid as a large initial up-front purchase with ongoing maintenance or a smaller annual cost that amortizes the total cost over 10 years, depending upon whether an On-Site or Cloud Based solution is used.

In the most extreme case, a $68.4M system developed as an on-site implementation would consist of a large up-front purchase such as $45M with an ongoing annual maintenance cost of $2.6M/year. This would compare to a cloud based solution which would evenly spread the costs to be approximately $6.84M/year.



11.4 Annual Cost Projection

The follow tables and graph show a more detailed projection of annual costs comparing an on-site implementation with a cloud based implementation.

For the on-site implementation, the initial $45M is spread over the first 4 years of the implementation project followed by maintenance costs. The cloud based solution remains with an evenly distributed $6.74M over the course of the 10 years.

On-Site Implementation Costs

Cost	Total	Year 0 Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Preparation Costs	$910,000	$910,000										
Hardware & Software	$16,500,000		$8,250,000	$8,250,000								
Implement-ation Services	$20,180,000		$5,045,000	$5,045,000	$5,045,000	$5,045,000						
Internal Staff Support	$5,040,000		$1,260,000	$1,260,000	$1,260,000	$1,260,000						
	$42,630,000	**$910,000**	**$14,555,000**	**$14,555,000**	**$6,305,000**	**$6,305,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

On-Site Annual Support Costs

Cost	Total	Year 0 Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Annual Software License & Maintenance	$23,250,000		$2,325,000	$2,325,000	$2,325,000	$2,325,000	$2,325,000	$2,325,000	$2,325,000	$2,325,000	$2,325,000	$2,325,000
Annual Hardware Maintenance	$1,500,000		$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
	$24,750,000	**$0**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**

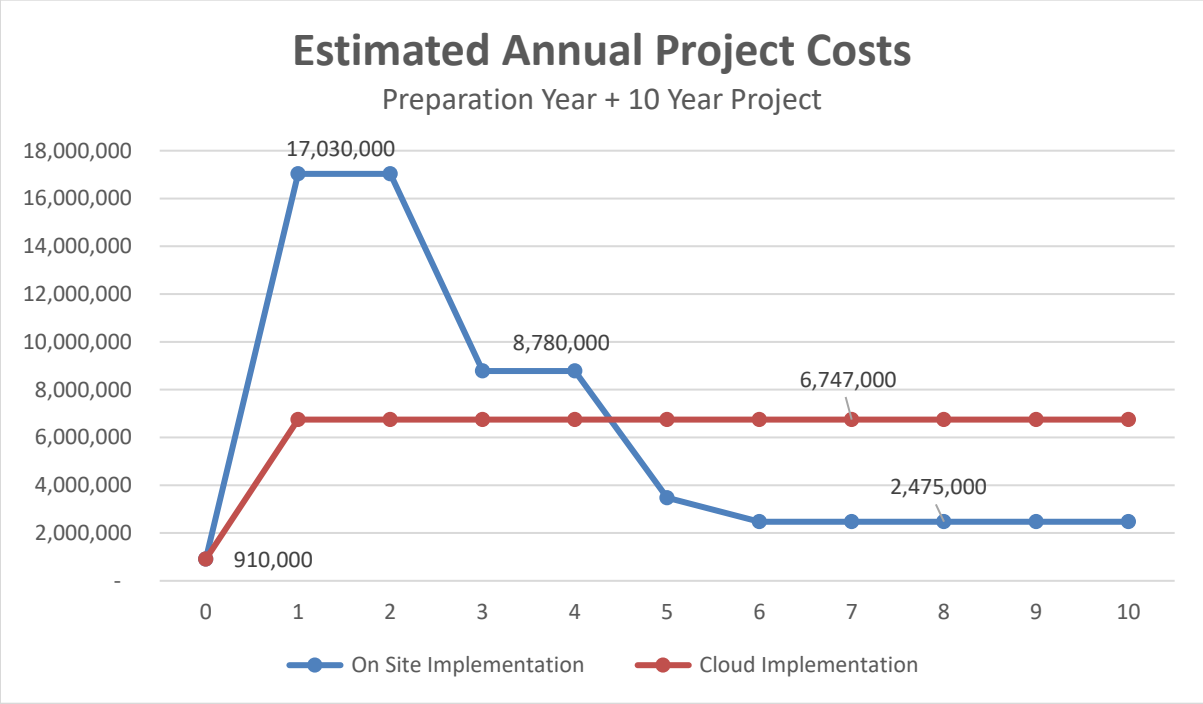
On-Site Total Costs

Cost	Total	Year 0 Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Initial Implement-ation Costs	$42,630,000	$910,000	$14,555,000	$14,555,000	$6,305,000	$6,305,000	$0	$0	$0	$0	$0	$0
Hardware Refresh	$1,000,000						$1,000,000					
Annual Costs	$24,750,000	$0	$2,475,000	$2,475,000	$2,475,000	$2,475,000	$2,475,000	$2,475,000	$2,475,000	$2,475,000	$2,475,000	$2,475,000
	$68,380,000	**$910,000**	**$17,030,000**	**$17,030,000**	**$8,780,000**	**$8,780,000**	**$3,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**	**$2,475,000**

Cloud Based Total Costs

Cost	Total	Year 0 Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Total Costs	$68,380,000	$910,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000	$6,747,000

The following graph compares the annual cost projections for on-site and cloud-based.



Consistent with the schedule provided earlier, the large expenses are incurred in the first five years of an on-site implementation is selected.

11.5 Potential Savings from Mainframe Retirement & Current Consulting Staff

As the RIS system is retired, its associated costs should be eliminated and replaced with costs in the proposed budget which should provide some offset to the modernization project costs.

To fully eliminate the mainframe, all functions must be retired and moved to a new system which is a reasonable goal when modernizing and replacing the RIS system. Secondly, all of the data must be migrated off of the mainframe. This goal can be achieved by creating a staging database for all mainframe data. The staging database will be used to:

- Copy all data from the mainframe
- Support data quality analysis and conversion
- Support migration of a subset of data to the new system
- Maintain a historical reference for data not migrated to the new system

Eliminate ETS Mainframe Costs – Once the mainframe is unnecessary, WYDOT should be able to save approximately $900,000 annually. Other ETS charges such as network costs that are incurred by WYDOT and the counties will likely be similar to infrastructure costs for the new system.

Eliminate HP Consultant Costs – Once the RIS system is retired, WYDOT can disengage the consultant currently supporting the RIS system saving WYDOT approximately $422,500 annually.

11.6 Changes from Prior Cost Estimates

The proposed cost estimate is more comprehensive than the 2013 estimate prepared by WYDOT/ETS and now includes:

- Preparation Costs
- Contractor Staffing Costs
- Hardware Update
- Modern Software Components
- 10 Year Total Cost

The new model provides a more accurate estimate of General Fund needs.

11.7 Potential Funding Sources

11.7.1 Funding Models

The State has three primary tools for funding the modernization effort. A blended approach may also be needed.

- **Capital & Operating Expenditure**
  - State "general" funding is a typical approach and this is the most common strategy used by states, even when confronting an up-front purchase.
- **Fee Increase**
  - Some states have used a technology fee which is added to customer transactions to fund the project.
  - A fee of $5 to $12 per transaction could cover the expected project costs.
- **Vendor Charge**
  - Some jurisdictions may allow for a convenience or transaction fee to be charged by the vendor implementing the system. This fee would need to apply to all transactions, not just web transactions.
  - A fee of $5 to $12 per transaction could cover the expected project costs.

The above fee estimates are based on an annual volume of 1.5 M customer transactions.

11.7.2 Additional Revenue Generation

Mathtech collaborated with WYDOT to identify and assess other revenue generation opportunities. These included the following:

- Access Fees & Transaction Fees for Private Sector Companies Using the Modernized RIS System
- Access Fees & Transaction Fees for State Agencies and Counties Using the Modernized RIS System

The following Private Sector companies were identified and analyzed for access and transaction options. This list was based on Wyoming and other state business transactions.

- Banking Loan/Lien Processors
- Commercial Driver Employers
- Data Brokers
- Dealer System Services
- Dealers & Auction Houses
- Driver Record Requestors
- Driving Schools & Testing Centers
- Ignition Interlock

- Insurance Companies
- Organ Donor Agencies
- Research/University
- Tag & Title Agencies
- Third Party – Full Service
- Vehicle Inspection

While there may be some small options for new revenue generation these options were deemed not substantial for budgeting purposes for reasons such as:

- Already charging fee, but fee could be increased (ex: from $5 to $10 per record lookup)
- Transactions are conducted by the Counties, not WYDOT
- Wyoming does not have such transactions (ex: vehicle inspections)
- Not substantial or good appearance (ex: Organ Donor Agencies)

One small possibility was identified relating to Driving Schools as they do not currently access the RIS system to confirm or register students. In the future, if a new system supported access by driving schools, an access or transaction fee could be charged but this would not be a substantial amount.

Additionally, as Wyoming develops the ability to manage electronic liens and titling for vehicles, there may be a market for additional services to banks and lending institutions. Again, this overlaps with services currently offered by counties and may not be substantial enough to impact the project's overall cost or budget.

The following is a list of public sector agencies and partners that could be considered when assessing an access or transaction fee. Through a range of discussions, it was deemed inappropriate or ineffective to attempt to push a substantial part of the new system's cost to any of the following:

- County Processors
- Courts
- Law Enforcement
- Parking & Toll Authorities
- State Agency

11.7.3 Approaches Used by Other States

Other states have use a variety of options to support the funding of new computer systems, but in general they have used general funds.

- New Jersey issued a $50M bond to support technology and facility upgrades for the Motor Vehicle Commission
- Nevada, Texas, and Minnesota created a $1 transaction fee which was included on motor vehicle and driver licensing transactions.
- Other states have considered a transaction fee but, in the end, for both political and other reasons, they have not pursued them.

12. Next Steps

Wyoming needs to develop commitment for moving forward with RIS modernization. The system is aging and presents many operational risks. Developing commitment may take one of many routes as would be typical for a state agency and state government. In the meantime, there are clear preparation steps that WYDOT can move forward with and they have direct benefit to WYDOT regardless of the timing of modernization. The preparation projects were outlined in Section 9.1.2 of this report and include:

- Data Analysis & Preparation
- Interface Analysis & Preparation
- Requirements Analysis & Preparation
- Vendor Demonstrations and Investigations

Additionally, WYDOT needs to secure a support team for the RIS system that can understand and support the system both for maintenance and troubleshooting as well as enhancements as needed. The preparation projects will also support this objective.