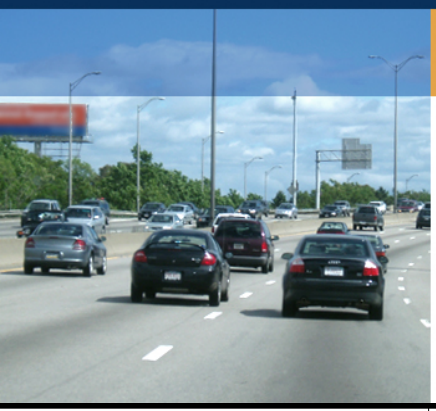
CASE STUDY



# VIRGINIA DEPARTMENT OF MOTOR VEHICLES
## Systems Redesign with Enterprise Architect

### CHALLENGE

*"What is the DMV systems redesign project? It is an agency priority initiative which involves re-thinking the way we do business and creating a technological infrastructure that can support those changes."*

— Karen Chappell,
Deputy Commissioner for Operations,
Virginia Department of Motor Vehicles

### WHY ENTERPRISE ARCHITECT

Enterprise Architect provided cost and functionality advantages in relationship to other CASE tools, supporting all of the functionality and traceability required for project management. In addition, business process engineering efforts were enabled using an add-in for the ICONIX process.

### BENEFIT

Enterprise Architect has enhanced communication between the analysts and business operations areas by providing a consistent language that both business users and technologists can understand. It has also offered a means to ensure that the technical implementation can fully support the business requirements.

The Virginia Department of Motor Vehicles (DMV) is a governmental agency in the Executive Branch of Virginia state government. DMV administers motor vehicle and tax related laws for the continued benefit of all citizens of the Commonwealth of Virginia. These include titling and licensing, transportation safety, and other motor vehicle-related laws and regulations.

Nearly 2000 full and part-time employees meet DMV's daily mission of providing transportation services to customers in Virginia via an administrative center located in Headquarters in Richmond, Virginia, 74 Customer Service Centers and 40 DMV Select offices located statewide which provide a service alternative to visiting a full-service DMV customer service center. Local governments and private entities are contracted to provide secure, select DMV transactions at convenient locations.

Total vehicle registrations currently stand at 7.5 million and licensed drivers number 5.3 million. To ensure that service levels are maintained and to sustain the business value offered to these customers, DMV decided to implement a modeling process for the most commonly provided services as part of its efforts to reengineer processes and define the requirements for a replacement of its legacy computer system. Sparx Systems Enterprise Architect was chosen to support this initiative.

## DMV's Vision for Improved Service Delivery

DMV provides a multitude of services to private citizens, transportation entities, courts, law enforcement agencies, government agencies, insurance companies, and related transportation clients. The most commonly provided DMV services include:

- Credentialing – This includes the provision of driver testing and licensing, vehicle titling and registration, credentialing of commercial motor carriers, and regulatory licensing functions such as fuel distributors, rental car companies, dealers, commercial driver training schools, driver improvement clinics, and third party testers.

- Tax processing – This includes support for the calculation, collection, accounting, and reporting statistics for all tax filings (including IFTA, tax on fuel, and tax on motor vehicle rentals) as well as support for an external/taxpayer audit function.

- Oversight of related programs such as transportation safety and information management.

*"Enterprise Architect has allowed analysts, management, subject matter experts, business partners, and stakeholders to collaborate in a fashion that each one can understand."*

— Michael Farnsworth
Lead Technology Architect,
Virginia Department of Motor Vehicles

Due to the nature of DMV business processes, the type of work performed by the agency requires substantial use of automated systems. It is imperative that the agency operate its programs and facilities in an efficient manner, incorporating into its operation those technological developments and automated solutions that will enhance the delivery of services to DMV's various transportation clients.

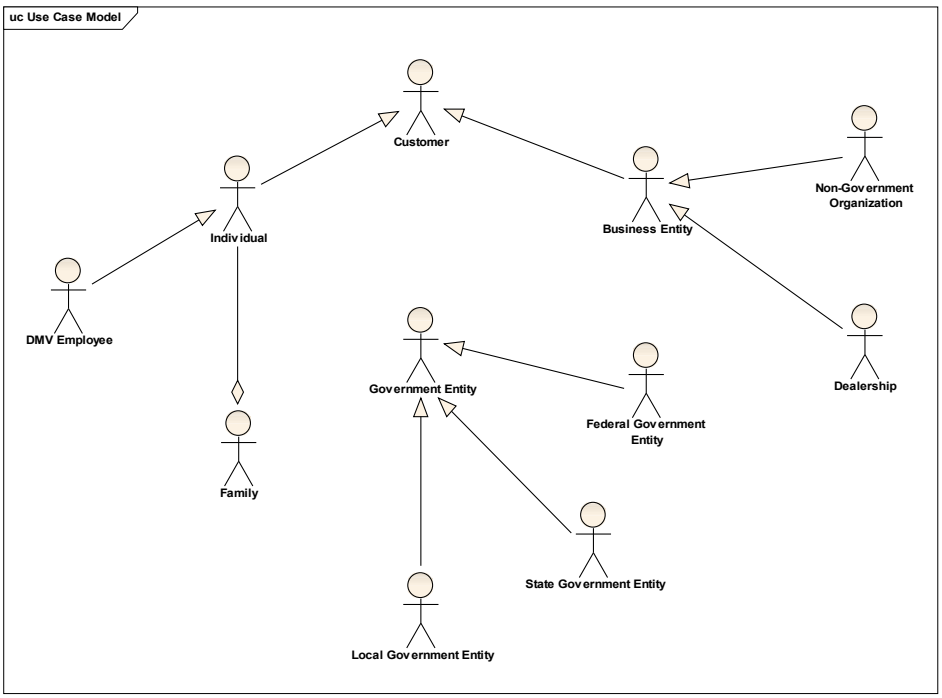



*Figure 1: DMV's key stakeholders modeled as UML Actors*

Implementing a modeling process for these functions will enable the organization to increase the business value offered to customers (business model), to create a common approach to be carried out and address incremental improvement to processes (business process model), and to determine the impact and how the organization's data is valued and organized (data model).

The Integrated Systems Redesign effort focuses on the fragmented processing of DMV's three major business areas: driver, vehicle, and motor carrier. The purpose of the redesign is to transform these outdated systems into a single modernized system that is responsive to the ever-changing need for internal security, homeland security, legislative mandates, and customer relationship management.

DMV has named the new system CSI, which embodies the following key aspects of the corporate vision:

- C = Customer-Centric
- S = Secure, Service-Oriented, State-of-the-Art
- I = Intelligent

CSI[1] will provide connectivity to myriad databases populating a data warehouse. System programming (business intelligence) will utilize this warehouse to supply data at the desktop for transaction volumes, revenue collection, wait times, etc. An interface to the agency's enterprise resource planning (ERP) system (PIPs at this time) will create connectivity between customer trends and budgetary impacts.

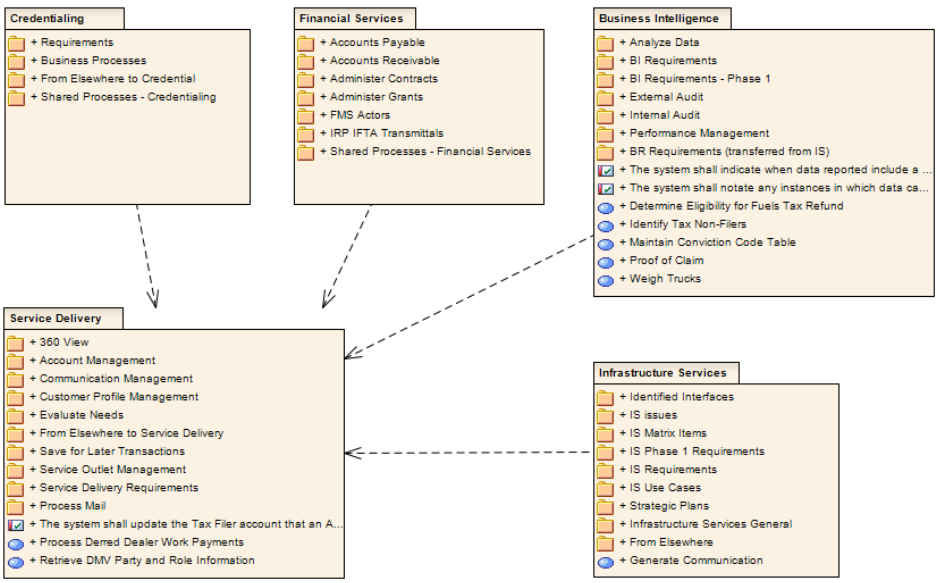



*Figure 2: Business Processes Package Diagram*

Project completion is estimated to take 3 to 4 years, with a total estimated cost of US $32.6M.

To begin the redesign effort, DMV contracted with a vendor to perform a business process analysis (BPA) focusing on what DMV is doing today (as-is) and where DMV can be in the future (to-be). In addition to the BPA, a business impact analysis (BIA) and risk assessment (RA) were also completed. The RFP for the systems redesign solution was released August 31, 2007.

## Central Repository for Business Processes and Transformation

Sparx Systems Enterprise Architect[2] was used in re-engineering sessions to obtain, document, and facilitate conversations about the business processes in real-time and provide a cross-process central repository for all information necessary to support the re-engineering efforts in preparation for a detailed

system design.

DMV plans to make extensive use of the Design Driven Testing capabilities built into the ICONIX[3] Add-in for Enterprise Architect, and extensions proposed by ICONIX which include automatic generation of test classes from test cases, automatic generation of test cases from requirements, etc. These capabilities are critically important during project transition from business process modeling into design and implementation of software, to tightly control the quality of DMV software developed by vendors and subcontractors.

A library of add-ins has been built to transform many business artifacts and aid in transitioning activities to system design. Using Enterprise Architect's customization capabilities, some DMV-specific requirements have been included in the ICONIX Process and add-in to assist in contracting aspects of system design.

## Large-scale Deployment and Concurrent Usage

DMV has deployed Enterprise Architect to the core CSI team of analysts and utilizes Enterprise Architect within re-engineering sessions throughout the enterprise. There are approximately 50 members of the CSI team, 30 of which concurrently use Enterprise Architect at any time. The team is engaged in many simultaneous initiatives including BPR, interface analysis and documentation, Business Rule Extraction and definition, as well as data profiling, modeling, etc. Two primary Enterprise Architect repositories have been established – the Business Model and Systems Design Model. Each of these has been deployed on SQL Server and contains many nested models.

DMV has leveraged Enterprise Architect's built-in HTML reporting engine, to share model information with personnel outside of the team. DMV has also published a portion of its BPR model online – making it possible for DMV business partners to review their contributions to the BPR sessions. Stakeholders and other interested parties are also able to review this work[4].

## Shared Information and Managed Complexity

Enterprise Architect has allowed analysts, management, subject matter experts, business partners, and stakeholders to collaborate in a fashion that each one can understand. DMV is using Enterprise Architect in the business process definition, re-engineering, system design, and deployment phases. Enterprise Architect is empowering DMV to manage the complexity of a large system with multiple stakeholders.

The DMV's CSI Team has now successfully released an RFP for CSI-Systems Redesign that references a large Business Process Re-Engineering Model developed using Enterprise Architect, based on a use-case driven, UML object modeling approach (the ICONIX Process) The model is updated regularly as issues are clarified and published as HTML - available to all interested parties[4].

## References

This article has been prepared by Sparx Systems using information supplied by Michael Farnsworth, Lead Technology Architect, Virginia Department of Motor Vehicles (DMV) and from public information available from DMV.


1 http://www.dmvnow.com/csi

2 http://www.sparxsystems.com/products/ea

3 http://www.iconixsw.com

4 http://www.dmv.virginia.gov/csi/eahtml/index.htm


## About Virginia Department of Motor Vehicles

Virginia's Department of Motor Vehicles (DMV) serves a customer base of approximately 5.6 million licensed drivers and ID card holders, and 7.5 million registered vehicle owners. DMV operates 74 customer service centers, two call centers, 13 weigh stations and 56 DMV Selects. Virginia DMV also provides service by Internet, automated telephone, mail and fax.

Vehicle titling and registration, driver licensing and maintenance of driver and vehicle records are some of DMV's responsibilities. The agency also collects Virginia's fuel tax, monitors the state's trucking industry and serves as Virginia's Highway Safety Office. The current operating budget is $214.5 million. During the 2008 fiscal year, DMV collected $2.2 billion in revenue for Virginia's transportation programs.

DMV's mission is to promote security, safety and service through the administration of motor vehicle and tax-related laws. To fulfill the transportation safety part of its mission, DMV's Virginia Highway Safety Office disburses federal grant funds to localities, state agencies, higher education institutions and non-profits for development and continuation of traffic safety programs. The Highway Safety Office also collects, manages and analyzes the Commonwealth's traffic crash data.

## About ICONIX

**ICONIX** (www.iconixsw.com) offers a wide range of products and services with a focus on ICONIX Process; a streamlined approach to UML that reliably gets projects from use cases to code quickly and efficiently. ICONIX President Doug Rosenberg has authored 5 books on UML, including "Use Case Driven Object Modeling with UML--Theory and Practice" and "Agile Development with ICONIX Process".

ICONIX specializes in customized, hands-on, JumpStart Training. Available worldwide, these onsite, 5-day workshops allow students to use Enterprise Architect to model a real client project. "Hands-on EA for Power Users" is an ongoing series of two-day open enrollment public classes where students follow the design of a mapping project using Enterprise Architect.

Enterprise Architect for Power Users is a multimedia tutorial that provides over four hours of video tutorials covering a wide range of Enterprise Architect's features and capabilities.

## About Sparx Systems

Sparx Systems (www.sparxsystems.com) specializes in high performance and scalable visual modeling tools for planning, designing and constructing software intensive systems.

With customers in industries ranging from aerospace and automotive engineering to finance, defense, government, entertainment and telecommunications, Sparx Systems is a leading vendor of innovative solutions based on the Unified Modeling Language (UML) and its related specifications. A Contributing Member of the Object Management Group (OMG), Sparx Systems is committed to realizing the potential of model-driven development based on open standards.

The company's flagship product, Enterprise Architect, has received numerous accolades since its commercial release in August, 2000. Now at version 7.5, Enterprise Architect is the design tool of choice for close to 200,000 registered users world-wide.