

Project Summary Report: 8238-001

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Strategic Enterprise Architecture and Implementation Plan for the Montana Department of Transportation

http://www.mdt.mt.gov/research/projects/isd_architecture.shtml

Introduction

The purpose of this project was to develop a strategic Enterprise Architecture (EA) design and supporting implementation plan for the Montana Department of Transportation (MDT). An Enterprise Architecture (EA) is a strategic information technology plan that aligns technology with the strategic plan of the agency, integrates the technology needs of the agency, and leverages the agency's data, systems, technology infrastructure, and staff knowledge to implement technology systems to support the efficient delivery of the programs, operations, and services of MDT.

What We Did

The research team conducted the EA project in two phases using an approach based on TOGAF

(The Open Group Architecture Framework) as shown in Figure 1. This consisted of a best practices synthesis and review of MDT's As-Is technology environment, followed by the development

of the actual EA Strategic Plan, consisting of an implementation plan for the recommended architecture; recommendations for a technology governance model; recommendations for a

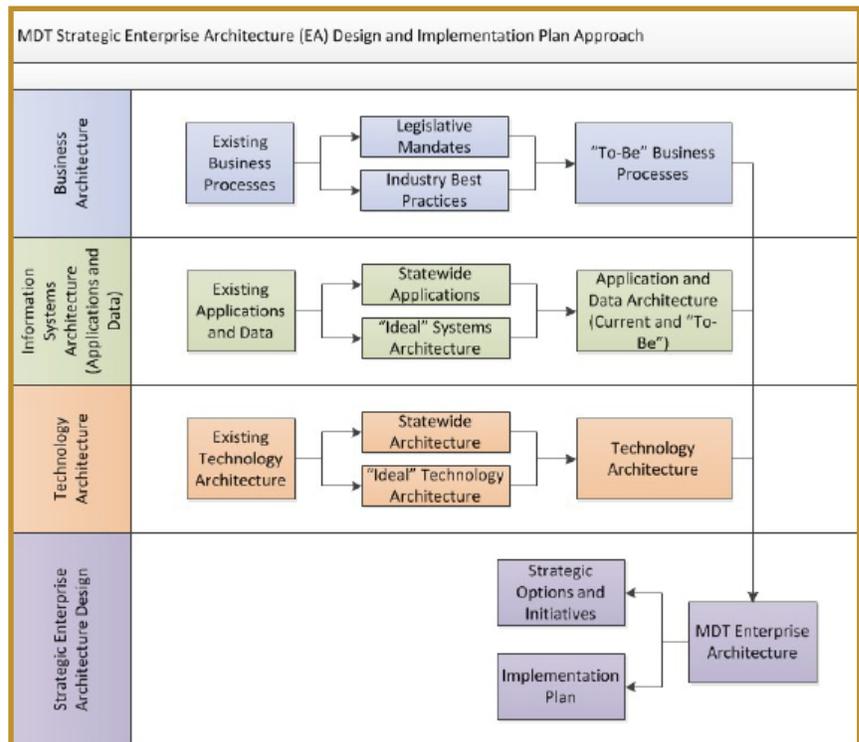


Figure 1: EA Design and Approach

data governance model, and an organizational change management strategy to support implementation of MDT's proposed EA.

As part of project initiation, the research team interviewed MDT staff and stakeholders. These interviews captured agency business drivers; business functions and objectives of MDT; alignment of the agency's critical success factors to those objectives; identified agency challenges; technology systems used, being implemented, or planned; and identified strengths and challenges of the current technology environment at the agency. This information was distilled and documented for validation and agreement in subsequent workshops.

Following the interviews, the research team conducted six validation workshops with agency staff. These validation workshops focused on five business functional areas (Project Delivery, Maintenance and Asset Management, Business Support Services, Multi-Modal and Grants Management, and Transportation Operations Management.) and the Information Technology (IT) functions housed in the Information Services Division and other MDT divisions. These workshops were interactive and resulted in validation of the identified business drivers and critical success factors (CSFs). During the validation workshops, the research team had attendees validate, modify, and supplement the business drivers captured during the interviews. In addition, attendees were tasked with aligning those business drivers to the agency's CSFs (Quality, Safety, Cost Effectiveness, Economic Vitality, and Environmental Sensitivity). In all cases, as expected, business drivers aligned with at least one CSF, while

many business drivers aligned with all of the CSFs. Last, the attendees validated the list of technology systems employed in each of the sub-functions within the business functions. Based on the stakeholder interviews and workshops, the Strategic EA report documents our team's findings about the MDT As-Is information technology environment.

Using enterprise architecture best practices, the findings from the Current Situation Analysis (As-Is) and the research team's experience coupled with the current and anticipated state and federal legislative environment as inputs, the research team defined a preliminary MDT To-Be Strategic Enterprise Architecture. In a series of workshops with MDT stakeholders, this preliminary To-Be architecture was reviewed, validated, and refined. The research team also developed an EA Implementation Plan depicting a mix of short-term, intermediate, and long-term implementation projects. The research team conducted multiple reviews of the EA Implementation Plan with various stakeholder groups to obtain feedback and to tune the EA Implementation Plan content. The final version of this plan is included in the Strategic EA report.

What We Found

The current information systems environment at MDT, in large part, is a fragmented collection of standalone or silo-based information systems and processes. These systems include both older inhouse developed systems and a number of recently acquired best-of-breed commercial off-the-shelf (COTS) solutions. These COTS systems were largely selected by a single business unit to meet their

specific needs and not selected from a holistic agency or enterprise perspective.

This type of fragmentation is common in larger organizations utilizing information systems for four or more decades, as the majority of the systems were not developed in any cohesive fashion under a singular strategic vision. Some of these applications are old and support for them is increasingly challenging due to their age and the potential obsolescence of the software or the retirement from State service of people familiar with the systems. Many of these systems were developed for specific functional areas and never designed to integrate with any overall architecture. This has resulted in limited data integration, and in some cases, requires the same information to be entered into multiple systems across the same or different business units.

What the Researchers Recommend

The research team summarized its conclusions in the Strategic EA final report. Recommendations include continuing with several planned application system implementation projects and launching a number of other significant application systems implementation projects over the next five years; establishment of data governance policies and practices; deployment of a data warehouse; and implementation of enhanced information technology governance processes. Table 1 summarizes the key high-level recommendations from the report.

The research team prepared an enterprise readiness or organizational change management strategy to support the recommended MDT Strategic EA

Implementation Plan. Successfully implementing change in an organization is truly about people, the change leaders who initiate the effort, the staff that manages and supports the effort, and ultimately the staff affected by the change.

Panel and the MDT executive management team to sequence the timing of the various projects to balance the total cost and the total MDT share of the cost within each fiscal year of the proposed program.

Based on the research team’s experience, it is anticipated there will be a number of benefits directly related to the establishment of the Enterprise Architecture program itself, as well as benefits from the individual projects proposed

The research team prepared a high-level Information Technology Governance Strategy as part of the Final Report. This strategy defines the management structures needed to guide implementation of the MDT Strategic EA Plan.

Also included in the report is a seven-year implementation plan for deploying the proposed recommendations. Individual projects to implement each recommendation or a grouping of related recommendations were sequenced within this plan based on priority and complexity rationalized by the interrelationships between the various recommendations. The plan is intended to be constrained by financial capacity, resource capacity, and business unit subject matter expert availability to work on projects, tempered by the degree of change it would be reasonable for MDT to absorb. This implementation plan was provided to MDT as a draft and reviewed with the Technical Panel and the MDT executive management team. The research team then updated and finalized the plan reflecting the feedback from MDT on the prioritization of recommendations and assumptions about financial and other resource capacity constraints across the seven-year planning horizon.

The program includes projects, which are eligible for Federal funding at various percentage splits, as well as projects expected to be 100% MDT funded. The research team worked with the Technical

Recommendations
Transportation Project Delivery
Implement Next Generation PPMs
Implement Next Generation TIS/LRS & Roadway Inventory
Implement ROW and Utility Relocation system
Extend Planisware® implementation to support resource management
Reengineer As-Built process
Establish and Implement Design Model Strategy
Implement AASHTOWare™ Project Construction and Materials
Maintenance and Asset Management
Define Enterprise Asset Management Strategy
Extend SIMS functionality
Implement Modeling and Analytics for Structures
Extend MMS to handle ancillary assets
Transportation Operations Management
Implement new COTS Traveler information System
Implement new Outdoor Advertising System
Continue implementing SMARTCOP enhancements
Implement Mobile Technology support
ePart Enhancements
Multi-modal and Grants Management
Implement Enterprise Grants Management Solution
Business Support Services
Implement Financial Suite as part of ERP project
Implement State's ERP solution as financial system of record for MDT
Implement Talent Management solution
Implement Discipline & Grievance Management solutions
Implement a Case Management System
Cross-Functional
Implement Enterprise Content Management (ECM)
Implement Mobile Technology support
Information Technology Organization and Governance
Retire all Oracle Forms Applications
Establish Data Governance Program
Implement Data Warehouse, Business Intelligence (BI), and Analytics
Define and implement data services strategy
Implement single sign-on
Define and implement Disaster Recovery Planning (DRP) and Strategy
Develop Cloud Strategy
Develop Mobile Device or Mobility Strategy
Establish IT Governance
Establish Agency Technology Procurement Policy
Establish enterprise strategy and framework for effective use of IT resources across agency
Establish consistent use of IT standards and policies MDT-wide for all programs/projects with an information technology component
Establish Effective IT Contract services capabilities

Table 1: Summary of High Level Recommendations

within the Enterprise Architecture program. Examples of anticipated benefits related to the establishment of the MDT Enterprise Architecture program include:

- Structured documentation of an organization's business drivers—Improved planning and decision making
- Improved communication and collaboration
- Process standardization and business efficiencies
- Improved sharing of information across the enterprise—Consistency, accuracy, availability and timeliness of information
- Structured technology investment process
- Better leveraging and management of MDT's technology spend

It is expected that quantified benefit streams will be identified and a return on investment analysis prepared for individual projects within the Enterprise Architecture program as part of detailed project planning for each initiative.

Examples of anticipated benefits from individual projects proposed within the Enterprise Architecture program include:

- Increased efficiency in the delivery of the transportation program through better project prioritization and selection tools, improved project management tools and a holistic asset management systems strategy;
- Improved effectiveness in the use of the agency's maintenance budget through improved life-cycle cost management, as a result of implementation of an integrated transportation asset management solution with life-cycle cost modeling, needs identification, trade-off analysis, and performance-based budgeting capabilities;
- Increased automation of accounting and other support functions allowing some MDT staff time currently spent on transaction processing to be re-directed to higher value activities;
- Improved contract management capabilities through the consolidation of multiple contract management systems into a single contracts management application that is tightly integrated with SABHRS ERP;
- Redirection of some MDT IT staff to supporting more mission specific business applications by leveraging SABHRS, Oracle Taleo

and potentially the future statewide grants management solution and other statewide solutions for the department's financial, contract management, human capital management and procurement management system requirements; and

- Standardized reporting capabilities with more timely and accurate data and improved management analytics and performance measurement capabilities through the new Data Warehouse environment.

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For More Details . . .

The research is documented in Report FHWA/FHWA/MT-16-007/8238-001
http://www.mdt.mt.gov/research/projects/isd_architecture.shtml

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MDT Implementation Status: August 2016

An implementation plan was prepared as part of the project and presented to the MDT Technical Panel and MDT executive management in May 2016. Several of the initiatives recommended to take place during Fiscal Year 2017 have been initiated while others are on hold pending budget constraints and assessment of the impact of the Statewide IT Convergence initiative (Executive Order 09-2016).

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