

Data Management Strategy (DMS)

State Self-Assessment (SS-A)

Medicaid Information Technology Architecture
(MITA) Version 3.0

Healthcare IT Consulting

MITA State Self-Assessments (MITA SS-A) for the
Medicaid Information Technology Architecture 3.0 Project

Prepared for:

Arkansas Division of Medical Services

Version 2.5
June 27, 2019

STATEMENT OF CONFIDENTIALITY

This document is the property of NTT DATA and is produced in response to your request. No part of this document shall be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, to parties outside your organization without prior written permission from NTT DATA. For more details, see Legal Notice © 2019 NTT DATA, Inc.

REVISION HISTORY

Version	Effective Date	Brief Description of Change	Affected Section(s)	Prepared By	Reviewed By	Approved By
1.0	11/16/2018	Draft		MITA Team		
1.1	12/10/2018	Incorporate comments/feedback from Eligibility Team Review		MITA Team		
2.0	01/14/2019	Incorporated final feedback from Stakeholders		MITA Team		
2.1	06/27/2019	Draft to include Phase 2 (MMIS)		MITA Team		
2.2	7/30/2019	QA/QC Review		MITA Team		
2.3	09/03/2019	Comments from Stakeholder review		Stakeholders		
2.4	09/06/2019	Update document to address Stakeholder comments		MITA Team		
2.5	09/30/2019	Signature Approval		MITA Team		Stakeholders

TABLE OF CONTENTS

1. Executive Summary	1
2. DMS Introduction	4
2.1 DMS Overview	4
2.2 DMS Scope	5
2.3 CMS DMS Requirements and Purpose	5
3. DHS DMS Assessment	7
3.1 DHS DMS Assessment Approach	7
3.2 Current DHS DMS Analysis	7
3.3 Arkansas Projects and Initiatives – IT Service Programs	8
4. DHS Data Management Strategy	12
4.1 Data Governance	12
4.2 Data Management & Data Stewardship	18
4.3 Data Architecture	19
4.4 Enterprise Data Models	20
4.5 Data Sharing Architecture	22
5. Enterprise-Wide ARIES Platform	23
6. Summary	26
Appendix A: Acronyms	27
Approvals	30

LIST OF FIGURES

Figure 1: MECL SS-A Workflow 1

Figure 2: DHS Organization Chart 3

Figure 3: DMS in the Context of the MITA Framework 4

Figure 4: DHS 2018 MITA SS-A IT Asset Diagram 8

Figure 5: DIS Organizational Chart 9

Figure 6: Enterprise Governance Vision 14

Figure 7: Data Governance Framework 16

Figure 8: Data Governance Organization Model 17

Figure 9: Architectural Principles and Guidelines 24

Figure 10: Enterprise Technical Reference Architecture 24

1. Executive Summary

The Arkansas Department of Human Services (herein referred to collectively as DHS) tasked NTT Data (formally Cognosante) to conduct a Medicaid Information Technology Architecture (MITA) Version 3.0 State Self-Assessment (SS-A) for the state of Arkansas. The DHS SS-A process updates the 2013 MITA SS-A. This MITA SS-A is being completed in two phases: the first relates to Eligibility, and the second incorporates the rest of the Medicaid Enterprise. This document represents both, with it combining the findings from both phases of the SS-A.

NTT DATA developed this DHS Eligibility Data Management Strategy (DMS) document as a necessary component of the Centers for Medicare & Medicaid Services (CMS) MITA SS-A, which is part of the Initiation and Planning phase of the Medicaid Certification Lifecycle (MECL) and the Medicaid Eligibility and Enrollment Toolkit (MEET). The information from the DHS DMS feeds into the DHS MITA Concept of Operations (COO) and 5-Year Roadmap, which are also components of the overall DHS MITA SS-A. Figure 1 shows the workflow of these documents as they relate to the MECL and Medicaid Eligibility and Enrollment Life Cycle (MEELC).

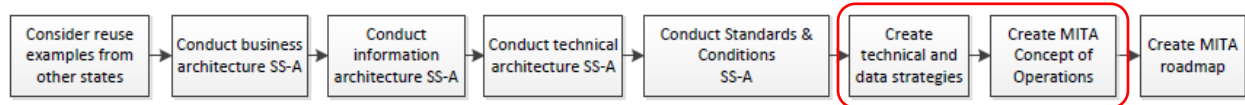


Figure 1: MECL SS-A Workflow

The CMS MITA Framework 3.0 recommends that DMS address the following strategy components relative to DHS Executive Vision:

- Data Governance
- Data Management & Data Stewardship
- Data Architecture
- Enterprise Modeling
- Data Sharing Architecture

The premise of the DMS Data Management Strategy is threefold:

1. State Medicaid Enterprises need to exchange and share information internally and with other state and federal agencies, organizations, and enterprises.
2. DHS needs to extend current data and information activities to include alignment with industry standards, data sharing, seamless integration, reuse, and semantic interoperability at the Enterprise-level, while maintaining data quality and integrity.
3. The DMS will coordinate the efforts for DHS with the goal of getting the right Medicaid data to the right people at the right time.

DHS is in a dynamic time as a major initiative is currently underway that will consolidate and replace all current eligibility systems with a new Enterprise-wide eligibility system called ARIES. Several opportunities exist to align data strategies and technical architectures to this ARIES solution.

A MITA DMS identifies specific strategies that help facilitate MITA Maturity, improve MITA Business Areas and Process capabilities, and support the DHS Executive Vision, including future IT Service Initiatives. As part of the strategy in developing the proposal for the new ARIES eligibility solution, DHS

identified a list of goals, visions, and guidelines for the technical implementation of the ARIES system. These visions complement the overarching goals typically presented in a DMS document.

The strategic goals outlined for this effort include:

- **Migration to a Person-centric Model.** This solution intends to provide services that are unique to each individual, rather than shoehorn a person into programs that may not be the best fit. This will allow service to the individual across multiple programs.
- **Data Standardization with Master Data Management (MDM).** The establishment of the ARIES platform will consolidate all eligibility data into a single source, as well as establish an MDM solution for managing the data. This will also allow much easier access to data for the purposes of analysis and reporting, as workers would no longer need to search data across multiple systems.
- **Leverage Technology.** It is the intent of DHS for this platform to be a web-based solution utilizing web services that will allow for a much greater ease of access for its clients. This will expand a client's ability to utilize self-service for their needs using the internet or smartphones.
- **Decrease Technology Risks and Costs.** Newer systems and technology require less maintenance and less costs associated with that maintenance. Shared services based around new technology drive down costs Enterprise-wide by allowing other agencies and business units the ability to leverage the shared service for similar business needs, rather than having separate systems.
- **Improve Operational Efficiency and Effectiveness.** Implementing web services will improve overall operational efficiency as opposed to running multiple, older systems.
- **Establish an Integrated Platform to Support Future Needs.** It is intended for this project to utilize open technology architectures to allow for shared services and data across agencies.

To complete the DMS, as well as the MITA Information Assessment and Technical Assessment, NTT Data met with various State personnel to better understand the current data management environment and the overall strategy for data management for the future. These meetings were held with the CIO, Deputy CIO, and various other technical and information Subject Matter Experts (SMEs).

For better understanding of the strategic planning, NTT Data met with the CIO, Deputy CIO, and EEF Technical Project Managers. These meetings were used to gather information regarding strategic planning in the Enterprise based around several DMS components, including data governance, data management, data stewardship, data architecture, data models, and data sharing.

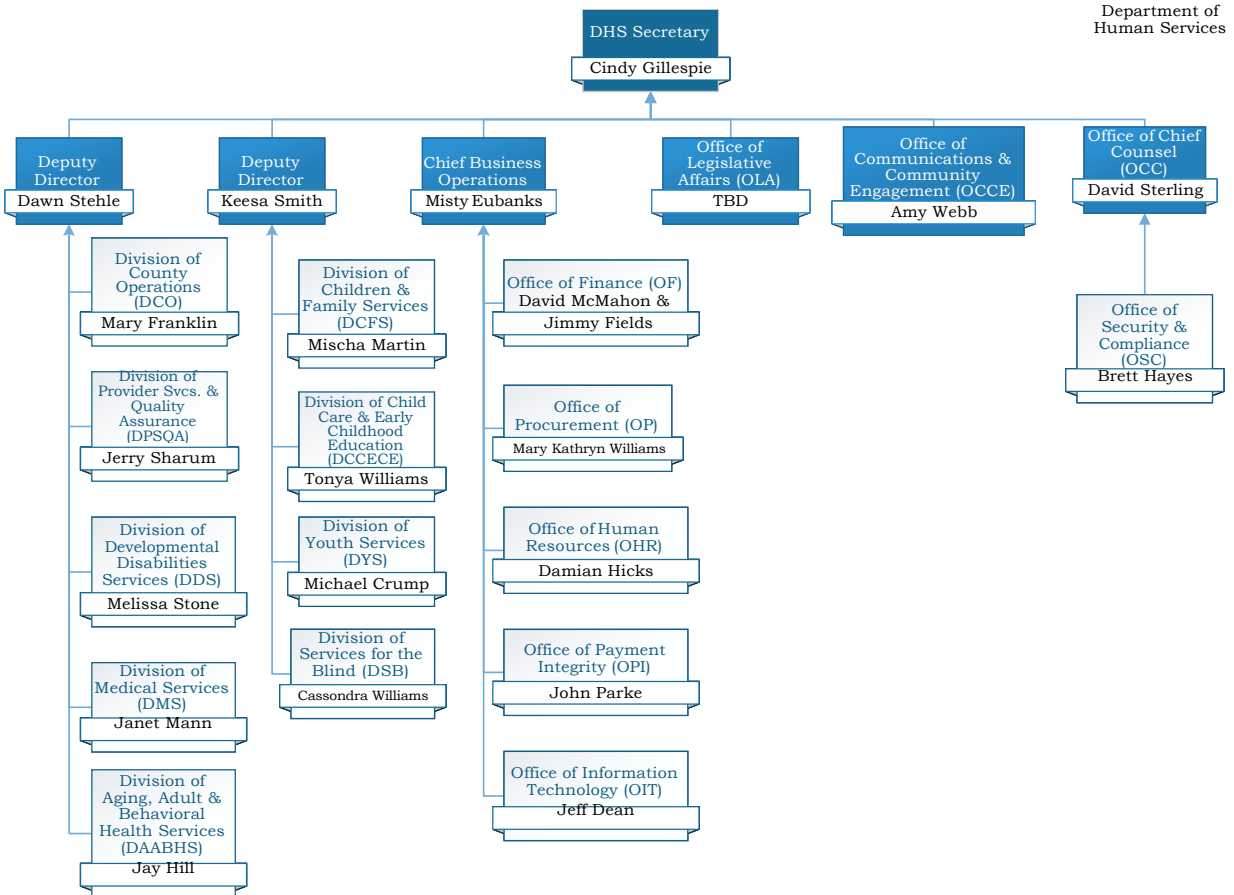
In addition to the meetings held with State staff, existing documentation was also leveraged to better understand the strategic approach, including the ARIES Request for Proposal (RFP), which provided significant detail as to how DHS plans to move forward with technical and data management, and a draft plan of the ARIES Data Governance, much of which will be outlined in Section 4.1: Data Governance.

NTT Data developed this DMS in parallel with development of the DHS Technical Management Strategy (TMS) document. The TMS is a separate deliverable but shares the same methodology, approach, and structure.

- The DMS focuses on the data management processes, techniques, and products needed to achieve optimal sharing of Medicaid Enterprise information.
- The TMS focuses on the technologies needed to achieve optimal sharing of Arkansas Medicaid Enterprise services and information.

The Arkansas DMS Audience

The primary audience for the MITA DMS is CMS, along with the Arkansas Medicaid executives and lead architects. In this document, the Medicaid Enterprise audience is defined as DHS, included in the following diagram:



As of - 9/11/2019

Figure 2: DHS Organization Chart

These departments/agencies can impact the DHS Medicaid Business Processes, MITA Maturity, Concept of Operations (COO), and 5-Year Roadmap.

2. DMS Introduction

The Information Architecture section of the CMS MITA Framework 3.0 requires a Data Management Strategy, as shown in Figure 3. With the release of the CMS Medicaid Enterprise Certification Toolkit (MECT) 2.3, the DMS is an artifact that states must produce as part of the MITA Self-Assessment. In addition to the DMS, a Technical Management Strategy and MITA Concept of Operations must be produced as part of the MITA SS-A.

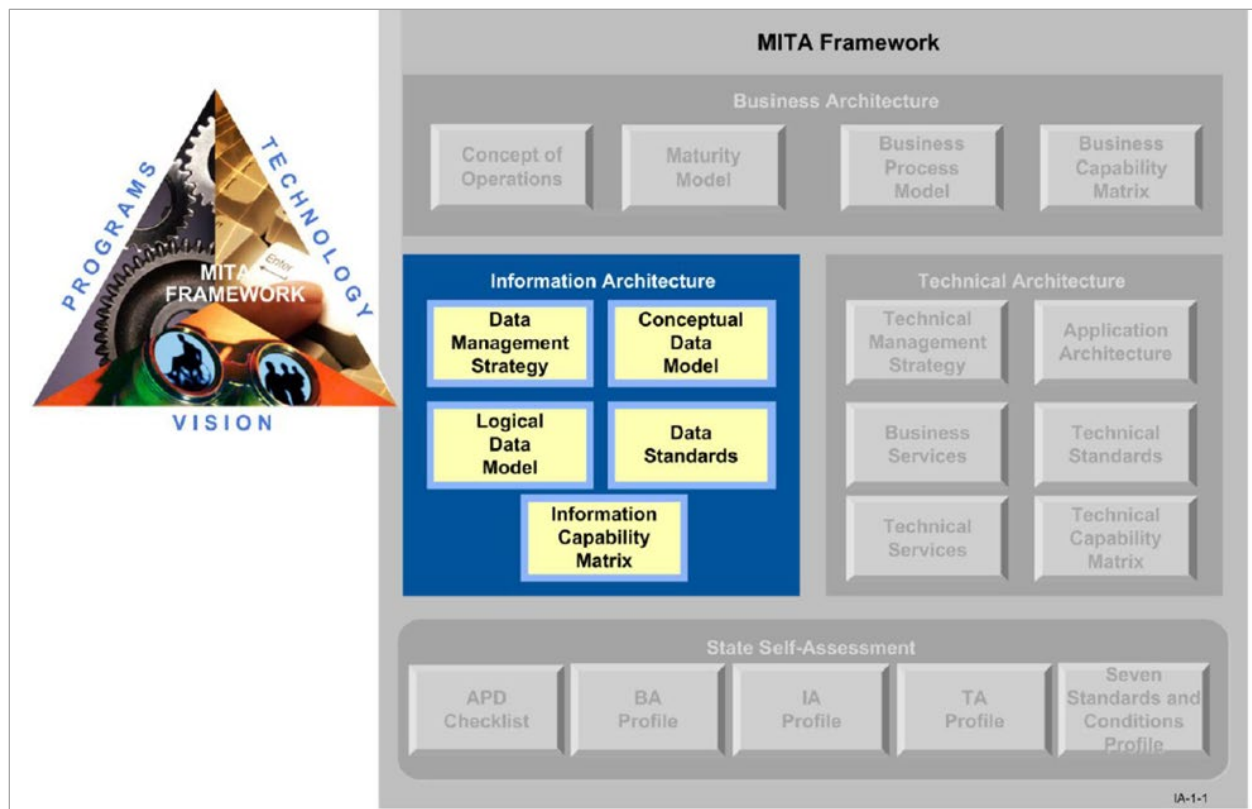


Figure 3: DMS in the Context of the MITA Framework

2.1 DMS Overview

The purpose of the DHS DMS is to provide a structure that facilitates the development of information to effectively share across the Medicaid Enterprise, which encompasses the systems and business functions where federal matching funds apply that are influenced by MITA, to improve mission performance. The DMS addresses fundamental areas necessary to enable information-sharing opportunities and position DHS to operate in an environment of required information.

The DMS covers data management challenges the Medicaid Enterprise currently faces, as well as initiatives underway in DHS and the entire Enterprise. The Data Services strategies are designed to help improve the core Medicaid functions and assist in providing shared services and interoperability throughout the entire Enterprise.

CMS documentation regarding the DMS and what it entails is provided in the MITA 3.0, Part II, Chapter 2, Data Management Strategy document.

2.2 DMS Scope

The DMS addresses the common Medicaid DMS strategies, techniques, and components for the Medicaid Enterprise at a high level. CMS requires the Medicaid Enterprise extend the MITA DMS for state-unique strategies, techniques, and components. The following points describe the scope of the MITA DMS:

- The DMS is technology, location, and organization neutral. DHS is responsible for its individual allocation strategy of the DMS.
- The DMS should address state-specific strategies, techniques, and components.
- The DMS associated with the physical data model, databases, and data files is not part of the MITA Framework. The DHS Medicaid Enterprise is responsible for developing this strategy.

2.3 CMS DMS Requirements and Purpose

Data Management is complex, with many components that must be defined, organized, and managed in a framework where guidelines are established. The DMS identifies enabling technologies and specifies interoperable designs for data exchange and the associated processes and procedures. Many organizations contribute to the development of the target data management environment according to standard specifications.

Data Management is the business of planning, controlling, and delivering data. The scope of the data management function and the scale of its implementation vary depending on the size, means, and experience of the organization.

Data Management is a shared responsibility between the data management professionals within the IT Organization and the business data stewards representing the collective interests of data producers and information consumers.

The DMS defines a DHS enterprise-wide data strategy that addresses the business flow of data across the Medicaid Enterprise. It involves architecture, modeling, standards, management, interoperability, Security & Privacy (S&P), access methods, quality, and performance standards.

The DHS DMS considers DHS and the rest of the Medicaid Enterprise's goals in conjunction with five DMS components:

1. **Data Governance** – Focuses on/exercises authority and control (planning, monitoring, and security) over management of data assets.
2. **Enterprise Data Management and Data Stewardship** – Implements Data Governance, Data Stewards, Owners and Policies - defines the governance processes for making enterprise-wide decisions regarding MITA's information holdings.
3. **Common Data Architecture** – Establishes standard data-management procedures for the MITA data models. Data Architecture provides guidelines to ensure that policies are established by DHS, DIS, and other relevant agencies for:
 - a) Data Documentation
 - b) Data-Sharing (development and use)
 - c) Data Management of Metadata (all types)
 - d) Data Definitions for:

- I. Data Entities
 - II. Data Attributes
 - III. Data Models (conceptual and logical)
 - IV. Data Relationships (to convey the overall meaning and use of Medicaid data and information)
4. **Enterprise Modeling** – Standardizes data across source systems and establishes data standards that support enterprise modeling capabilities.
 5. **Data-Sharing Architecture** – Establishes an Arkansas Enterprise formalized view that describes technology considerations for healthcare enterprises to participate in information-sharing communities. The Data Sharing architecture is based on business requirements. The Medicaid community defines or adopts standard data definitions and data-sharing schemas.

DHS is responsible for knowing and understanding its environment to map its data to information-sharing requirements. The data-sharing architecture addresses the Conceptual and Logical mechanisms for data-sharing (data hubs, repositories, and registries).

The data management strategy identifies the patterns in DHS for the exchange and sharing of Medicaid information. Identifying the DHS data patterns allows the development of optimal data governance procedures, data architecture, and data-sharing architecture for the Medicaid Enterprise.

3. DHS DMS Assessment

This section describes the approach used in conducting the DHS DMS Assessment and an overview of existing DHS systems.

The information in this section identifies the gaps and opportunities in the adoption of the MITA SS-A DHS Data Management Strategy.

3.1 DHS DMS Assessment Approach

Three sources of information were used to develop the TMS and DMS:

- Existing system documentation, including RFPs for proposed systems
- Interview sessions
- Enterprise Architecture review board meetings

The assessment approach includes the following activities:

1. Identify systems that support DHS Medicaid Operations and SMEs
2. Conduct MITA training for SMEs
3. Review existing documentation for systems deemed in scope for the MITA SS-A
4. Schedule system interview sessions with identified SMEs
5. Compile and analyze system responses
6. Determine data and technology capabilities and MITA maturity scores
7. Analyze the existing DMS environment
8. Generate the DMS deliverable

3.2 Current DHS DMS Analysis

This section provides an overview of the current DHS systems. NTT Data assessed seven systems in the DHS MITA SS-A and engaged DHS business and system experts to gather system business and technical interface information. The results of the technical assessments were used to complete the Information Architecture (IA) and Technical Architecture (TA) components of the DHS MITA SS-A.

The DHS IT Asset Diagram shown in Figure 4 illustrates the current DHS technical architecture as documented in the MITA SS-A Technical Assessment. Not all of the systems shown in the diagram were assessed in the SS-A.

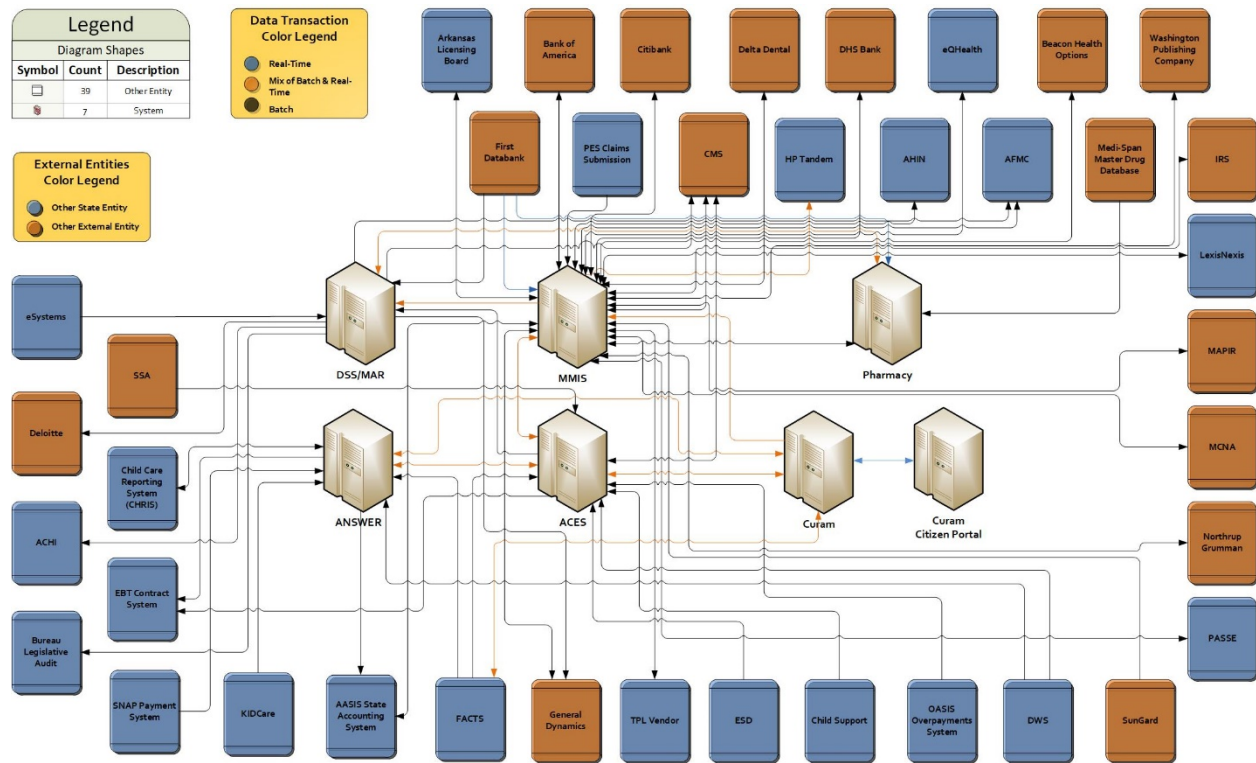


Figure 4: DHS 2018 MITA SS-A IT Asset Diagram

The overall DHS eligibility information maturity As Is capabilities are at Level 1. Two of the major systems that have a big role in eligibility determination, ACES and ANSWER, are old legacy systems that exist on a mainframe and require extensive coding for updates or changes. However, these systems will be replaced by the proposed integrated eligibility system that is in the procurement process, which should substantially improve in maturity.

The following list provides an overview of existing DMS capabilities:

- The four Data Management Strategy information components are mostly a Level 1, with only the Data Sharing component being a Level 2. ACES and ANSWER are limited in data governance, data architecture planning, and enterprise modeling. Curam, being a commercial off-the-shelf (COTS) product, is more mature in most of these capabilities.
- Conceptual Data Model (CDM) and Logical Data Model (LDM) information components are mostly a Level 1, with the LDM capability being more mature at a Level 2 for all systems except ACES.
- Data Standards information component is a Level 1 for all systems. None of the systems use a set of data that is standardized across multiple systems.

3.3 Arkansas Projects and Initiatives – IT Service Programs

NTT Data reviewed various documents that provided an insight into IT Service Programs in several agencies and/or commissions. The main document reviewed was the ARIES RFP, which had a lot of detail regarding the current state of DHS, the current systems, and the technology transformation plan for the future.

Cross-agency collaboration and IT Services Support are officially provided by the State Department of Information Services (DIS), which is the State’s information technology solutions provider. The DIS focuses on five main areas:

1. Centralizing the data center
2. Technical management services
3. Networking services
4. Storage and backup
5. Telephony/voice services

DIS provides all the common technology and infrastructure for technical services to DHS, including networks, servers, data centers, and disaster recovery, aside from systems that are outsourced to cloud vendors.

Figure 5 displays the current organizational structure of DIS:

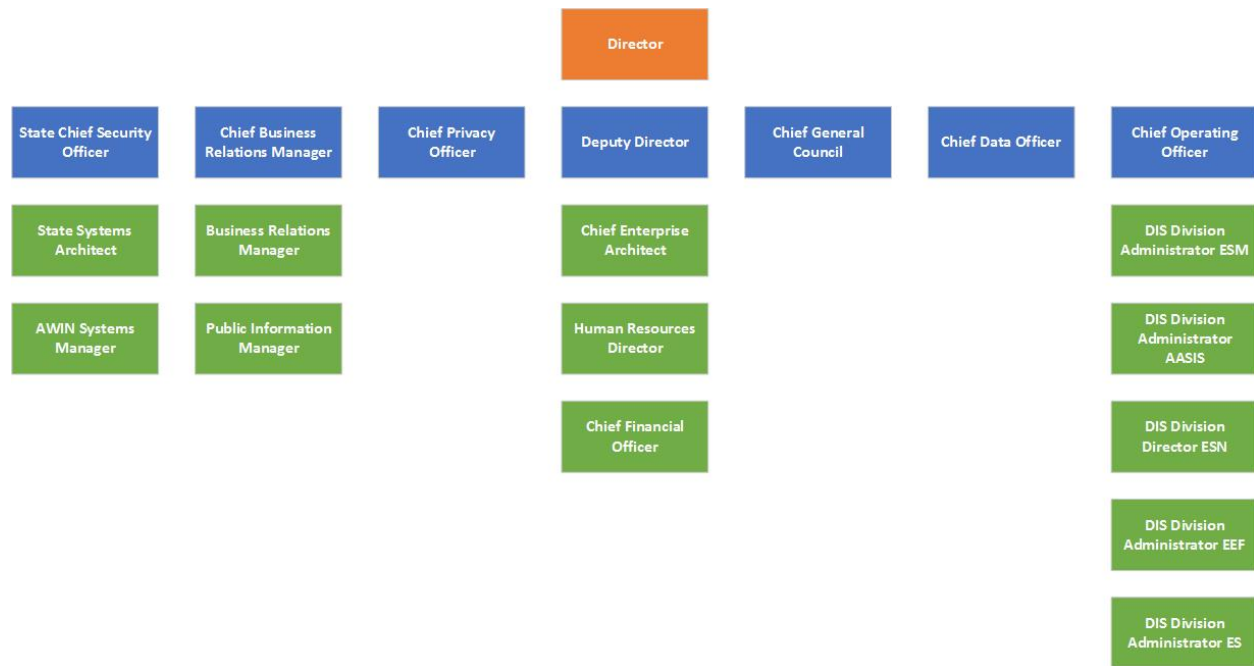


Figure 5: DIS Organizational Chart

The biggest initiative underway is the ARIES implementation, which is led by DHS and being developed by Deloitte. Many processes of this procurement will have impacts across the Enterprise, mostly regarding eligibility data sharing and reporting. This new system will also need to have access to system data in other departments/agencies.

The ARIES RFP lists several departments that will be impacted by the ARIES implementation and what those impacts will be. That list is as follows:

- **Department of Human Services (DHS)** — ARIES Solution will serve as the primary eligibility and benefits management solution for DHS programs through the use of an “integrated application” for the

screening, application, and determination processes, as well as benefits management for the non-healthcare programs.

- **Department of Workforce Services (DWS)** — ARIES Solution, through the “integrated application” capabilities, will be used to determine eligibility for Temporary Assistance for Needy Families (TANF)/Transitional Employment Assistance (TEA).
- **Arkansas Department of Health (ADH)** — ARIES Solution will provide, through the “integrated application” approach, a preliminary eligibility assessment for WIC benefits – as an additional online channel to the State’s WIC benefits and services.
- **Department of Finance and Administration (DFA)** — ARIES Solution, through the “integrated application” approach, will gather and transmit key child support related data to OCSE (Office of Child Support Enforcement).
- **Department of Veterans Affairs (ADVA)** — ARIES Solution, through the “integrated application” approach, will provide a screening for ADVA benefits as an additional online channel to the State’s VA benefits.
- **Department of Information Services (DIS)** — As the information technology agency for the State, DIS will provide the infrastructure on which the ARIES Solution will run and provide oversight and support to all aspects of the ARIES.

Other initiatives underway that are listed in the MITA Roadmap that could have implications in the DMS in regard to data management strategies include:

- **Comprehensive Child Welfare Information System (CCWIS)** – CCWIS will be a case management system for child welfare programs. This system is intended to replace the older Children’s Reporting and Information System (CHRIS) with the goals of promoting data sharing with other agencies and implementing data quality plans.
- **Juvenile Justice Information System** – This system is intended to replace the older juvenile justice case management system.
- **Enterprise Business Case Management System** – The Business Case Management System (BCMS) is intended to support operational business needs throughout the Enterprise. This will be achieved through information management and automated workflows.
- **Portal Enhancements** – Both the member portal and provider portals are intended to be enhanced with extended functionality offered to both members and providers.
- **Data Management** – There are several planned projects for the enhancement of data management capabilities, including data inventories, data analytics, data quality improvements, and consolidated data repositories. These initiatives are more focused in the DMS, but may have some technical implications as well, such as how the data is stored and how the data is routed between systems.
- **MMIS System Enhancements** – There are over 150 requirements that were deferred when the MMIS was implemented. DHS would like to start going through those deferred requirements and “unlock” them in order to provide enhanced functionality to the current MMIS.
- **DHS Website** – This would replace the current website with a much more robust website featuring more content and a complete redesign.
- **Shared Services Enhancements** – Shared services are a big component of MITA, and Arkansas is currently planning several projects to enhance its shared services throughout the Enterprise. These include:
 - **Workflow Management** – JIRA is a COTS product that can be used for issue tracking, project management, and workflow management. QuickBase is another case management COTS product that is being considered.

- **E-Procurement** – DFA is looking to obtain a cloud-based Software as a Service (SaaS) solution for handling procurements electronically. This solution could be beneficial on the Enterprise level and should be viewed with the overall TMS in mind.
- **Enterprise Service Bus (ESB)** – The implementation of ARIES will also include an ESB component. Originally this was going to be implemented by the winning vendor (Deloitte), but recently it was decided to procure an ESB separately.
- **Active Directory Enhancements** – This project is intended to implement Single Sign-On (SSO) functionality.
- **Security Enhancements** – Closely tied to the SSO initiative above, the State would like to move towards 2-factor authentication for logging into system portals.
- **Amazon E-Procurement** – This project is to procure and implement Amazon Web Services (AWS) in order to better centralize web services and data integration.
- **Integrated Ticketing System** – Currently, each system has its own ticketing system for tracking issues and tech support. The State would like to consolidate the issue tracking to a single system to better streamline the issue resolution process.
- **HIT/HITECH Integration** – Interface with the HIE to receive clinical data.
- **Dashboards** – Working with the winning ARIES vendor Deloitte, enhanced dashboard functionality is being developed for multiple systems to better track and display system performance metrics.
- **Enterprise File Transfers** – The State is looking at improving the way files are transferred across the Enterprise. Currently MOVEit and Accellion are used for file transfers. The State would like a single file sharing platform to, at the very least, replace MOVEit.

4. DHS Data Management Strategy

This section presents the DHS MITA Data Management Strategy and addresses the data management opportunities available for the DHS. This takes into consideration the existing operational, information, and technical DHS environment. Recommendations align with the CMS MITA Maturity Models, Seven Standards and Conditions, and the MITA 5-Year Roadmap.

4.1 Data Governance

Data Governance Overview

Data Governance is not the same as IT Governance. IT governance makes decisions about IT investments. Data Governance is focused on and exercises authority and control (planning, monitoring, and enforcement) over management of data assets. The purpose is to ensure that data is managed properly according to defined policies and best practices. Data Governance is accomplished as an on-going program and continual improvement process.

Data Governance also provides high-level planning and control over data management. Data Governance defines the governance processes for making enterprise-wide decisions regarding information holdings. It provides the capability to determine ownership and data standard adoption processes, address data integrity, define processes for business-process development, and establish a mechanism for arbitrating differences. Data Governance responsibilities ensures the following:

- Registration of data solutions into an enterprise repository
- Compliance of all data solutions with enterprise data-naming standards
- Compliance of all data solutions with security and disclosure
- Data integration plan that supports Technical Service Model (TSM) efforts for all data solutions

DHS Data Governance will determine the necessary data management functions and their respective processes to be defined and documented in the Enterprise Data Lifecycle. Data Management processes should include context diagrams that identify:

- Suppliers
- Inputs
- Tools
- Primary Deliverables
- Consumers
- Metrics

Data Governance guides the management of each of the data management functions. The following Data Management functions should be prioritized as essential in the ongoing DHS IT Service Programs in the Enterprise:

1. Data Architecture Management
2. Data Development
3. Data Operations Management
4. Data Security Management

5. Reference and Master Data Management
6. Data Warehousing and Business Intelligence Management
7. Document and Content Management
8. Metadata Management
9. Data Quality Management

Governance Structure and Data Management Services organizations are best developed by each enterprise. There may be a centralized organization or, alternatively, multiple decentralized service organizations.

Data Governance Strategy

A plan is in the works to establish a shared data governance with DIS, which will oversee the data management for the State. This governance will establish a Master Client Index (MCI) and eventually a Master Provider Index (MPI) that will consolidate account name and demographic information across all of DHS.

An Enterprise-wide governance strategy is in the preliminary stages of development. Figure 6 depicts the multi-level governance vision for DHS:

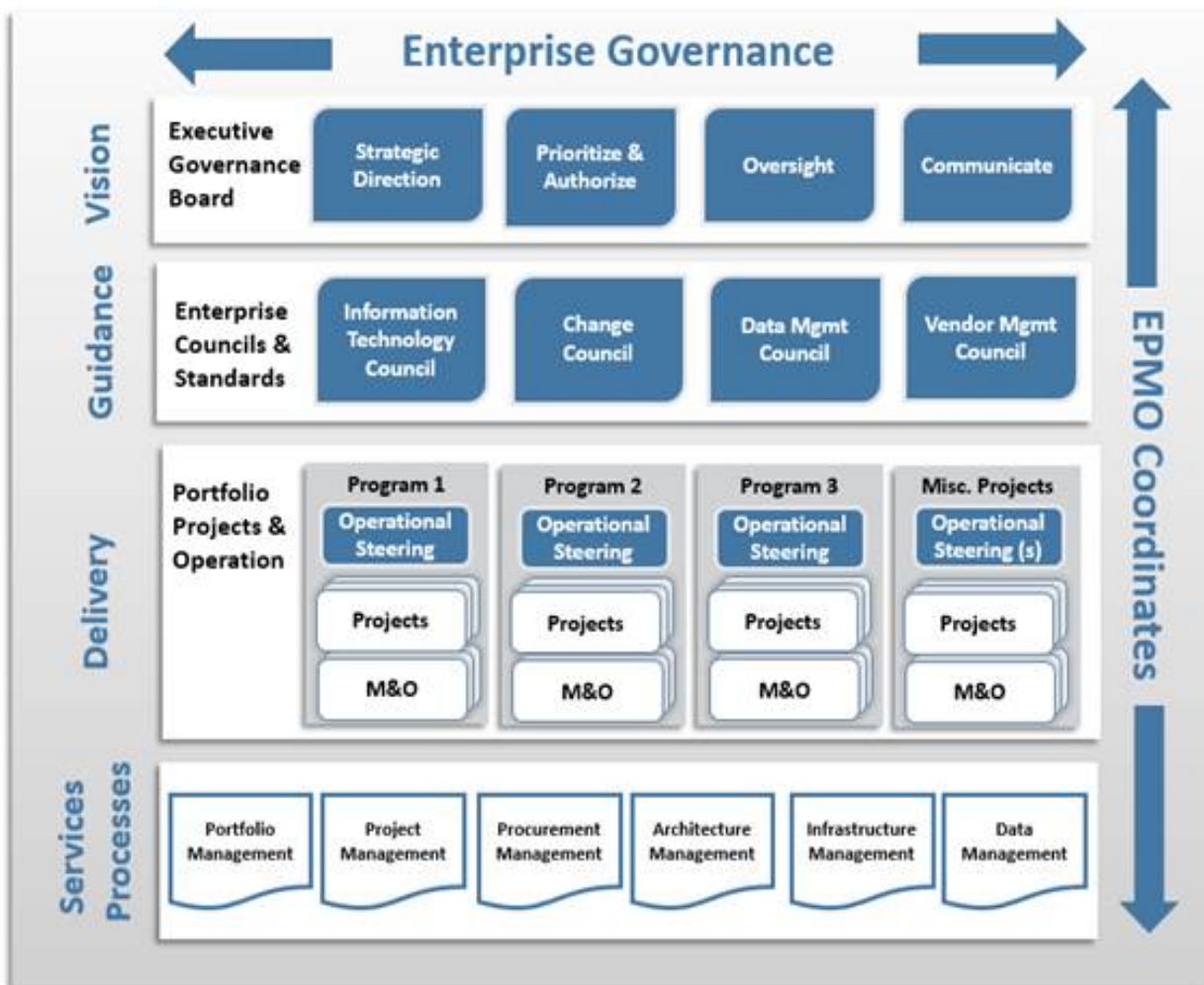


Figure 6: Enterprise Governance Vision

- **Vision:** The Executive Governance Board provides vision to the DHS enterprise by setting strategy and reviewing, authorizing, and prioritizing Information Technology Council-recommended projects or work efforts.
- **Guidance:** The Enterprise Councils & Standards groups support the Executive Governance Board by researching, evaluating, and making recommendations at their request. Each will consist of two or more individuals that have the collective responsibility and authority to review and recommend approval per specific Council scope, such as new technology projects, changes that impact multiple projects or systems, decisions about critical shared data, and vendor oversight. At the direction of the Executive Governance Board, each council or group in turn provides the guidance and standards to the Portfolio of IT projects and operations.
- **Delivery:** The Delivery of programs, projects, and operations maintains full control of the management required to deliver the approved objectives. They keep alignment with the Executive Governance Board strategy and adhere to standards or seek formal exception where necessary.
- **Service and Processes:** The Services and Processes are the organizations' services that may provide the programs, projects, and operations support services.

DHS has already approved and implemented the Information Technology Council and Change Council listed in the Guidance layer and the Executive Governance Board responsible for the vision. A Data Management Council will be established in the future. The Council will be responsible for establishing and maintaining data governance across the department.

ARIES Data Governance

The implementation of ARIES will bring an enhanced data governance vision to establish best practices in the management of the State’s eligibility data. This vision for the Data Governance framework is organized into four domains:

Domain	Description
Data Sharing	Governance of data sharing establishes policies and procedures for sharing or transmitting data between various State System stakeholder groups. Data sharing governance helps establish data owners, data stewards, review groups, and data transfer protocols to promote sharing and consuming ARIES data.
Data Security	Governance of data security helps secure data against potential threats or misuse. Data security includes a series of processes and activities related to data access, vulnerability, authentication, authorization, and monitoring of Personally Identifiable Information/ Confidential Information. These processes and activities help to manage security and safeguard the ARIES data.
Data Quality	Governance of data quality provides processes and activities related to capturing and maintaining accurate, reliable, relevant, and timely data. It encompasses a series of key processes related to unit testing, user acceptance testing, ETL validations, master data management, and quality audits to help proactively identify, resolve, and prevent data related issues.
Data Definitions	Governance of data definitions is essential for enterprise solutions such as ARIES to establish an agreed-upon and standard understanding for each data element. This domain involves defining common data definitions for the creation and maintenance of a centralized information repository about ARIES data, including details such as the data element name, business description, data relationships, data source, business logic, usage, etc.

With these four domains in mind, it is expected that the ARIES data governance framework will impact the following areas of ARIES:

- Data integration and ETL processes
- Data architecture and storage
- Business intelligence and reporting
- Advanced analytics and innovation

The following image provides an overview of how the ARIES data governance is expected to meet business goals across the enterprise:

Data Governance Framework

The framework establishes robust Policies, Processes, and Procedures to meet data governance business goals across the enterprise

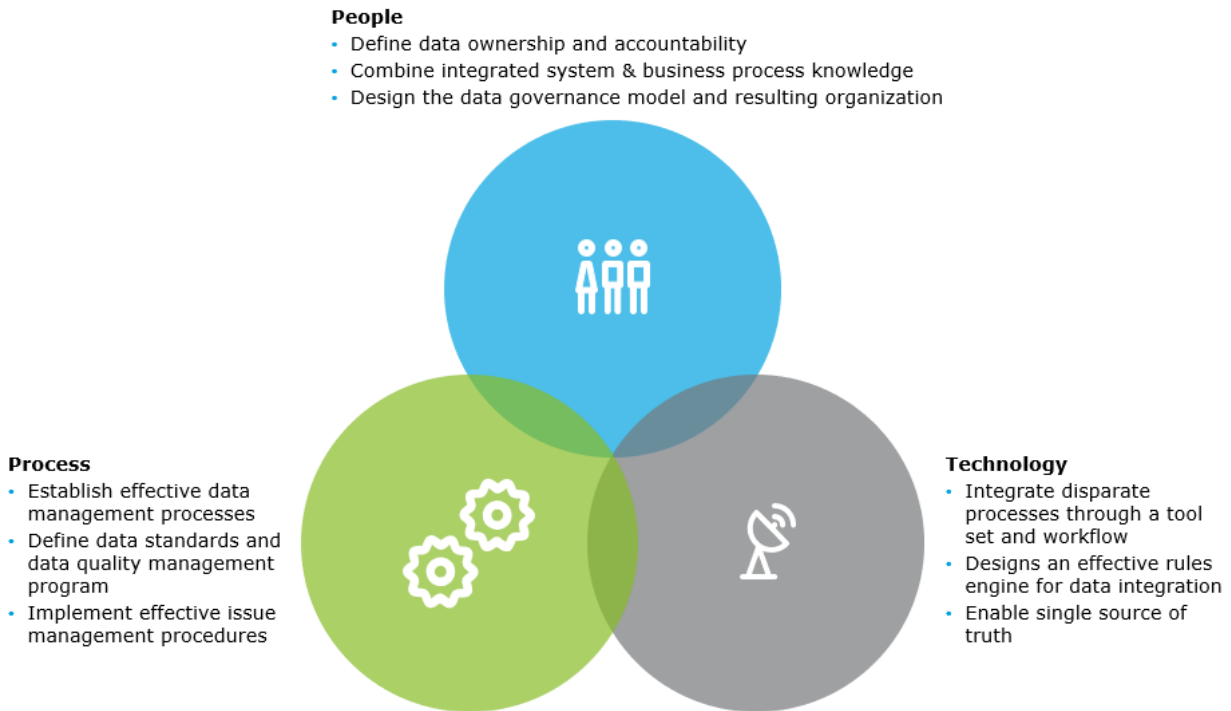


Figure 7: Data Governance Framework

To establish the data governance framework for ARIES, the following steps are expected to occur:

- Draft a data governance charter
- Establish a data governance committee
- Identify key data owners and stewards
- Obtain feedback from specific business stakeholders
- Schedule regularly occurring data governance committee meetings with key data owners, stewards, and stakeholders

Once a data governance framework is established, it is expected that the policies will be adapted throughout the department and agencies, resulting in real business outcomes. The following are a checklist of items that the establishment of data governance is expected to meet:

- **Domain Reduction:** The number of data domains where duplicative data exists and where data ownership is not defined will be consolidated.
- **Adoption Promotion:** The data governance council is expected to ensure that data owners and stewards adapt the governance processes and promote the governance to others.
- **Issue Identification:** Data issues will become more transparent as the data governance committee works with stakeholders to better identify issues.

- **Data Search Time:** An established governance will help stakeholders access the data they need in a timelier manner.
- **Tool Efficiency:** More effective data management tools will allow better access to data dictionaries and metadata repositories.
- **Data Source Numbers:** The number of overall documented data sources will be increased in order to better locate the data and identify who the stewards are.
- **Quality Metrics:** The establishment of data governance should better increase the quality of the data, including common metrics such as accuracy, consistency, completeness, precision, and integrity.

The following image provides a view of what the data governance organization model may look like:

Data Governance Organization Model

The Data Governance Organization Model supports interoperability and information-based decision making when managing the enterprise wide data governance activities.

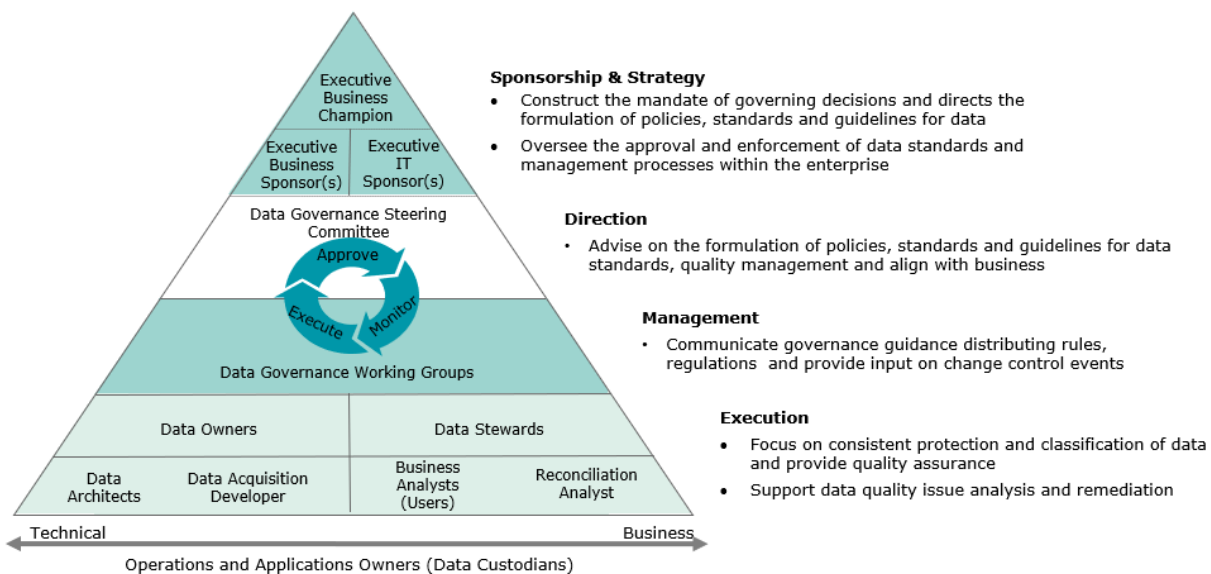


Figure 8: Data Governance Organization Model

The data governance strategy listed above is just a preliminary plan at this point. However, with it being a fairly robust starting point, the rest of the Enterprise would strongly benefit from adopting it and providing input in its formation. As part of the data governance strategy, a phased adoption approach is being planned to help the Enterprise adopt the strategy. The short-term plan is the development and establishment of the data governance strategy itself. The second phase involves scaling the plan across the Enterprise by capturing lessons learned, prioritizing the order of which agencies should adopt it, and opening up more communications with other agencies. The last phase involves completing the transformation to the new governance by having all agencies adopt it, working on changing the culture to increase promotion of the governance model, and establishing mechanisms that foster continuous improvements to the governance.

4.2 Data Management & Data Stewardship

DHS created a data catalog as part of the statewide initiative established through Senate Bill 983 and implemented in Act 1282. This act provides the following functionality:

1. Provides transparency and open access to public records and data
2. Establishes the open data and transparency task force to determine the best practices for the State to achieve the most efficient system for maintaining and delivering the state's public records and data
3. Makes recommendations for legislation to achieve a comprehensive open data and transparency act

Department heads from all the major agencies sit on the task force established by this act. The legislation also established the Chief Privacy and Chief Data Officer positions. The catalog establishes data sources, as well as owners/custodians (stewards) for the various DHS systems.

As part of this data management initiative, an Enterprise Data Management Strategy Development is underway which contains several projects intended to improve the management of the data used throughout the Enterprise. These projects include:

Data Quality Improvement – This is a big initiative that is aiming to improve the quality of the data that is being used to support the business. Data quality is an issue with many business functions needing to pull data from disparate sources, which may not have the best data available to begin with. This data quality initiative will start with improving the quality of T-MSIS data, MMIS data and will eventually be tied to ARIES and the greater Enterprise as a whole.

Data Quality is one of the four key domains that the ARIES data governance body is focusing on addressing. The goal of the Data Quality domain as listed in the ARIES data governance is to establish a strategy of improved data quality which provides processes and activities related to capturing and maintaining accurate, reliable, relevant, and timely data. It will encompass a series of key processes related to unit testing, user acceptance testing, ETL validations, master data management, and quality audits to help proactively identify, resolve, and prevent data related issues.

Data Inventory & Mapping - One of the big efforts currently underway is a mapping of data assets and information led by DIS and assisted by DHS. This effort is being guided by the data governance board and is being tied to a number of other projects and initiatives such as ARIES and the MMIS. The purpose of this data inventory is to create data dictionaries and definitions, determine business and technology stewards for the data, and establish systems of record. In addition to these goals, DHS would also like to conduct a gap analysis to determine what types of data might be missing from meeting business needs, rather than solely focus on what data is present.

Consolidated Data Repository/Master Data Management - The Enterprise Data Warehouse (EDW) used by DHS is a centralized repository consisting of over forty databases and ten thousand tables from across multiple DHS divisions and offices. The EDW framework is based on the Microsoft Business Intelligence stack utilizing SQL Server 2012 databases, SQL Server Integration Services for ETL/file handling, and SQL Server Reporting Services for report delivery and presentation. The EDW utilizes approximately 6 TB of space with an expected growth of 100 GB/ year.

The new ARIES application will either replace or enhance the current data feeds and provide data feeds to the DHS Data Warehouse as needed. Currently, this EDW is not accessible by outside agencies unless agreed upon by a data sharing agreement.

DHS collects data and information that is valuable to both internal and external stakeholders. Increasing demand to access the data from multiple stakeholders has strained data management to the point where the current technical solutions are no longer able to meet the growing demand. DHS staff must access

multiple systems to get the data they need, which requires multiple searches in separate systems. This runs into the problem of data being inconsistent since the data is not standardized among all the systems. Implementation of the ARIES will solve this problem by consolidating all the eligibility data that currently resides in multiple eligibility systems into a single data domain. ARIES will then be the single source of truth for all eligibility data across the Enterprise.

In addition to consolidating all eligibility data into ARIES, the State would like for all data to feed into the EDW so there can be a centralized repository for all data from all sources. Currently most of the EDW data feeds come from DXC and Magellan, but the State would like for all data from all vendors to flow into the EDW at some point.

The ultimate goal is to use the ARIES program to establish a Master Data Management (MDM) plan, which would be comprised of two phases. The first phase would establish a Master Client Index (MCI), containing all member data, which would get the most leverage from the ARIES project. Once that is established, the next phase would be to expand on the MCI and include providers, thus establishing a full Master Provider Index (MPI). This would include data on all stakeholders. Informatica has been procured to help develop the Master Data Management system.

Another aspect of the Master Data Management plan is to develop a standardized platform to host and route the data to and from across the Enterprise. The State is looking at utilizing Amazon Web Services (AWS) as a means to use cloud services. Other ideas in designing a standardized data platform include building a Data Lake and Enterprise Landing Zone that would store the raw data brought in from a data hub.

A fully developed strategy on enterprise-wide data management will not be realized until the Data Governance establishment has been completely finalized and approved.

4.3 Data Architecture

Enterprise data architecture is part of the larger enterprise architecture, where data architecture integrates with other business and technology architecture. Common Data Architecture establishes standard data-management procedures for the MITA data models. Data Architecture provides guidelines to ensure that policies are established by the State agencies for:

- Data Documentation
- Data-Sharing (development and use)
- Data Management of Metadata (all types)
- Data Definitions for:
 - Data Entities
 - Data Attributes
 - Data Models
 - Data Relationships (to convey the overall meaning and use of Medicaid data and information)

DHS identified the need to provide, through push and pull capabilities as well as robust reporting capabilities, decision support that moves data from information to knowledge. This will allow DHS to anticipate, support, and validate their decisions and activities. This can be achieved by building a Metadata Management system to take that information and turn it into knowledge by providing a bridge between business needs and IT infrastructure. The Executive Governance Board would need to plan a

metadata management system to ensure everyone knows what data sets are available, where the data resides, what the data means, and how the data may be transformed.

The planned MCI and MPI projects mentioned in the Data Governance section will define a subset of metadata and provide a data dictionary. Furthermore, DHS recently documented a Data Asset Inventory compilation that lists the data types that DHS uses for its business processes, what the data is used for, who the data stewards are, and other metadata. This analysis was put together for sharing with DIS. To expand on this effort, DHS would like to conduct a gap analysis as well, to identify what types of data may be missing to support the business needs. For example, identifying data that can help track opioid usage.

Since the ARIES system is intended to be the single source of truth for all eligibility data throughout the Enterprise, this project can serve as a pilot for the concept of data domains, which would group common data sets together as a single source. These data domains would follow the ten MITA Business Areas and group the common data together that meet the business needs of those areas. The Executive Governance Board would need to oversee this effort to ensure that all stakeholders to the data (stewards and systems) would have correct access to these new data domains to meet their business needs.

As listed above in Section 4.1: Data Governance, development of data definitions are one of the four key domains that the ARIES data governance board is focusing on. This domain involves defining common data definitions for the creation and maintenance of a centralized information repository about ARIES data, including details such as the data element name, business description, data relationships, data source, business logic, and other usage.

A fully developed strategy on enterprise-wide data architecture will not be realized until the Data Governance establishment has been completely finalized and approved.

4.4 Enterprise Data Models

Data Models Overview

Enterprise Modeling standardizes data across source systems and establishes data standards that support enterprise modeling capabilities. Business entities are classes of business ideas, processes, and concepts. Data is the set of facts we collect about business entities.

Data models define business entities and data attributes (facts about entities) needed to operate and guide the business. Data Modeling is an analysis and design method used to:

- Define and analyze data requirements
- Design logical and physical data structures that support the data requirements

Data Modeling is a technique used in Data Architecture and Data Development. CMS MITA 3.0 identified the need for DHS to develop Conceptual Data Models (CDMs) and Logical Data Models (LDMs).

Conceptual Data Model

A CDM is a blueprint or conceptual plan for building an information system's Information Architecture. The CDM serves as a tool that enables the reengineering of business processes and enterprise strategies. Specifically, system architects and designers use the CDM for guidance in developing plug-and-play and interoperable Medicaid information services. It is a representation of initial high-level data that serves as the plan architects and designers use to construct the more detailed LDM. The CDM includes the following information:

- Class Definitions
 - Class Names
 - Business Process for each class
 - Superclass
 - Source of class
- Messages
 - Name and description of the message
 - Message Type, i.e., Inbound or Outbound
 - Business Process and Business Area
 - Source of message information
 - Super classes
 - Abstract class that represents the generalized grouping of each class
 - Crosswalk of classes to super classes

Logical Data Model

The LDM provides the mechanism for ensuring the completeness of the business model and serves as a tool that enables the reengineering of Medicaid business processes. Using a shared data model, DHS will achieve true plug-and-play capabilities of services and interoperability. The LDM contains the following associated data:

- Class –represents a person, place, thing, organization, event, or concept of interest to the Medicaid Enterprise
- Class Properties
 - General Information – includes the name of the class and visibility
 - Attributes –an item of data, a fact, or a single piece of information about an entity
- Relationship – depicts the business requirements joining two entities and traces the interaction between the entities in either direction
- Documentation – contains clear definitions and uses examples or exclusions as needed to improve clarity
- Domains – human-friendly computer hostnames translated into IP addresses where the system stores a specified entity or attribute
- Related Standards – industry agreed-upon rules applied to the entity or attribute
- Entity-Relationship Diagram (ERD) – the method that produces a formal, graphical depiction of the model that includes classification or super classes, common classes, common data types, common vocabulary, input messages, and output messages

Data Model Strategy

DHS is planning on developing conceptual models that depict business entities, including their properties and relationships, that are based on the data sets that will be established in the eligibility data domain

during the ARIES implementation. CDMs will then be produced as creating the models at this level provides the foundation for future modular implementation and shows how different business areas interact with each other. This will provide a clear view of how data is used by the business and the flow of the data, as well as help establish ownership of data.

From the conceptual models, the next step will be to develop the logical data models to begin the process of documenting the data in detail. A logical model is independent of the technology used to physically implement the database. It standardizes the elements, rules, relationships, and events between them. DHS will begin to identify the attributes, along with the primary and foreign keys.

These models will become the basis for design decisions and requirements documentation. They will be living documents that will change throughout the lifespans of the data architectures. Fully developed strategies on data model designs and development will not be completely realized until the Data Governance establishment has been completely finalized and approved.

4.5 Data Sharing Architecture

Data-sharing architecture describes technology considerations that allow DHS to participate in information-sharing communities. DHS would define the data and information exchange formats.

In addition to ARIES, several other initiatives that were identified in Section 3.3 would have a need for Enterprise data sharing.

Once an eligibility data domain is established through the ARIES effort, these initiatives could be used as a jumping point to begin strategy and analysis on building the next set of data domains by aligning the initiatives to the ten MITA business areas.

As mentioned in previous sections, data governance is the starting point in establishing how data is shared and with whom. The Executive Governance Board needs to make the governance of data sharing one of its priorities, especially between DHS and DIS. Once this governance structure for data sharing is established, other DMS functions can be prioritized based on the IT Service Programs that will be responsible for sharing that data. One of the key domains for the ARIES data governance strategy focuses on data sharing. The governance policy will make a point of promoting the sharing and transmitting of data between the rest of the Enterprise.

5. Enterprise-Wide ARIES Platform

With the proposed ARIES platform, it is DHS's intent to create an Enterprise-wide solution and platform for sharing common services that can be leveraged throughout the Enterprise. It is intended for the technical components and modules to be reusable by other agencies as it fits their business needs for the purposes of reducing overall costs and providing a single source of truth for all eligibility data throughout the Enterprise. In doing so, all existing eligibility systems would be consolidated, which would reduce the need for storing redundant and/or unstandardized data in multiple locations. This approach potentially addresses many of the MITA DMS components, such as standardizing data with an MDM, leveraging technology to allow cross-agency shared services, and consolidating data into a single source of truth.

In planning for procurement of this Enterprise-wide eligibility solution, DHS developed a list of architectural principles and guidelines for the development of this system. Those guidelines, taken from the ARIES RFP, are listed in Figure 9.

Architectural Imperatives, Principles and Guidelines
<p>To build out a common Enterprise Platform that will support Integrated Eligibility and Benefit Management Services (ARIES) and further provide an enterprise technology foundation for all DHS business operations and programs, the following architectural imperatives have been developed by AR DHS leadership:</p> <ul style="list-style-type: none">• Focus on Users' Needs: Participants and program users need to be able to use the future system via multiple channels and task-appropriate devices aligned with the DHS' model of practice• Meet Federal Requirements: The Solution will address and meet all Federal requirements• Enterprise Approach: Integrate all systems support into a single integrated solution reflecting the user's experience in using the system to support their work efforts• Integrated Access and Consistent Interface: The system's user interface needs to provide users with an integrated access to all modules, data, and services relevant to the user group. Each user should be provided a consistent, customizable, and easy to use interface• Ease of Use: The system will provide user-defined criteria for ease of learning, use, and support for State staff and also to provide robust client self-service wherever possible and appropriate• Decision-support: Timely, accurate, and complete decision support information should be made available to authorized users, at all levels, through the application and standard tools• Service-Oriented: The target architecture should consist of a number of services that are compliant with industry standards for SOA to facilitate reuse, adaptability and interoperability supporting the larger DHS IT agenda for an integrated enterprise platform• Agile: The system should be able to readily adapt to changing business needs quickly and with minimal technical resources• Scalable and Extensible: The envisioned system needs to be scalable to accommodate additional users and extensible in expanding capabilities to meet future business needs and Federal and State mandates• Secure and Manageable: The target architecture for the next generation system needs to be protected against common Internet threats and will be manageable within the existing operational and financial constraints• Location Independence: System access should not be restricted based on the location of

- the user. Authorized users should have access based on their roles irrespective of their geographical location
- **Data availability:** The most up-to-date version of data needs to be made available to system users at all times within the cost and performance constraints

Figure 9: Architectural Principles and Guidelines

To address these functional needs, DHS is adopting an Enterprise-wide approach to the underlying technology that will set standards for the technology, interoperability, and data management. Figure 10 provides an estimated view as to what the integrated platform will look like.

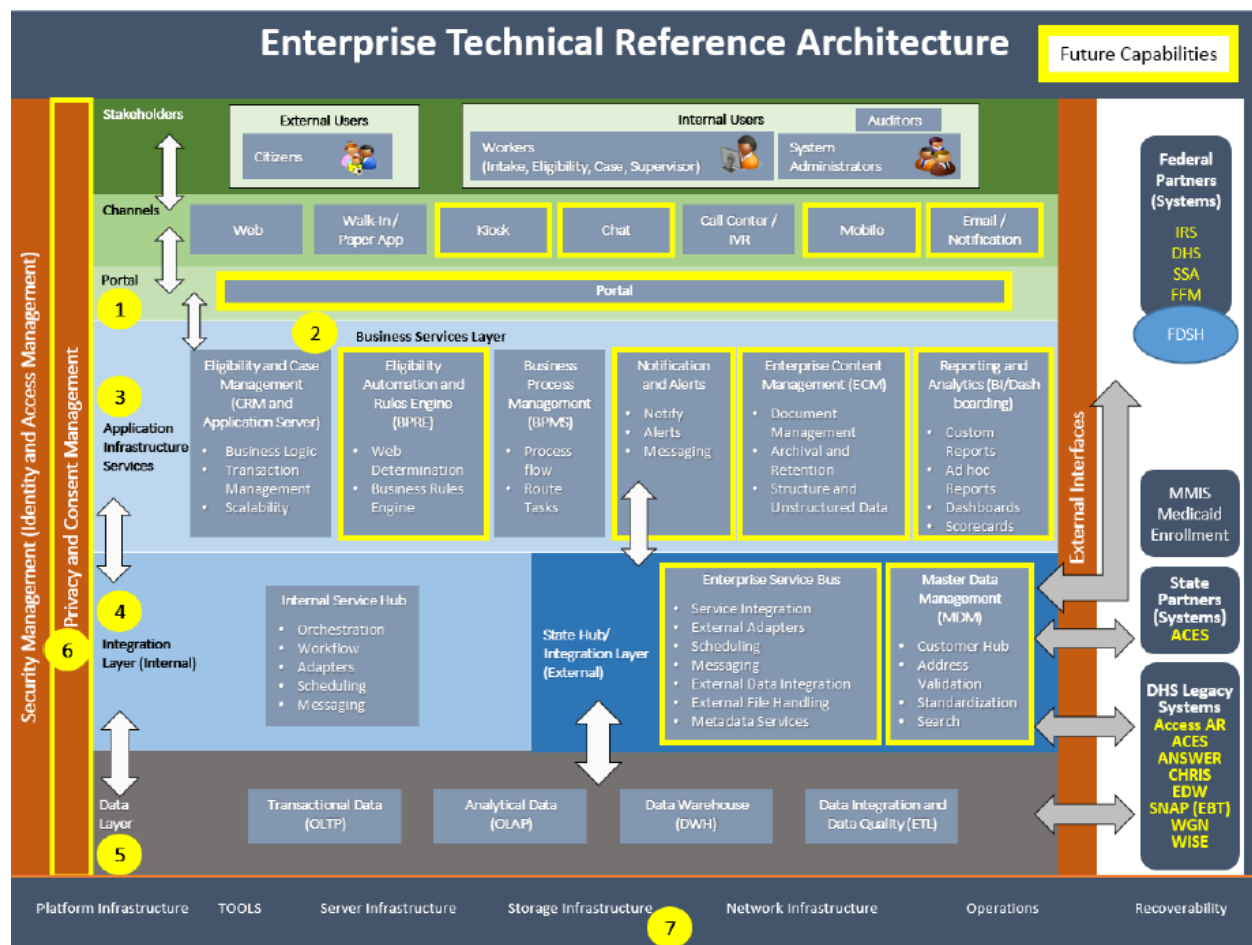


Figure 10: Enterprise Technical Reference Architecture

DHS will continue to develop its COO and future conceptual model. However, initial planning and key functional considerations for the Medicaid Enterprise will build on the foundation provided in the conceptual model, which includes Service Oriented Architecture (SOA) and implementation of modular functionality.

DHS requires the formalization of an Executive Governance Board, Information Technology Council, Data Council, and Change Council (listed in Section 4.2, Data Governance), with peer review groups, an architecture review board, and registration of technical and application service solutions into an enterprise repository. All application and technical solutions should follow established enterprise naming standards and comply with security and disclosure.

These councils and review boards will be responsible for establishing and maintaining data governance across the Enterprise.

6. Summary

DMS documents the data management processes, techniques, and products needed by the Enterprise. The DMS is used to gauge the level of data management strategy throughout the Medicaid and greater enterprise. Many key stakeholders throughout the enterprise provided valuable insight into how they believe the data management exists today and where it is heading.

Overall, all data efforts must start with governance. While data standardization is a great goal to work towards, DHS and DIS must conduct these efforts in step with the oversight and guidance that the data governance review boards envision to ensure that the data is truly meeting the needs of the business.

Data Management is complex and can be organized using some industry framework guidelines to document the different data management functions.

- Data Management as a discipline needs to be understood by leadership, technical governance, and data governance.
- DHS needs a framework that defines all the functions and associated processes necessary to manage the lifecycle of the data business needs. The framework will reduce the complexity and prevent confusion.
- DHS needs a governance based on data stewardship and shared responsibilities that include:
 - Data Governance Structure including levels of authority
 - Data Governance adoption of Industry Standards and Frameworks for Data Management
 - Data Management Functionality prioritized for 2019 – 2023
 - Compliance in the Development of CDMs and LDMs
 - Pilot IT Service Programs and Mandatory Data Management Functionality Compliance
 - Formalization of Data Service Models – Architecture, Modeling and Data Sharing Architecture – Required for any IT Service Program Software Development Life Cycle (SDLC).

The main theme regarding the DMS is the State's ability to manage data and establish data governance. DHS is currently working with DIS in establishing a data governance group with multiple levels of governance that will be led by an Executive Governance Board and include an Information Technology Council, Data Management Council, and Change Council. These review boards will ensure that data standards are being developed and applied throughout the Enterprise, which will in turn help meet the strategies of modularity, leveragability, and interoperability outlined in the TMS and CMS Seven Conditions and Standards. The ARIES project is also being leveraged to develop a data governance strategy that can be expanded across the Enterprise.

As part of the data standardization effort, an MCI and MPI are being planned that will consolidate all client data and all provider data into single data domains that will be the standard data sources of truth. DIS is leading these efforts.

Appendix A: Acronyms

This appendix will contain the acronyms used throughout the document and their corresponding definitions.

Acronym	Definition
ACES	Arkansas Client Eligibility System
ADH	Arkansas Department of Health
ADVA	Arkansas Department of Veterans Affairs
ANSWER	Arkansas Networked System for Welfare Eligibility and Reporting
APD	Advanced Planning Document
ARIES	Arkansas Integrated Eligibility System
AWS	Amazon Web Services
BA	Business Architecture
BCMS	Business Case Management System
CCO	Communications and Community Engagement
CCWIS	Comprehensive Child Welfare Information System
CDM	Conceptual Data Model
CFO	Office of Finance
CHRIS	Children's Reporting and Information System
CHRO	Office of Human Resources
CIO	Chief Information Officer
CLO	Office of Legislative and Intergovernmental Affairs
CMS	Centers for Medicare and Medicaid Services
COO	Concept of Operations
COTS	Commercial Off the Shelf
CRM	Customer Relationship Management
DAABHS	Division of Aging and Adult and Health Services
DCCECE	Division of Child Care and Early Childhood Education
DCFS	Division of Children and Family Services
DCO	Division of County Operations
DDS	Division of Developmental Disabilities Services
DFA	Department of Finance and Administration
DHS	Department of Human Services
DIS	Department of Information Services
DMS	Data Management Strategy
DMS	Division of Medical Services
DSB	Division of Services for the Blind

Acronym	Definition
DWS	Department of Workforce Services
DYS	Division of Youth Services
EDI	Electronic Data Interchange
EDW	Enterprise Data Warehouse
EEF	Eligibility and Enrollment Framework
EHR	Electronic Health Record
ERD	Entity-Relationship Diagram
ESB	Enterprise Service Bus
ETL	Extract, Transform, and Load
HHS	Health and Human Services
HIE	Health Information Exchange
HIT	Health Information Technology
HITECH	Healthy Information Technology for Economic and Clinical Health Act
IA	Information Architecture
IBM	International Business Machines
ITSM	Integrated Vendor Ticketing System
LDM	Logical Data Model
MAR	Management and Administrative Reporting
MCI	Master Client Index
MDM	Master Data Management
MECL	Medicaid Enterprise Certification Lifecycle
MECT	Medicaid Enterprise Certification Toolkit
MEELC	Medicaid Eligibility and Enrollment Life Cycle
MEET	Medicaid Eligibility and Enrollment Toolkit
MITA	Medicaid Information Technology Architecture
MMIS	Medicaid Management Information System
MPI	Master Provider Index
NTT Data	Nippon Telegraph and Telephone Data
OCC	Office of Chief Counsel
OCSE	Office of Child Support Enforcement
OP	Office of Procurement
RFP	Request for Proposal
SaaS	Software as a Service
SDLC	Systems Development Lifecycle
SOA	Service Oriented Architecture
SQL	Structured Query Language
SSO	Single Sign-On


Acronym	Definition
TA	Technical Architecture
TANF	Temporary Assistance for Needy Families
TEA	Transitional Employment Assistance
TMS	Technical Management Strategy
T-MSIS	Transformed Medicaid Statistical Information System
TSM	Technical Service Model
WIC	Women, Infants, and Children
WSDL	Web Service Definition Language
XML	Extensible Markup Language

Approvals

We, the undersigned, have reviewed and approved this document as the official MITA SS-A deliverable, including all revisions as documented in the Revision History table, above.

Business Owner or Designee	Signature	Date
<i>Mary Franklin</i>	 Recoverable Signature  X <hr/> <p>Mary Franklin Director Signed by: mary.franklin@dhs.arkansas.gov</p>	

Aaron Karjala

 Recoverable Signature

X .

Aaron Karjala
NTT Data - PMO
Signed by: 31c39546-9e69-41e6-b58a-8c67baef34cf

Jeff Dean

 Recoverable Signature

X 

Jeff Dean
CIO
Signed by: Jeff Dean