
Part II — Information Architecture

Chapter 6 — Information Architecture Summary

Introduction

The Medicaid IT Architecture (MITA) Framework 2.0 contains three interrelated parts: Business Architecture (BA), Information Architecture (IA), and Technical Architecture (TA). MITA is the combination of all the architecture models described in this document. This chapter summarizes the components of the IA and links them to the other architectural elements of MITA. The MITA IA provides the bridge between the BA and the TA. The IA provides the framework to go from the BA's information requirements to the TA's data requirements.

This chapter answers the following questions:

- What is the purpose of the Information Architecture?
- What methodologies and tools were used?
- What are the components of the Information Architecture and their interrelationships?
- What is the connection between the Information Architecture and the Business and Technical Architectures?
- How will the Information Architecture be used?
- What are the next steps in developing the Information Architecture?

The IA is only a placeholder in the MITA Framework 2.0. It provides a blueprint of what will be defined in future MITA Frameworks. The IA is one of the primary areas to be developed in the next version of the Framework, and it is currently anticipated that initial conceptual and logical data models will exist in the next version.

What Is the Purpose of the Information Architecture?

The IA identifies the major types of information used by the Medicaid enterprise. This information can be used to do the following:

- Identify new business processes to manage information
- Identify information be collected that has no use

The IA is also used to define the information requirements for currently defined business processes. (**NOTE:** These processes do not have to actually exist; their information requirements just need to be defined.)

The purpose of the IA is as follows:

- Align information requirements with business vision and direction
- Improve system effectiveness
- Facilitate growth and innovation
- Lower overall life cycle costs
- Enable interoperability and data sharing

The MITA IA provides a description of the information strategy, architecture, and data to a sufficient level that States can use it to define their data needs and enable the future business processes of their Medicaid enterprise.

This summary of Part II, Information Architecture, reviews the tools and methodologies, the IA components and their interrelationships, and the link between the IA and the BA and TA. This summary concludes with a look at the road ahead.

What Methodologies and Tools Were Used?

The IA uses complementary methodologies and tools to construct the data models that represent the Medicaid enterprise today and how it may evolve and be transformed in the future. These methodologies are borrowed from government and private sector solutions and have been adapted to the multi-State Medicaid environment.

The MITA IA is technology-, organization-, and location-neutral. MITA does not address these aspects of the implementation, because they are the responsibility of each State. It is extremely important that each State have the flexibility to address the technology, organizational, and location aspects for its specific implementation. For the IA, this will include completing the Logical Data Model to include State-unique entities and relationships and detailed attributes. States will also be responsible for deriving a physical model from their logical model.

These approaches are summarized below:

- **Data Management Strategy (DMS)** is the use of government and industry data management initiatives and best practices to provide the techniques, processes, and products to meet Medicaid's need for timely, accurate information. The DMS addresses fundamental aspects (i.e., syntax and semantic operability) to enable information-sharing opportunities and to position State Medicaid agencies to operate in an environment of global information. *The DMS provides a structure that facilitates the development of information/data that can be effectively shared across a State's Medicaid enterprise boundaries to improve mission performance.*

- **Conceptual Data Model (CDM)** is a data model used to represent the overall structure of information at a conceptual level in the Medicaid enterprise. This model will be used primarily as a communication tool between the business user and IT architect to obtain agreement on the scope and relationships of the data and to facilitate the identification of subject areas. *The CDM represents the overall logical structure of the data, which is independent of any software or data storage structure, and provides a formal representation of the data needed to run an enterprise or business activity.*
- **Logical Data Model (LDM)** is a data model used to identify the data classes and attributes needed to specify the information/data needed by a MITA business process (Part I Chapter 4), business service (Part III Chapter 4), technical function (Part III Chapter 5), or technical service (Part III Chapter 6). The model also identifies relationships among the data entities. *The LDM represents all of the data elements that are in motion in the system or shared within the Medicaid enterprise.*

The MITA Framework 2.0 IA has not selected any specific tools to manage the information products (i.e., CDM, LDM, list of data standards). This will be done in a future MITA Framework.

What Are the Components of the Information Architecture and Their Interrelationships?

Table 6-1 summarizes the results of using the methodologies described above.

Table 6-1. Summary of the Components of the MITA IA

Component	Description	Role in the IA
Part II Chapter 2 — Data Management Strategy	<p>The DMS is an enterprisewide data strategy that addresses the business flow of data across the Medicaid enterprise. It will involve architecture, modeling, standards, metadata, management, interoperability, security and privacy, access methods, quality, and performance measurement. The three key parts of the MITA DMS are as follows:</p> <ul style="list-style-type: none"> ■ Data Governance ■ Data Architecture ■ Data-Sharing Architecture 	<p>Provides a tool to enable States to transition their current information architecture to a MITA IA, a move that will ultimately result in lower cost, improved outcomes, and reduced errors for State Medicaid enterprises. The MITA DMS will also provide a roadmap for States to use as they transition their enterprise from one level of the MITA Maturity Model (MMM) to the next.</p>

Component	Description	Role in the IA
Part II Chapter 3 — Conceptual Data Model	<p>The CDM identifies subject areas and groupings of data important to the business and defines their general relationships. the CDM must have the following associated data:</p> <ul style="list-style-type: none"> ■ Entities ■ Relationships ■ Definitions ■ Domains ■ Related standards ■ Entity-Relationship (E/R) Diagram 	<p>Provides a tool to do the following:</p> <ul style="list-style-type: none"> ■ Bridge the gap between Medicaid subject matter experts and IT architects and designers ■ For an IT staff (e.g., MITA, States, or vendors) to develop a LDM (discussed in Part II Chapter 4) ■ Ensure the completeness of the business model and serve as a tool that enables the reengineering of Medicaid business processes
Part II Chapter 4 — Logical Data Model	<p>The LDM is derived from the CDM but contains more details (all entities, attributes, and relationships). The LDM will also reference any associated data standards. Data organization rules are also applied to the data model. The data modeling term used for the application of these rules is Normalization. The objective of an LDM is to have a fully attributed and normalized data model.</p> <p>The parts of the MITA LDM are as follows:</p> <ul style="list-style-type: none"> ■ Entities ■ Attributes ■ Relationships ■ Definitions ■ Domains ■ Related Standards ■ Entity-Relationship (E/R) Diagram 	<p>Provides guidance and specifics to an IT staff (e.g., States or vendor) on how to design MITA enterprise service interfaces. It is also used to develop the State's Physical Data Model that describes how data will be distributed to different processing nodes and how data will be structured to meet performance objectives in a specific physical implementation. The LDM provides a mechanism for ensuring the completeness of the business model and serves as a tool that enables the reengineering of Medicaid business processes. It is only through the use of a shared data model that the States will achieve true plug-and-play capabilities of services and interoperability.</p>
Part II Chapter 5 — Data Standards	<p>Key elements of a data standard are data element names, definitions, data types, and formatting rules. MITA data standards describe objects, features, or items that are collected, automated, or affected by the business processes of a State's Medicaid enterprise.</p> <p>MITA data standards fall into two major categories: structure data standards and vocabulary data standards.</p>	<p>Enable the sharing or exchange of information in a way that guarantees the mutual understanding of what is represented within that information.</p>

Figure 6-1 shows the interrelationships among the IA components.

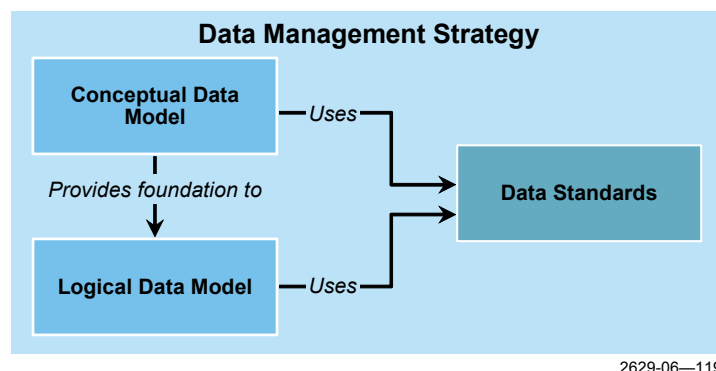


Figure 6-1. IA Components

In summary, the four IA components provide an integrated architecture that provides the standardization, data sharing, and interoperability required by the various State Medicaid enterprises.

- The DMS provides a structure that facilitates the development of information/data that can be effectively shared across a State's Medicaid enterprise boundaries to improve mission performance. The DMS addresses fundamental areas necessary to enable information-sharing opportunities and to position State Medicaid agencies to operate in an environment of global information.
- The CDM represents the overall logical structure of the data, which is independent of any software or data storage structure, and provides a formal representation of the data needed to run an enterprise or business activity.
- The LDM shows data subject areas broken down into the data classes and attributes needed for one drilled-down business process, as well as the relationships between them. The LDM identifies all of the data elements that are in motion in the system or shared within the Medicaid enterprise.
- The data standards identify the applicable standard for each MITA data element. The MITA data standards are a collection of standards applicable to the administration and operation of Medicaid enterprise data.

What Is the Connection Between the Information Architecture and the Business and Technical Architectures?

As shown in **Figure 6-2**, the IA has a mandatory relationship with both the BA and the TA. The BA describes the business processes along with data input, data output, and shared data required. The TA describes the technology enablers that are associated with different levels of maturity. The MITA IA provides the bridge between the business view of the information and the technical view of the data.



Figure 6-2. MITA Framework Architecture Relationship Diagram

Link to the Business Architecture

The Business Process Model (BPM) requires a companion data model. For example, the business process Enroll Provider lists a set of input data coming from the application (e.g., name, address, date of birth, college degrees, licenses, affiliations, and other required data). The business capability for Enroll Provider at Level 1 states that this data adheres to State requirements and is nonstandard (i.e., it does not meet national standards). At Level 3, provider enrollment data will meet national standards (as determined collectively by State Medicaid agencies in collaboration with other organizations that enroll providers, such as mental health, Indian Health Service, managed care organizations, and other payers). At Level 5, enrollment data may also contain clinical information and will be interoperational across all States.

MITA requires a data model linked to the BPM. The data model will be developed in subsequent releases of the Framework. **Figure 6-3** shows how the business process description links to data.

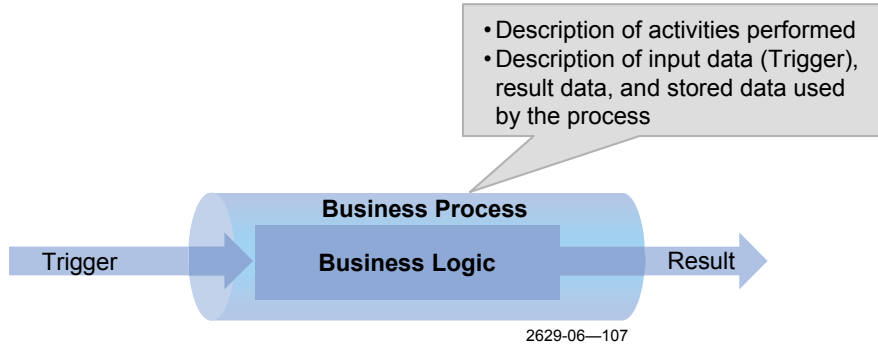


Figure 6-3. MITA Business Process and Data Links

Link to the Technical Architecture

The TA requires a companion IA. The information model is used to translate and define the information needs of the BA into the data specifications of the TA. The IA also provides the vision and guidance for information management that will be implemented in the technical functions and technical capabilities. The data portions of the service specification will be derived from the MITA LDM.

How Will the Information Architecture Be Used?

States, CMS, vendors, legislators, and others will use the IA components to plan for improvements in the State Medicaid enterprise, both in the delivery of services (i.e., to providers, beneficiaries, and citizens) and in its internal operations and exchanges of information with other external parties. **Table 6-2** summarizes how stakeholders will use the IA.

Table 6-2. Stakeholder Use of the Business Architecture

Stakeholder	How Information Architecture Is Used
State Medicaid Agency	It is anticipated that States will participate in workgroups defining and maintaining the MITA IA. States will need to extend the MITA data models to include their State-unique information and data requirements. Once a State has done its self-assessment, which will determine its To-Be business process and capability level, the IA is used to determine what information is required by the new processes. The IA also provides the detailed data specifications to be used in defining the MITA services to implement the business process. As the details of the IA are defined, they will be available for use by the States as requirements in their RFPs. Initially States may request vendors to supply data models for proposed solutions. These proposals would then be submitted for inclusion in MITA's data models in the MITA repository

Stakeholder	How Information Architecture Is Used
CMS	The CMS provides leadership in establishing the MITA guidelines and promoting them among States. Through the release of the MITA Framework documents, special workshops with States, Medicaid conference material, and working with early adopter States, CMS is creating the standards that Medicaid programs will have to meet in the future.
Vendors	The vendor community will use the MITA Framework as a reference in planning their research and development activities. They will use the IA in particular to identify the syntax, semantics, definitions, and relationships of all Medicaid data used between the Medicaid enterprise processes. This will result in vendors having a common understanding of the data's syntax, function, and semantics that will align their solution with the MITA Framework and interoperability with other State Medicaid enterprises.
Providers	Providers will play an active role in the exchange of information with States in the future. This exchange will be based on the definitions supplied by the MITA IA.
Other Payers and Other Agencies	Other are invited to review the MITA IA to learn about the Medicaid plans for transformation with MITA. CMS envisions that other agencies and data standard organizations will collaborate increasingly with Medicaid to come up with a harmonized set of data standards that will promote interoperability of all healthcare functions.

In general, MITA predicts that stakeholder roles and access to information will improve over time; that technology will eliminate most manual activities; and that State Medicaid enterprises, CMS, providers, and beneficiaries will witness a transformation of the Medicaid business over the next decade. A key factor in accomplishing this interoperability is to reach an agreement with all stakeholders on a common IA.

What Are the Next Steps in Developing the Information Architecture?

MITA Framework 2.0 delivers the starter kit for a controlled State Medicaid transformation. MITA will always be a work in progress. In the years ahead, CMS envisions significant collaboration between Federal and State authorities, vendors, and data standards organizations to develop and maintain the MITA DMS, CDM, LDM, and data standards. State participation is critical to the success of MITA. CMS envisions that teams of States will select various subsets of the information architecture, refine the activities, and standardize the information exchanges. From this activity will come data models that States and vendors will extend for State-specific data and use as a basis to develop physical data models.

The CMS MITA team will continue to support State efforts by serving as a conduit for improvements to MITA models that all States and vendors can access.

The next version of the MITA Framework will develop the initial CDM and LDM by using early adopter State data models and the Health Level 7 (HL7) Reference Information Model (RIM). These initial models will be reviewed and adopted as the first data models in the MITA IA.

In the end, MITA Framework 2.0 and the IA are about *change*, so that State Medicaid agencies can continuously improve the way they deliver services to beneficiaries and providers, account for outcomes, reward participants based on performance, and respond dynamically to requests for information.



2629-06—057

This page intentionally left blank.