
Part II — Information Architecture

Chapter 4 — Logical Data Model

Introduction

This section provides a discussion of the Medicaid IT Architecture (MITA) Logical Data Model (LDM). The MITA Framework 2.0 Information Architecture (IA) will recommend data standards, identify enabling technologies, and specify interoperable designs for data exchange. Data models represent a significant portion of the IA.

MITA Framework 2.0 does not contain an LDM. Future versions of the MITA Framework will develop an LDM. Framework 2.0 is a placeholder for the MITA LDM and describes information about the LDM.

A data model is a preliminary representation of something that serves as the plan from which the final object is to be constructed. Data models document the data (and the characteristics of that data) that is required to satisfy the needs of a State's Medicaid enterprise. Data models serve as a blueprint or plan for building information systems, and they serve as a tool that enables the reengineering of business processes and enterprise strategies. Specifically, the MITA data models will be used by Medicaid system architects and designers to develop plug-and-play and interoperable Medicaid information services.

This chapter answers the following questions:

- What is the MITA Logical Data Model?
- What are the parts of the MITA Logical Data Model?
- How is the MITA Logical Data Model developed?
- How do States use the MITA Logical Data Model?

Purpose

The MITA LDM 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, which 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.

The MITA LDM will provide the following:

- Focus on what data comprises the organization, and not on what data is needed by the processes
- Facilitate business-focused data analysis
- Aid in understanding enterprisewide business rules and business data usage, as well as uncovering existing data defects, from a 360-degree view of a business
- Provide a basis for performing data integration
- Contribute to improved data quality

Scope

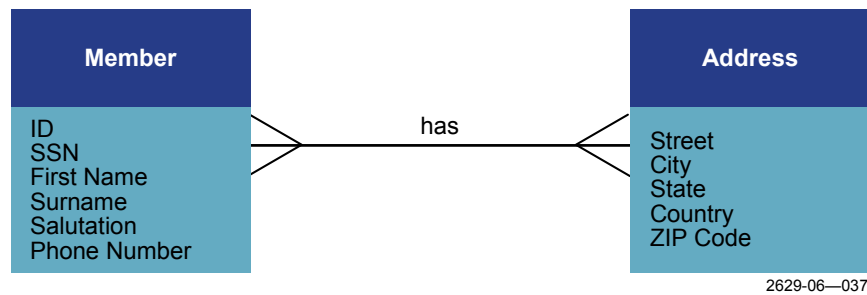
MITA Framework 2.0 only discusses the concepts related to the MITA LDM. The actual model will be developed in future versions of the Framework. The following list describes the scope of the MITA LDM:

- MITA Framework 2.0 does not contain an LDM. Future versions of the MITA Framework will evolve as the processes and services are defined in detail and will, at a minimum, contain all the data needed by the defined process and services.
- The MITA LDM will include all of the data needed for the entire Medicaid enterprise regardless of the location or systems currently performing the process.
- The MITA LDM will be extended to be compatible with the electronic health records once they are defined.
- The MITA LDM will not contain information regarding a State's unique processes and data. It is the State's responsibility to supplement the MITA LDM with its unique data requirements in the State's own LDM.

The MITA IA does not contain a physical data model. Each State will be responsible for developing their own specific physical data models based on their specific implementation.

What Is the MITA Logical Data Model?

An LDM presents a detailed version of the Conceptual Data Model (CDM), which was described in Part II Chapter 3. **Figure 4-1** represents a simple LDM.



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Figure 4-1. Simple Logical Data Model

In Figure 4-1, the Member entity has additional details specified (e.g., ID, SSN, First Name, etc.). In data modeling, these additional details about a Member are referred to as *attributes*. Attributes can be specified as mandatory or optional. In addition, an attribute can be used to locate a particular entity (in the system). Typically, a Member's data could be located by either using the ID or SSN, in which case both of these attributes would be labeled as *key attributes*. The LDM will also reference any associated data standards. Data organization rules are also applied to the data model in order to do the following:

- Minimize duplication
- Ensure precise capture of business logic
- Prevent loss of information
- Aid in model management

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.

What Are the Parts of the MITA Logical Data Model?

The parts of the MITA LDM are as follows:

- **Entities.** An entity represents a person, place, thing, organization, event, or concept of interest to the State and CMS. It is an object (or concept) about which States store information. In general, an entity must have the following characteristics:
 - It must have one or more attributes that distinguish between individual occurrences of that entity. These are the key attributes.
 - It must have at least one relationship to another entity.
- **Attributes.** An attribute is an item of data, a fact, or a single piece of information about an entity (e.g., the attribute Beneficiary Birth Date provides information about the entity Beneficiary).

- **Relationships.** Relationships depict the business rules/requirements by which two entities are joined. The interaction between the entities joined by the relationship can be traced in either direction.
- **Definitions.** Definitions must be clear, precise, and unambiguous. They must identify and distinguish the item being defined from any other actual or possible item. Examples or exclusions may be used as needed to improve clarity.
- **Domains.** The domain to be applied to the entity or attribute must be specified.
- **Related Standards.** Any standards related to the entity or attribute must be defined.
- **Entity-Relationship (E/R) Diagram.** E/R diagramming is the method by which a formal, graphical depiction of the model is produced.

How Is the MITA Logical Data Model Developed?

The process to be used for developing the MITA LDM is described in the following steps:

- Develop an LDM based on the MITA CDM, a subset of early adopter data models and HL7's Reference Information Model (RIM).
- Validate the harmonized LDM against the business process requirements.
- Distribute the draft LDM to early adopters for review.
- Update the model with comments. At this point, the LDM only represents the current state of data.
- Update the model to include all Medicaid enterprise data (current and future) to develop a 360-degree view of the information domain.
- Submit the model for second review to early adopters and then to all States.
- Submit the updated model to MITA for adoption as the standard MITA LDM.

In parallel with this process, the MITA LDM will be developed as part of an HL7 test bed ("sandbox") and, when approved, will be submitted by MITA as an HL7 standard.

Once the MITA repository has been deployed, the MITA LDM will be located on it.

How Do States Use the MITA Logical Data Model?

The MITA LDM should be used as a reference document that identifies the data and relationships used by a MITA-compliant Medicaid enterprise. It can also be used as a requirements document specifying the details for data used by the services of the Medicaid enterprise. The document in this role can be used as a source for a State's APDs and RFPs. The LDM provides a tool for ensuring the completeness of the business model and serves as a tool that enables the reengineering of Medicaid business processes.

States will need to extend the MITA LDM with their unique data requirements. States will also use the MITA LDM to develop their State-specific physical data model.

Conclusion

The MITA LDM helps to ensure that implementations are interoperable and plug-and-play capable. With participation by States, partners, and other stakeholders, the MITA LDM will become a tool to enable interoperability and data sharing.

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