
Part II - INFORMATION ARCHITECTURE

Chapter 3 - CONCEPTUAL DATA MODEL



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Introduction

The Medicaid IT Architecture (MITA) Framework Information Architecture (IA) recommends data standards and identifies enabling technologies and interoperable designs for data exchange. The Conceptual Data Model (CDM) is a blueprint or conceptual plan for building an information system's IA. 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. The topics covered in this chapter include:

- ❖ Conceptual Data Model
- ❖ Components of the Conceptual Data Model
- ❖ Developing the Conceptual Data Model
- ❖ Using the Conceptual Data Model

Purpose

The CDM is a tool to bridge the knowledge gap between Medicaid subject matter experts, IT architects, and designers. The model depicts the major business information objects in their relationships to each other, using business terminology. In addition, the CDM provides the basis for IT staff (e.g., States or vendors) to develop a Logical Data Model (LDM) - reviewed in Part II, Chapter 4, Logical Data Model. It also provides an initial 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, States will achieve the true plug-and-play capabilities of services and interoperability.

Scope

The following topics provide an overview of the scope as it pertains to the CDM:

- ❖ **Identified Data** – The CDM includes high-level data that the defined business process and services require for the MITA Business Architecture artifacts.
- ❖ **Common State Data** – The CDM includes all high-level data common to all States, regardless of location or systems currently performing the process, and the relationships of these common subject areas.
- ❖ **Electronic Health Record (EHR)** – MITA will extend the CDM for compatibility to EHR requirements.
- ❖ **Unique State Specifications** – A state is responsible for supplementing the CDM with its unique high-level data requirements in the state's own CDM. The MITA CDM will not contain information regarding state-specific processes and data.

Conceptual Data Model

The CDM is a representation of initial high-level data that serves as the plan from which architects and designers construct the more detailed Logical Data Model (LDM). The CDM contains the following information:

- ❖ Table including:
 - 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
 - Superclasses
 - Abstract class that represents the generalized grouping of each class
 - Crosswalk of classes to superclasses

Table 3-1 presents a sample draft of a partial CDM table for the Determine Provider Eligibility business process that serves as a base for the sample LDM in Part II, Chapter 4, Logical Data Model, Figure 4-1.

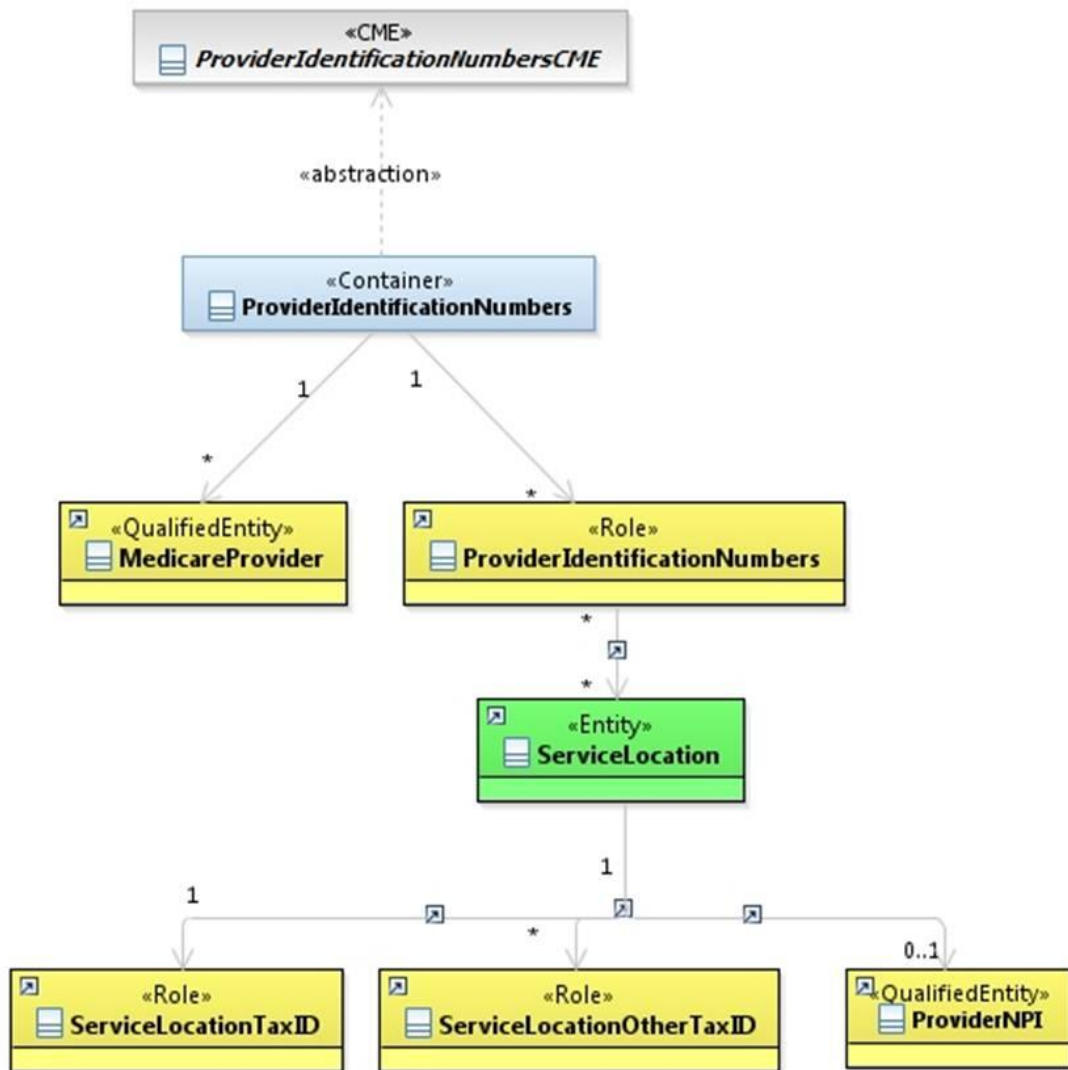
Table 3-1. Sample Draft CDM Partial Table

Determine Provider Eligibility Superclasses						
<i>Provider Eligibility CME*</i>	<i>Provider Identification Numbers CME</i>	<i>Provider CME</i>	<i>Provider Coverage CME</i>	<i>Provider Insurance Coverage CME</i>	<i>Provider Communication CME</i>	<i>Provider Physical Equipment CME</i>
Provider Type	Medicare Provider	Organization	Provider Hospital Privilege	Provider Insurance Coverage	Provider Language	Bed Data
Program Information	Provider Identification Numbers	Person	Organization	Insurance Company	Language Communication	Ambulance
Provider Specialty	Service Location	Healthcare Provider	Administrative Contact		Service Location Contact Information	Aircraft
Service Location	Service Location Tax ID	Provider NPI	Jurisdiction		Service Location Phone Coverage	
PCP Detail	Service Location Other Tax ID	Individual Billing	Service Location			
Service Location Patient Type	Provider NPI	Individual Rendering	Service Location Service			
Territorial Authority		Atypical Provider	Service Category			
Organization		Institutional Provider				
		Pharmacy				
		Supplier				

***Note:** The modeling term “CME” is a Common Message Element, a.k.a. superclass or generalized class.

Below is a sample CDM developed from one superclass, Provider Identification Numbers CME.

Figure 3-1 is a Unified Modeling Language (UML) sample CDM of the Provider Identification Numbers.



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Figure 3-1. Sample UML CDM

Components of the Conceptual Data Model

In the MITA Framework, the CDM contains the following associated data:

- ❖ **Entities** – An entity (class) represents a person, place, thing, organization, event, or concept of interest to the state and the Centers for Medicare & Medicaid Services (CMS). It is an object (or concept) a state uses to store information.
- ❖ **Definitions** – Definitions should be clear, precise, and unambiguous.
- ❖ **Source** – The MITA team analyzed other general and Health Care Industry models, such as the National Information Exchange Model (NIEM), Federal Health Information Model, (FHIM), Health Level Seven International (HL7), Veterans Health Information Model (VHIM), and Council for Affordable Quality Healthcare (CAQH) Universal Provider Datasource (UPD) for potential harmonization.

Developing the Conceptual Data Model

Key activities for CDM development include the following:

- ❖ **Collaboration** – Participating in design discussions to review and receive input from stakeholders and industry organizations on desired or expected outcomes and areas of concern.
- ❖ **Definition** – Defining of parameters and scope of the conceptual data.
- ❖ **Model** – Creating the visual representation of the high-level data passing from external entities as well as between business processes within each business area.
- ❖ **Use** – Expanding CDM abstractions, visual representations, classes, and descriptions to include attribute data types and vocabulary necessary to develop a more detailed LDM.

Using the Conceptual Data Model

The CDM is a reference document that provides a high-level overview of the data and relationships used by the State Medicaid Enterprise. The CDM is a tool for ensuring the completeness of the information architecture work products that support the MITA business processes. The SMA will extend the conceptual data with their unique conceptual data requirements. The SMA should identify any components and solutions that have high applicability for reuse by other States. Further definition of the artifacts including the System Development Life Cycle (SDLC) deliverables, business requirements, process flows, conceptual and logical data models, and how to provide them to the national repository will follow in subsequent guidance.