

**Information Technology Policy
Commonwealth of Pennsylvania
Governor's Office of Administration/Office for Information Technology**

ITP Number:	ITP-INF003	
ITP Title:	Data Modeling Standards	
Issued by:	Deputy Secretary for Information Technology	
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Domain:	Information	
Discipline:	Data Administration	
Technology Area:	Data Modeling	
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11/18/2010	ITP Refresh	

Abstract:

The purpose of this Information Technology Policy (ITP) is to establish enterprise-wide standards for data modeling practices and supporting software, and to promote their effective usage for application development projects. Establishing data modeling standards will provide guidance to agencies as they plan for new application development projects, or make significant investments in existing applications. This ITP documents the policy to be followed by Commonwealth of Pennsylvania application development organizations in the preparation and maintenance of data models describing the data, and data relationships, supporting Commonwealth applications. A summary of data modeling best practices, and basic guidelines on data modeling are provided in the accompanying Data Modeling Best Practice Standards and Data Modeling Basics documents. The Data Modeling Product Standards document itemizes recommended software products that support the data modeling function, in accordance with the Commonwealth [Technology Life Cycle Classification](#) framework.

Policy:

All new application development projects will be required to use one of the current standard Data Modeling Software products as defined in Data Modeling Product Standards. Likewise, all new application development projects are required to adhere to Data Modeling Best Practice Standards. Existing production applications are encouraged to adopt these standards as well. All IT projects related to application development or database design will be subject to review for compliance with this standard.

The practice of Data Modeling helps with the identification of business requirements and the resolution of problems earlier in the development cycle, promotes effective communication of design ideas to the teams during the discovery and design phases of the process, and provides a strong foundation for future changes to the data.

The main objectives of this policy are to:

- Promote and support the use of Data Administration and Data Modeling within the Commonwealth.
- Increase data sharing opportunities across agencies, reduce data redundancy, and improve application interoperability.
- Increase opportunities for consolidation of like data and business processes.
- Standardize on Data Modeling Software tools that best meet current and future enterprise requirements, considering traditional, legacy, and web based application development efforts.
- Leverage and reuse existing Data Models where appropriate.
- Build a foundation to help with the integration of information silos.

Benefits of Data Modeling

Data Models are a valuable source of information, providing a graphical depiction of data at different levels of abstraction. For example, the owner of a business process is interested in the conceptual view of data – the conceptual model. The designer of the data is interested in the logical view – the logical model (sometimes referred to as the transformation layer). The data administrator is typically concerned with this model. The database administrator is typically more concerned with the physical model and the physical implementation of a relational database. The table below presents a summary of the various levels of models that may be developed to define and support the business, and the perspectives from which these models are used in the development process.

Model Name	Perspective	Model Description	Type of Model	Entity	Type of Relation
Business Model	Business Owner	Semantic Model	Conceptual	Business Entity	Business
System Model	Designer	Logical Data Model	Logical	Data Entity	Data
Technology Model	Data Database Administrator	Data Design	Physical	Table/Segments	Key/Pointer
Detailed Representation	Developer	Data Definitions		Field	Address

Model Types:

There are three basic types of data models; conceptual, logical, and physical.

Conceptual data models - These models, sometimes called domain models, are typically used to explore domain concepts, and to identify underlying business rules, with project stakeholders. Conceptual data models are often created as the precursor to Logical Data Models or as alternatives to Logical Data Models.

Logical data models (LDMs) - Logical Data Models are used to further explore the domain concepts, and their relationships. This could be done for the scope of a single project or for your entire enterprise. Logical Data Models depict the logical entity types, typically referred to simply as entity types, the data attributes describing those entities, and the relationships, and relationship cardinalities, between the entities.

Physical data models (PDMs) - Physical Data Models are used to design the internal schema of a database, depicting the data tables (derived from the logical data entities), the data columns of those tables (derived from the entity attributes), and the relationships between the tables (derived from the entity relationships).

A brief primer on the practice of data modeling and the function of each of the above model types is presented in the supplemental document: Data Modeling Basics. Please refer to this document for further details on each model type, and explanations of steps used in the process. Whenever new systems are developed, or existing systems enhanced, these modeling steps are to be followed; and corresponding models are to be created at the appropriate stages of discovery and design. Subsequently, models are to be managed effectively to promote reuse.

Data Modeling Best Practice Standards Supported:

A list of Data Modeling Best Practice Standards has been compiled by the Information Domain Team. These standards are presented in the Data Modeling Best Practice Standards document, have applicability across all current standard products, and are required to be used for all application development efforts.

A data modeling methodology that will become part of the System Development Methodology is currently being developed to provide additional guidance to agencies.

General:

This ITP applies to all departments, boards, commissions and councils under the governor’s jurisdiction. Agencies not under the governor’s jurisdiction are strongly encouraged to follow this policy to ensure they develop and implement software modeling tools that facilitate enterprise-wide interoperability and standardization.

The Information domain team was engaged to set Data Modeling Standards and Best Practice Standards for the Commonwealth. The domain team evaluated the Data Modeling Software tools currently deployed within the Commonwealth, considering such factors as the projected market longevity; existing platform, technical and overall vendor support; performance and management functionality; and other relevant business and technical criteria to support the recommendation.

Refresh Schedule:

All standards identified in this ITP are subject to periodic review and possible revision, or upon request by the Enterprise Architecture Standards Committee (EASC).

Exemption from This Policy:

In the event an agency chooses to seek an exemption, for reasons such as the need to comply with requirements for a federally mandated system, a request for waiver may be submitted via the Community of Practice Procurement and Architectural Review (COPPAR) process. Requests are to be entered into the COPPAR Tool located at <http://coppa.ia.pa.gov/>. Agency CIO approval is required. Contact your agency CoP Planner for further details or assistance.

Questions:

Questions regarding this policy are to be directed to RA-ITCentral@pa.gov.

Policy Supplements:

[STD-INFO03A](#) - Data Modeling Product Standards

[STD-INFO03B](#) - Data Modeling Basics

[BPD-INFO03C](#) - Data Modeling Best Practices

[BPD-INFO03D](#) - Core Citizen Data Model and Data Elements