Standard ID:	**IN-DAT-003**
Title:	**Data Modeling**
Domain:	**Information**
Discipline:	**Modeling**
Effective Date: Revision no.: Original date:	**5/15/2013** **2** **11/10/2011**

I. Authority, Applicability and Purpose

A. Authority – Title 29 Chapter 90C Delaware Code, §9004C – General Powers, duties and functions of DTI "2) Create, implement and enforce statewide and agency technology solutions, policies, standards and guidelines, including as recommended by the Technology Investment Council on an ongoing basis and the CIO.

B. Applicability – Applies to all State of Delaware communications and computing resources. DTI is an Executive Branch Agency and has no authority over the customers in Legislative and Judicial Branches, as well as School Districts, and other Federal and Local Government entities that use these resources. However, all users, including these entities, must agree to abide by all policies, standards promulgated by DTI as a condition of funding, access and continued use of these resources.

C. Purpose – Due to the importance of the information managed by the State's technology solutions, it is necessary to establish common guidelines for Data Modeling. This document provides approaches and best practices for Data Modeling.

II. Scope

A. State of Delaware – All communications and computing resources involved with data owned by the State of Delaware

B. Areas Covered – This standard covers all data and data modeling technologies whether they were developed in-house or purchased as a complete solution.

C. Environments – This standard addresses all environments that contain State of Delaware data, managed by State of Delaware Data Stewards.

III. Process

A. Adoption – These standards have been adopted by the Department of Technology and Information (DTI) through the Technology and Architecture Standards Committee (TASC) and are applicable to all Information Technology use throughout the state of Delaware.

B. Revision – Technology is constantly evolving; therefore the standards will need to be regularly reviewed. It is the intent of the TASC to review this standard annually. The TASC is open to suggestions and comments from knowledgeable individuals within the state, although we ask that they be channeled through your Information Resource Manager (IRM).

C. Contractors – Contractors or other third parties are required to comply with these standards when proposing technology solutions to DTI or other state entities. Failure to do so could result in rejection by the Delaware Technology Investment Council. For further guidance, or to seek review of a component that is not rated below, contact the TASC at dti_tasc@delaware.gov.

D. Implementation responsibility – DTI and/or the organization's technical staff will implement this standard during the course of normal business activities, including business case review, architectural review, project execution and the design, development, or support of systems.

E. Enforcement – DTI will enforce this standard during the course of normal business activities, including business case and architectural review of proposed projects and during the design, development, or support of systems. This standard may also be enforced by others during the course of their normal business activities, including audits and design reviews.

F. Contact us – Any questions or comments should be directed to dti_tasc@delaware.gov.

IV. Definitions/Declarations

A. Definitions

1. **Attribute –** An attribute is another name for a column in a database schema.
2. **Data Dictionary** – It contains the non-technical (business terminology) definitions of fields.
3. **Data Modeling** – Method used to define and analyze data and the requirements needed to support the business process. The final product will be a true and current representation of the production database. The Data Model is a living document and will change in response to the business. The Data Model also, defines the structure and relationship between the data elements. The three main types of Data Models are Conceptual Data Model, Logical Data Model and Physical Data Model. The preferred sequence for doing Data Modeling is:
   - ✓ Conceptual Data Model
   - ✓ Logical Data Model
   - ✓ Physical Data Model

   - **Conceptual Data Model** – This Data Model describes data requirements from a business point of view without the burden of technical details. Models at this level are about understanding the data requirements of the business.

   - **Logical Data Model** – This Data Model refines the conceptual models by documenting the entities, their attributes and their relationships. These models are technology oriented designs, although they are database-independent.

- **Physical Data Model** – This Data Model represents the detailed specification of what is physically implemented using specific technology. Physical design considerations include performance, size and growth, availability, recovery from failure, and use of specific technology features.

4. **Metadata** – Data that describes the data. A Metadata record consists of a set of elements that describe the characteristics of an information asset or resource. The more detailed the metadata (especially the business explanations) the better it will be for system implementation, usage and maintenance.

   Consistency in the metadata is necessary to keep information organized. Consistent terminology helps communicate metadata, and it helps applications process the metadata. The Categories of Metadata are:

   - **Analytical** - Analytic Metadata describes the derivations and display of reporting environments. Primary sources of analytic metadata include OLAP and reporting packages metadata environments.
   - **Business** - This category of metadata defines in a business context the information that the data provides. Examples of business metadata are business attribute names, business attribute definitions, business attribute valid values, data quality rules, data models and business rules. Primary sources of business metadata include logical data models and data quality.
   - **Navigational** – Navigational metadata describes the data linkage and data movement within the environments. Examples of navigational metadata are derived fields, business hierarchies, source columns & fields, transformations, data quality checkpoints, target columns & fields and source & target locations.
   - **Operational –** Operational metadata describes the data integration applications and jobs through statistics giving a full technical view of the environment. Examples of Operational metadata include jobs statistics and data quality check results. Primary sources of Operational metadata include data integration job logs and data quality checks.
   - **Structural** - Structural metadata provides the description of data within the IT infrastructure For Example, where the data is located, the names under which it can be accessed, what kinds of data types are being stored, data lineage and data integration within Client's IT environment. Examples for Structural Metadata are:
     - Databases / File groups
     - Tables / Views / Files
     - Keys
     - Indices
     - Columns/fields
     - Source columns/fields
     - Target columns/fields

B. Declarations

Data Model Tool must:

- Be able to export the metadata to common format (XML, Text and Microsoft Excel) which would help in repository sharing.
- Have a central repository.
- Be able to search objects (tables, columns, constraints) across the entire model.
- Generate code for multiple types of databases.
- Able to import or export data models created or consumed by other data model tools.
- Provide the ability to re-use objects across models and automatically create linkage for object use.
- Be able to provide impact analysis within and across models.
- Provide the ability to create connections, mappings, and dependencies between models.
- Be able to export data models to a common viewable format where users can see the data model without the Data Model tool.
- Have an entry in the central repository that consists of its model type, name, definition, and applicable characteristics such as a data type for database columns.

Data Model must:

- At minimum, a data model or data dictionary must be submitted to DTI once the application design has been finalized or prior to production implementation of the application. DTI will preserve the data model in a central repository and apply the data model to the enterprise data model based on the fit. The data model or data dictionary must be submitted to DTI in either PowerDesigner, Erwin, Excel in a single worksheet with each item listed below in a separate column.The data model or data dictionary submitted to DTI must include at least the following items:
    - Field Name
    - Description
    - Field Type/Data Type
    - Length

- Data dictionaries or data models for vendor solutions must contain information about the core entities,tables or fields that house state-owned business data. To protect the proprietary information of vendor solutions the information submitted only needs to contain the core objects that house state-owned business data. Examples of core state-owned business data are citizen, address, company, etc. The submitted data dictionary or data model does not need to include objects for the data that is not owned by the state. Examples of non-state data are the objects that exist to maintain the database or control the inner workings of the application. To further protect the proprietary information about the database, the data dictionary or data model is not expected to have the actual physical object names.

- The data models/dictionaries that are submitted to DTI via the Architecture Review Board (ARB) process are stored in a secure repository where only the agency who is the steward of the data and the DTI Data Management Team can access the information for purposes of data governance. Contents of the data model or data dictionaries may be shared with the Chief Security Officer for data security purposes. The data models/dictionaries will only be shared with others if approved by the data steward.

V. Definition of Ratings

Individual components within a Standard will be rated in one of the following categories. **COMPONENT RATING**	**USAGE NOTES**
• **STANDARD** – DTI offers internal support and/or has arranged for external vendor support as well (where applicable). DTI believes the component is robust and solidly positioned in its product life cycle.	These components can be used without explicit DTI approval for both **new projects** and **enhancement** of existing systems.
• **DECLINING** – Deprecated – DTI considers the component to be a likely candidate to have support discontinued in the near future. A deprecated element is one becoming invalid or obsolete.	Via the State's waiver process, these components must be explicitly approved by DTI for **all projects**. They must not be used for **minor enhancement** and **system maintenance** without explicit DTI approval via the State's waiver process.
• **DISALLOWED** – DTI declares the component to be unacceptable for use and will actively intervene to disallow its use when discovered.	No waiver requests for new solutions with this component rating will be considered.

A. Applicability of Ratings – The ratings and usage notes are intended to encourage technology decisions to move toward components that enjoy the full support of DTI. However, acknowledging that mass replacement of lower rated components is not feasible, DTI will allow continued maintenance, enhancement, and possibly limited new development using these components. In making such determinations, DTI may require that the requestor demonstrate that they have adequate support arrangements in place.

B. Missing Components – No conclusions should be inferred if a specific component is not listed. Instead, contact the TASC to obtain further information.

VI. Component Assessments

All implementations of the following components much adhere to the State of Delaware's standards and policies. Of particular note are State of Delaware Information Security Policy, State of Delaware Data Classification Policy and Retention Schedules.

#	Component	Rating	Comments
1			
a)	Sybase PowerDesigner	Standard	
b)	CA ERwin	Standard	
c)	Visio	Disallowed	Not for use for official ARB submitted data model. Use for other purposes permitted.